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The Therapeutic Expression of Anger: Emotionally Expressive Writing and Exposure

Cory James Patrick
University of Wisconsin-Milwaukee

THE THERAPEUTIC EXPRESSION OF ANGER:

EMOTIONALLY EXPRESSIVE WRITING AND EXPOSURE

by

Cory James Patrick

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Abstract
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Cory James Patrick

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Under the Supervision of Shawn P. Cahill, PhD.

The following reports on multiple studies in a line of research examining the use of emotionally expressive writing as a means of altering the experiences of state anger and negative affect. This line of research has also sought to develop an iterative economic version of the prisoner's dilemma game as a behavioral measure of changes in state anger. Preliminary studies demonstrated evidence that expressive writing about an angry memory does trigger initial activations of state anger and negative affect but that subsequent repeated writing does lead to reductions in activation of state anger and negative affect. The current study sought to expand upon those prior findings and more adequately test whether or not such reductions in the activation of state anger and negative affect can be attributed to habituation as a mechanism of change. The differential effects of different schedules of writing/exposure were also investigated. The current study reports data from 100 student participants. All participants participated in three study sessions scheduled two to three days apart. Participants were randomly assigned to one of four conditions: A Spaced Exposure Condition in which participants wrote about an angry memory once on each of three participation days. A Massed Exposure with Long Retention condition in which participants wrote twice about an angry memory on the first day, did not write the second day, and wrote again about an angry memory the third day. A Massed Exposure with Brief Retention condition in which

participants did not write the first day, wrote twice about an angry memory the second day, and wrote once about an angry memory the final day. And a Neutral Writing Control group in which participants wrote about different emotionally neutral memories on each of the first two days and an angry memory on the final day. All participants played the economic prisoner's dilemma game on the first and last day of participation to examine differences in competitive behavior that may correlate with amount of expressive writing and levels of state anger and negative affect. The results found that expressive writing about an angry memory was consistently effective in triggering an acute increase in state anger and negative affect. There was some evidence of both within session and between session reductions of state anger and negative affect following repeated writing about an angry memory; however, these effects were tenuous and not able to be dissociated from uncontrolled factors occurring with the passage of time. Therefore, the results were unable to demonstrate evidence for habituation as a mechanism of change. The results are not able to provide support for any differential advantage to spaced or massed exposure sessions. The study does not support the use of the economic version of prisoner's dilemma game as a behavioral measure of changes in state anger. The limitations of the study and potential future empirical directions are discussed.

Dedicated to my family and friends for all their support and love that have helped me in accomplishing my dreams. I especially wish to acknowledge my father, James Gerald Patrick, who taught me about honesty, honor, caring for people, and most importantly not looking the other way.

I additionally acknowledge several people without whom this study and dissertation would not be possible. First and foremost, I offer my gratitude to my outstanding project coordinator Alison M. Bayne. She did a wondrous and masterful job managing the complex day to day operation of this study and keeping everything on track. This study would have never been finished without her and her amazing work. My mentor Shawn Cahill for helping me develop these ideas and for helping me grow and develop as a psychologist and as a man. My fellow graduate students who helped me along the way and all the research assistants who collected data on our various projects, thank you.

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General Introduction:

The current study was designed to investigate the utility of expressive writing in managing the emotional experience of anger, through providing a potential form of exposure, and whether or not expressive writing has the potential to be used as a therapeutic intervention to address problematic anger. This study also sought to investigate the mechanistic nature of expressive writing as a potential intervention through manipulating the temporal pattern of writing sessions. Specifically, the goal was to test whether massed or spaced writing sessions are more effective in reducing emotional responding in manner similar to that typically seen with massed and spaced exposure to fear evoking stimuli. A fourth factor investigated was whether or not an economic iterative version of the Prisoner's Dilemma Game can be utilized as an effective behavioral dependent measure of anger through the display of competitive behavior as an analog to aggression and anger.

Consistent with the preceding description, the following provides literature reviews and discussions of the following topics: a) anger (as an emotional response), b) current theoretical and clinical models of anger and treatment, c) exposure as a treatment technique, d) the possibility of enhancing treatment outcomes associated with exposure, e) expressive writing as a method of moderating emotional responses, f) the possible use of expressive writing as a form of therapeutic exposure to anger, g) the need for a behavioral dependent measure of anger and aggression, h) the results of pilot studies, i) the aims and methods of the current study, j) results of the current study, k) discussion of results and limitations.

Anger:

The Emotion and Its Consequences:

Anger is one of the most basic emotions that people frequently encounter and attempt to manage or effectively express. Anger can motivate behavior and be useful in the pursuit of goals or the exercise of self-protection and assertion. The experience of anger can also be detrimental to the extent that it manifests in socially ineffective and harmful behavior. Anger can result in aggressive, destructive, or maladaptive behavior that can severely damage important social relationships, interfere with goal attainment, and lead to a wide variety of undesirable consequences.

Anger? Conceptually, one of the first tasks is to address what is meant when the term anger is used. Anger is an experiential state (emotional, physiological, and cognitive) that is related to motivation and behavioral responses but is also separable from behavior (Deffenbacher, 2011). Therefore, there are important distinctions to make between anger, aggression, and hostility. The three terms certainly overlap; however, these terms are also distinguishable in important ways.

Anger can be defined as an emotion and as such a subjective experiential state (Del Vecchio & O'Leary, 2004; Lohr, Olatunji, Baumeister, & Bushman, 2007). As described in greater detail later, anger is associated with several physiological changes, cognitive processes, and behaviors; however, anger itself is the self-reported emotional experience that is correlated with those other factors.

Hostility is perhaps best defined as an attitude that potentially directs an individual toward aggressive behavior (Del Vecchio & O'Leary, 2004; Lohr, Olatunji, Baumeister, & Bushman, 2007). Hostility can be thought of as potentially resulting from

anger but is a separable construct. Anger does not necessarily lead to hostility and an attitude of hostility does not necessarily require the preexisting emotional state of anger (Del Vecchio & O'Leary, 2004; Lohr, Olatunji, Baumeister, & Bushman, 2007). Perhaps hostility is best thought of as a negative attitude toward another that is associated with a readiness to aggress.

Aggression is observable behavior with the intention to cause harm (Del Vecchio & O'Leary, 2004; Lohr, Olatunji, Baumeister, & Bushman, 2007). Anger does not always lead to aggression. In fact data suggests that the majority of angry episodes experienced by people do not actually result in aggressive acts. Some research indicates that only 10% of angry episodes resulted in a physically aggressive actions (Del Vecchio & O'Leary, 2004). Other reports are even lower with as few as 2% to 5% of anger episodes being associated with aggressive behavior (Digiuseppe, Tafrate, & Eckhardt, 1994). Additionally hostility does not always result in aggression either. In fact, social psychology theories of aggression often distinguish between hostile and instrumental aggression. Hostile Aggression is typically defined as stemming from feelings of anger and aimed at inflicting pain. By contrast, instrumental aggression occurs as a means to attain a goal. Thus, there is an intention to hurt another person, but it takes place as a means to a goal, not out of anger or to cause pain (Aronson, Wilson, & Akert, 2010). One consequence of this is that a therapeutic intervention may successfully reduce aggression or hostility while leaving unresolved feelings of anger, which may continue have undesired consequences including emotional stress (Del Vecchio & O'Leary, 2004).

It is important to note that aggressive and destructive behaviors are not the only problematic consequences related to excessive or poorly managed anger. The complex

consequences that can arise from behavior related to anger can include behaviors such as compliance by others, which the angry person may likely perceive as positive in the short-term but may produce undesirable long-term consequences (Del Vecchio & O'Leary, 2004). For example, an angry person might be quite successful in getting others such as friends or romantic patterns to serve their needs and avoid annoying behaviors on a day to day basis (though the use of behaviors such as facial expressions, being dismissive, and admonishing); however, the longer term consequence of such behavior might be the deterioration of those relationships, contributing to a pattern of failed relationships. Another example to consider is the employee who is frequently harsh, short tempered, or just negative and disagreeable toward their co-workers who may find themselves out of work or missing out on potential promotions. Thus, even in the absence of intentionally aggressive or violent behavior, poorly managed anger can undermine important relationships and interfere with goal attainment and quality of life.

Anger can also have other insidious consequences, such as compromising health. The experience of anger, similar to that of anxiety, results in physiological changes such as increased blood pressure and heart rate as well as associated physical responses including dry mouth, rapid breathing, and muscle tension. (Brondolo, DiGiuseppe, & Tafrate,1997; Del Vecchio & O'Leary, 2004; Lohr, Olatunji, Baumeister, Bushman, 2007). Anger, especially the suppression of anger, has been associated with increased pain, compromised immune system functioning, vulnerability to illness, hypertension, and cardiovascular disease (Digiuseppe, Tafrate, & Eckhardt, 1994; Suinn, 2001).

Although such behaviors and consequences may not be the most frequent outcomes associated with the experience of anger, an intense anger response can lead to

violent, destructive, and otherwise dangerous behavior. Anger has been linked to various forms of aggression including spousal abuse, child abuse, road rage, and violent crimes (Del Vecchio & O'Leary, 2004). For example, it has been found that arguments are reported as having preceded physical aggression in couples 67% of the time (Dobash & Dobash, 1984) and in a separate study, 100% of husbands and 67% of wives, who engaged in acts of physical aggression, reported that such aggression happened within the context of a verbal argument (Cascardi, Vivian, & Meyer, 1991). A related finding that supports the role of anger in domestic violence is that men in physically aggressive relationships have been found to display significantly higher anger scores (Boyle, & Vivian, 1996).

Anger has also been related to aggression toward children and child abuse. Mothers reported using physical discipline most frequently when the child's behavior lead to anger on the part of the mother (Peterson, Ewigmann, & Vandiver, 1994). Additionally, parental anger is significantly associated with risk of perpetrating child abuse (Kolko, 1996; Rodriguez, & Green, 1997). Another line of research investigating the consequences of anger has found that high anger drivers report more frequent accidents, more aggressive driving, and more intense and more frequent anger experiences (Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000; Deffenbacher, Lynch, Filetti, Dahlen, & Oetting, 2003).

In its most extreme form, anger can be linked to severe acts of violence against others. The U.S. Department of Justice (2000) reported that 29% of murders are preceded by an argument or disagreement. Thus, multiple sources of evidence indicate that anger frequently precedes a variety of aggressive and violent acts.

It is however important to note that aggression and violence do not always result from anger, such is the case in instrumental aggression. One also cannot assume that arguments or disagreements always include the presence of anger as an emotional experience. However, in cases where violence is preceded by disagreement, it is reasonable and intuitive to think that anger was a motivating factor in violent behavior. Even if anger was not present at the initiation, it is likely that anger entered into the disagreement at some point, and that the emotion of anger then contributed to a violent response.

Anger is also frequently a source of concern related to mental health and functioning and thus a target of therapeutic intervention. In a national survey, experienced psychologists and psychiatrists reported working with angry clients as frequently as with anxious clients (Lachmund & DiGiuseppe, 1997). Anger problems may present as a primary clinical concern and target of intervention. Anger problems also frequently accompany many other clinical conditions, such as posttraumatic stress disorder (PTSD), and in such cases can become a separate target of therapeutic intervention. Yet, anger seems to be a forgotten emotion in that when compared to other primary emotions such as depression and anxiety, anger receives much less clinical and empirical attention. The DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders, APA, 2000) contains categories for mood and anxiety disorders and provides a nosology for several specific disorders within each category; however, there are currently no formal clinical diagnoses that specifically recognize anger related disorders.

Conducting a search of published studies readily indicates the disparity in attention given to other emotions compared to anger. A reported search of Psychological

Abstracts for articles published between 1985 and March 1993 found 7,355 articles referencing anxiety and 15,369 referencing depression, compared to 704 referencing anger (Digiuseppe, Tafrate, & Eckhardt, 1994). Another search of Index Medicus, using the same procedures and publication time period, found 8,850 publications referencing anxiety, 8,352 referencing depression, and 744 referencing anger (Digiuseppe, Tafrate, & Eckhardt, 1994). Inspired by these reports similar searches were conducted on 06/15/2011 using Psych Info. Using a keyword search for articles published between 2000 and 2011, the following results were found: "Anxiety Treatment" resulted in 205 identified articles; "Depression Treatment" found 907 publications ; "Anger Treatment" resulted in 39 references. The searches produced a total of 1,152 articles of which 78.80% were about the treatment of depression, 17.81% were about the treatment of anxiety, and only 3.39% were about the treatment of anger. The same search was conducted again except this time the broader key words of "anxiety", "depression", and "anger" were used. The search resulted in the following article counts: 66,177 for "Anxiety"; 82,889 for "Depression"; and 9,931 for Anger. Thus, the searches produced a total of 158,997 published studies of which 52.13% were about depression, 41.62% were about anxiety, and only 6.25% were about anger. Based on these publication numbers it appears that anger is indeed an understudied emotion.

Taken together, it seems clear that like depression and anxiety, anger is a commonly experienced emotion that at times is highly adaptive and part of the normal human experience. Also, just like depression and anxiety, when experienced too frequently, too intensely, or inappropriately, anger can have a wide variety of negative consequences and significantly disrupt important behavior, impair functioning, and

reduce quality of life. Yet, it would appear that depression and anxiety receive much more empirical attention. The importance of that observation is that few would argue against the proposition that the empirical attention given to depression and anxiety have led to much more effective knowledge regarding their presentation and treatment. As a field, psychology has relatively sound understandings of anxiety and depression as emotional process and thus successful treatment is available. With so much less attention dedicated to anger, it is reasonable to think that our knowledge of anger as emotion and also the knowledge of how to most successfully intervene in cases of problematic anger has enormous potential for growth.

Theoretical Perspectives and Treatment Approaches:

The Pressure Cooker Analogy and Catharsis: Popular beliefs about anger and the effective management of angry feelings are largely connected to the psychodynamic perspective of the hydraulic model and the need for tension reduction in the form of catharsis. A popular and culturally persistent way of conceptualizing anger has been the pressure cooker analogy. The pressure cooker analogy of anger is captured in the idea that anger is like steam in a pressure cooker, that unless released will eventually blow up (Lohr, Olatunji, Baumeister, & Bushman, 2007). It is common place in society to talk about people's anger as "welling" or "building up" and that unless they express themselves they could "blow up". Such concepts of anger are readily apparent in the common ways we as a society describe angry outbursts with phrases like the following: blowing a fuse, bottled up, boiling point, or blowing their stack.

The implications are that in order to prevent some catastrophic explosion of anger, one must find ways to release the building tension. One can periodically vent

steam in safe amounts to reduce pressure and avoid some catastrophic build up, or one can turn down the flame to reduce the heat that builds the steam. The therapeutic implications of these solutions are that to effectively manage anger one must either express anger through venting, to achieve catharsis, or one must alter the source of the anger (Lohr, Olatunji, Baumeister, & Bushman, 2007).

The pressure cooker analogy and the proposed importance of cathartic expression are prevalent in clinical settings. It has been observed that many clients believe one must express their anger to avoid greater problems, and such hydraulic models of anger remain popular concepts with therapists as well, despite limited empirical support for such theories (Digiuseppe, Tafrate, & Eckhardt, 1994; Lohr, Olatunji, Baumeister, & Bushman, 2007). Subsequently, popular advice continues to suggest that socially approved outward expressions of aggression (hitting a pillow, contact sports) reduce feelings of anger and the potential for future problematic aggression (Verona, & Sullivan, 2008).

The pressure cooker analogy is misleading and overly simplistic because anger is not an expanding gas or any other physical substance for that matter. It is not a tangible thing that starts off inside a person nor can it be transferred out in order to reduce its present amount. Thus, the idea that anger will build in some manner until such transfer out occurs is misguided. That is not to say that the expression of anger cannot be therapeutic. Recounting a traumatic event in prolonged exposure for PTSD, which requires the experience and expression of feelings of fear and terror, ultimately leads to long lasting reductions in the symptoms of PTSD (Cahill, et al. 2009). Similarly, exposure to anger provoking stimuli, which would increase the short-term experience and

expression of angry feelings, may result in the long-term reduction of anger. Thus, although the pressure cooker analogy and the need to vent anger might be overly simplistic, some form of expression might be therapeutically beneficial. The key discerning factor is potentially the manner in which expression occurs and the function of the expression. Moreover, the potential benefits of catharsis should not be dismissed out of hand, but evaluated on the basis of existing empirical evidence.

Testing Catharsis: There is some mixed evidence for the therapeutic effects of venting and the catharsis model of anger. One of the primary sources of evidence cited is changes in psychophysiology. There is research evidence demonstrating a reduction in blood pressure following venting; however, venting does not seem to work in situations that cause anxiety such as if the target of venting is of high status like one's boss. In such cases venting has been shown to increase blood pressure. Also, venting anger against a substitute target (displacement) does not seem to reduce arousal (Lohr, Olatunji, Baumeister, & Bushman, 2007).

One recent study in particular (Verona, & Sullivan, 2008) conducted a test of the hydraulic model of anger. The authors gave participants the opportunity to aggress against another while also manipulating the level of environmental stress to which the participants were subjected. The design of the study was similar to the classic Milgram obedience study (1963) in that participants played the role of a "supervisor" while study confederates played the role of an "employee". The employee was performing a digit memory task and the role of the supervisor was to provide corrective feedback to enhance performance. Corrective feedback occurred in the form of a "shock" at intensity levels from 1 – 10, with the intensity of shock determined by the "supervisor". Of course no

actual shocks were administered (Verona, & Sullivan, 2008). Levels of aggression were measured by the selected intensity of the shock. Aggression trials were those on which the confederate employee provided an incorrect response and subsequently received a shock. Non-aggression trials were those in which the employee provided the correct answer and no shock was administered. Baseline aggression scores were obtained in a practice section. The amount of stress the participant supervisor experienced was manipulated with the use of brief annoying air blasts aimed at the throat. The dependent measures were level of aggression and heart rate (Verona, & Sullivan, 2008).

The results of the study were as follows: During nonaggression trials with low stress, no changes in heart rate were observed. On non-aggression trials with high stress, there was a slight increase in heart (Verona, & Sullivan, 2008). Some increase in heart rate is predictable based upon the presence of the stressor. For aggression trials with low stress, there was a large significant decrease in heart rate, suggesting the presence of tension reduction; however, for aggression trials with high stress, there was a large significant increase in heart rate (Verona, & Sullivan, 2008). Thus, aggressive responding did not reduce tension when an impersonal source of stress was present. The authors suggest that perhaps aggression is only helpful in reducing tension within interpersonal contexts (Verona, & Sullivan, 2008). Additionally, those participants who showed the largest decreases in heart rate following aggressive responding also displayed the largest intensities in aggression during both concurrent and subsequent trials (Verona, & Sullivan, 2008). Thus, tension reduction did not decrease the intensity of future aggression. Tension reduction actually seemed to increase future aggression, and from a behavioral perspective this finding is readily explainable. Tension reduction is

reinforcing so that those who experience the greatest tension reduction also receive the most reinforcement and are thus more likely to be aggressive in the future. Also, it is possible that those who are already more aggressive may experience greater tension reduction following aggressive acts.

Researchers have also tried testing the psychological benefits and changes associated with venting. In one study, participants received an insulting remark from a confederate and then either had the opportunity to engage in a proxy of aggression by hammering nails for 10 minutes or a non-aggressive control behavior. Participants were then given the opportunity to express their opinion of the confederate who insulted them. Those participants who hammered nails were more hostile toward the confederate than those who did not. Thus venting anger resulted in participants continuing to be willing to vent anger through hostile criticism, instead of reducing such analogues of aggression (Hornberger, 1959). In another study using a Milgram (1963) like trainer and student approach, teachers were instructed to deliberately frustrate students. The results found that students who had been randomly assigned to vent their anger midway through the class were more likely to continue to express anger at the end and reported feeling more hostility toward the teacher (Goldman, Keck, & O'Leary, 1969). In another test of catharsis, researchers proposed that playing football, an aggressive sport, should be an effective way to express hostility and reduce subsequent aggression. They gave questionnaires that measured hostility to high school football players one week prior to the start of the season and one week after the season ended. The football players showed a significant increase in hostility from pre-season to post-season compared to their peers (Patterson, 1974). Taken together, it seems that the evidence in favor of venting anger

leading to therapeutically beneficial catharsis in manner predicted by hydraulic models of anger is dubious at best. The bottom line appears to be that expressing anger does not relieve aggressive tendencies, and can in some circumstances make them worse.

Not only is venting unlikely to produce therapeutic benefit, but it is potentially harmful and contributes to perpetuating the misunderstanding of anger. For starters, venting becomes a habit, and venting as a habit is likely to perpetuate itself and simply make one angrier and more aggressive. Because venting itself can be an aggressive act it keeps the anger alive through stimulating arousal, aggressive thoughts, angry feelings, and aggressive impulses (Lohr, Olatunji, Baumeister, & Bushman, 2007). Basically people learn to respond to unpleasant situations with anger and aggression and they learn to do more and more of it. Figure 1 is a visual model representing the proposed process of catharsis and tension reduction and the alternative outcome of behavioral reinforcement increasing aggression.

So Why Does The Pressure Cooker Analogy Persist? One reason why venting as strategy likely persists is the observation that it helps people feel better. Because venting temporarily decreases arousal, people report venting results in a beneficial mood change; however, such benefits are often short lived and do not translate into reduced aggression. There is a similar process Lohr et al. (2007) termed *"Dissipation and the Fallacy of Venting"*. The fallacy is captured in the fact that anger dissipates with time, regardless of what people do when angry, which might facilitate the fallacy that venting works. What people fail to realize, through a lack of direct experience, is that if they had not vented their anger would have still dissipated. Therefore, such fallacies serve to perpetuate the myth that it is necessary to vent anger to feel better (Lohr, Olatunji, Baumeister, &

Bushman, 2007). The potential for harm with catharsis theory is that such fallacies create the illusion that venting is necessary and healthy. Thus, people continue to vent anger, which may only serve to increase anger and aggression.

Figure 1:
Model of Catharsis and the Alternative Outcome of Reinforcement

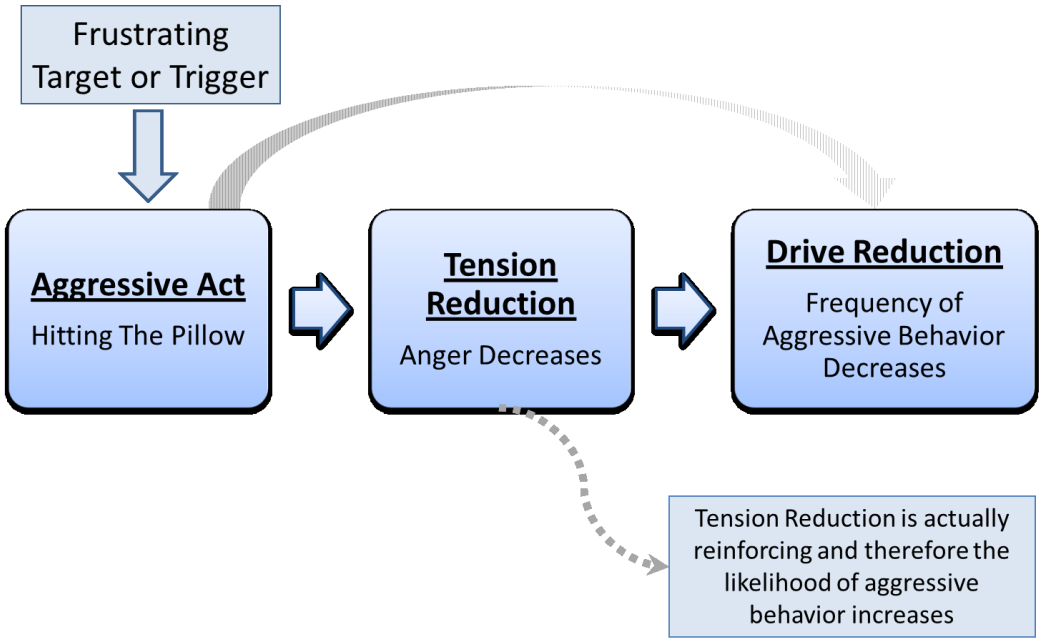


Figure 1: Displays the proposed process through which expression of anger and hostility leads to tension reduction (via catharsis), and thus reduces future aggressive behavior. The competing perspective that such hostile expressions reinforce aggressive behavior, increasing aggression, is also represented.

Why Exposure Is Not Venting: As a result of the preceding discussion it is important to distinguish exposure from venting. The functional purpose of venting is the immediate removal of anger as an aversive state of arousal. Venting, therefore, may serve as an escape behavior that is reinforced through the removal of arousal. Additionally, to the extent that venting can be likened to verbal aggression, the act of venting may reinforce and encourage aggression. Exposure, on the other hand, functions to prolong an aversive state of arousal until habituation occurs. Thus, the first basic difference is the

prolonging of aversive arousal as opposed to its immediate removal. Aside from the habituation that occurs during that instance of arousal, exposure reduces the intensity of future arousal in response to similar cues. Thus, another difference is that both venting and exposure serve to dissipate the current angry state but exposure should reduce the frequency and intensity of future anger responses. The use of expressive writing as a medium for exposure generates some potentially important procedural differences from venting. Writing is certainly by nature less aggressive than behavioral expressions like hitting a pillow. Writing may also be less aggressive than verbally venting. Verbal venting is perhaps more likely to devolve into an angry rant, whereas writing is by nature a slower more deliberate form of expression. The potential benefits of employing expressive writing as a form of exposure for problematic anger are described in greater detail later.

Cognitive Behavioral Conceptualizations of Anger: Well conceptualized cognitive behavioral models of anger and treatment exist. These models tend to present anger as chain of events consisting of stimuli, responses, and consequences, with the inclusion of preexisting state variables and cognitive mediators (Brondolo, DiGiuseppe, & Tafrate, 1997; Deffenbacher, 2011; Digiuseppe, Tafrate, & Eckhardt, 1994; Kassinove, & Tafrate, 2011). One note of interest is that these cognitive behavioral models of anger are very similar to those for anxiety.

In particular, Kassinove and Tafrate (2011) presented a well conceptualized sequence of events in the expression of anger. Stimulus triggers for anger lead to certain cognitive appraisals, which lead to internal experiences of anger, which lead to the

external expression of anger, and subsequently some outcome is created. This model is visually represented in Figure 2.

Figure 2:
Model of Anger Expression

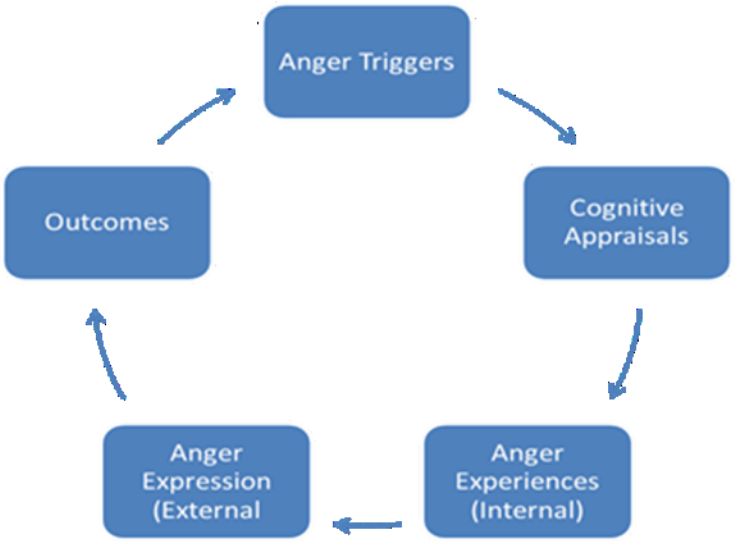


Figure 2: A recreation of a model of anger expression proposed by Kassinove & Tafrate (2011). Anger triggers lead to cognitive appraisals, which lead to internal experiences of anger, which lead to the external expression of anger, and subsequently an outcome.

Triggering events can be external, or internal, or a combination thereof. Specific external and identifiable events such as the behavior of others or one's own behavior can trigger anger. In such cases the source of the anger is identified in a causal manner and the angry person tends to see their anger as appropriate to the situation (Deffenbacher, 2011; Kassinove & Tafrate, 2011). Internal stimuli such as rumination about something anger provoking or another emotional response such as rejection, hurt, or embarrassment can also trigger anger as reaction. A combination of external events and internal anger-related memories and images may also occur. In such cases an external situation may trigger a network of associated memories that intensify the experience (Deffenbacher, 2011; Kassinove & Tafrate, 2011).

Cognitive appraisals are then introduced. Primary appraisals directly related to the trigger or source of anger tend to focus on the violation of values or expectations, trespass on one's personal domain, assault to one's ego, or interference with goals. If the actions of others are perceived as intentional, or the situation perceived as preventable, unwarranted, or blameworthy, anger is more likely and more intense. Anger is also more likely if the event is attributed to the actions of a perceived enemy. The importance or the amount of impact the event has is frequently overestimated (catastrophized) or viewed in dichotomous terms (Deffenbacher, 2011; Kassinove & Tafrate, 2011).

Subsequent secondary appraisals then tend to focus on coping resources. Anger is associated with secondary appraisals such as feeling overwhelmed, overtaxed, and unable to cope with the transgression in question. Such secondary appraisals can also include the invocation of the narcissistic rule that one should not have to put up with such things (Deffenbacher, 2011; Kassinove & Tafrate, 2011). The result of the trigger and appraisal process is the activation of anger as emotional response. The emotion of anger then motivates potentially problematic behavior and undesirable consequences as described earlier.

In concert with such models of anger expression, multi-faceted cognitive behavioral treatment strategies (CBT) have been developed (Brondolo, DiGiuseppe, & Tafrate, 1997; Deffenbacher, 2011; Digiuseppe, Tafrate, & Eckhardt, 1994; Eifert, & Forsyth, 2011; Kassinove, & Tafrate, 2011). Cognitive behavioral treatments tend to utilize multiple treatment tactics including increasing *self-awareness* of the pattern of triggers, the experience of anger, aggressive expression, and the consequences of behavior. As self-awareness of triggers and anger responses grows, the avoidance of such

triggers is often suggested as an initial strategy. *Relaxation training* is often introduced early in treatment as a means managing anger in response to triggers. *Cognitive restructuring* is typically used to challenge and alter anger-promoting cognitions and improve problem solving. *Behavioral interventions* targeting maladaptive expression and teaching positive coping skills like listening, problem solving skills, and conflict management skills are also traditionally included (Brondolo, DiGiuseppe, & Tafrate, 1997; Deffenbacher, 2011; Digiuseppe, Tafrate, & Eckhardt, 1994; Eifert, & Forsyth, 2011; Kassinove, & Tafrate, 2011). Kassinove and Tafrate (2011), provide a detailed account of a cognitive behavior treatment approach that is representative of current thinking.

How Effective are Current Treatments? Current treatment outcome research suggests that effective treatment of anger is available. In a meta-analysis of 50 between group and 7 within group studies of CBT for anger problems, DiGiuseppe and Tafrate (2003) found that the overall average effect size across all variables was 0.71, indicating that over 70% of those who received treatment were improved compared to those in a control condition. Del Vecchio and O'Leary (2004) reviewed 23 studies of treatment for anger and found mean weighted effect sizes ranged from 0.61 to 0.90. Thus, the results of meta-analyses support the use of psychotherapy for the treatment of anger problems; however, improving upon treatment and providing more treatment options is a worthwhile goal. Also, there are specific reasons to pursue improvements in the treatment of anger. For example DiGiuseppe and Tafrate (2003), found that while the overall effect size for anger treatment is 0.71, similar analyses of treatment for Depression (over 2.0 using the BDI) and anxiety (more than 1.00) produce much larger effect sizes. Thus, one

can argue that the treatment of anger is lagging behind when compared to treatments for anxiety and depression.

Also, if one specifically looks at outcome in relation to the different dependent measures, the results of meta-analyses become more complicated. In DiGiuseppe and Tafrate (2003), the overall effect size across all variables was 0.71. The effect sizes for changes in Aggression (1.16), Type A Behavior (1.00), Positive Behaviors (0.83), and Attitudes/Cognitions (0.81) were all greater than the effect size specific to changes in Anger (0.71). The effect sizes for changes in physiological arousal (0.52) and other emotions (0.48) were smaller than for anger. One note of interest is that the larger effect sizes are associated with behaviors and cognitive factors more so than the emotional response of anger itself. The difference between anger and aggression was found to be significant ($p = .02$). Thus, current treatments appear more effective at targeting aggressive behavior than the emotional experience of anger (DiGiuseppe & Tafrate, 2003). Although reducing aggression is certainly an important therapeutic goal, residual anger can have negative health and interpersonal/social consequences. Moreover, some patients may seek treatment specifically for relief from the experience of anger per se, in which case treatments that do not adequately alleviate the intensity of their anger experiences may be perceived by consumers as inadequate. Exposure may improve results with the affective experience of anger. Although DiGiuseppe and Tafrate (2003) did not find any differences for type of treatment, exposure based treatments were not well represented or clearly delineated in their meta-analysis.

A comprehensive CBT package may be the ideal practice when anger is the primary presenting problem without other comorbid psychopathology. But, what about

cases where the primary presenting concern is another disorder being addressed through another full CBT approach such as PTSD, obsessive compulsive disorder, or major depressive disorder where anger might be a recurring secondary concern. A more simplified and rapid approach to treatment that could be easily added into an existing treatment package could be ideal as opposed to adding another multifaceted level of intervention.

Anger and Exposure: One basis for the use of exposure as a treatment for anger is the observation that anger and anxiety are very similar, and exposure in its many forms tends to be a treatment of choice for anxiety disorders. Just as anxiety is a normative and a healthy human response to threat that prepares and helps people escape or otherwise respond to threat, so too does anger. Anxiety becomes problematic when the response is too frequent, too intense, takes too long to dissipate, occurs in inappropriate situations, or results in maladaptive behavior. Again, the same is true of anger. Problems of anxiety and anger tend to include similar perceptual and cognitive processes. Anxiety disorders are characterized by certain cognitive processing styles such as perceiving a neutral stimulus as dangerous and automatic thinking errors like fortune telling. Anger is also associated with certain cognitive processing styles and errors such as overestimating rejection, catastrophizing, overgeneralization, dichotomous thinking, and mind reading. These cognitive processes may coincide with the heightened arousal where arousal leads to quick automatic judgments that, while swift, may lack accuracy or other adaptive qualities, and may facilitate ignoring incompatible information. Physical sensations can be similar as well including, dry mouth, rapid heartbeat, rapid breathing, and muscle tension. And both anxiety and anger are associated with problematic behavior. Anxiety

produces avoidance and compulsive behavior. Anger can lead to impulsive responses, aggressive expression, resentful suppression, sulking, and withdrawal. With so much functional similarity it makes intuitive sense to consider similar treatments.

Cognitive behavioral approaches for treating anger do at times include exposure, but exposure is usually not a central aspect of treatment and is often introduced following the successful implementation of other intervention strategies. The treatment of anger tends to focus primarily on skill building (assertiveness training, social skills), relaxation, and self-control (Brondolo, DiGiuseppe, & Tafrate, 1997). By contrast, treatment of anxiety tends to focus on exposure and teaching clients to tolerate the experience of anxiety, with skills training being secondary. When used in the treatment of anger, exposure tends to focus on exposure to specific anger evoking cues, through role playing, combined with relaxation to control the response to the cue. The goal is to present the anger eliciting stimulus for a sufficient length of time that the emotional response extinguishes (Brondolo, DiGiuseppe, & Tafrate, 1997). There is also the issue of response prevention. Angry clients have habitual, reflexive responses to provocation. Such responses are incompatible with controlled reflective responses. It is thus important that clients not engage in such habitual responses (Brondolo, DiGiuseppe, & Tafrate, 1997). Response prevention breaks the connection between anger and automatic ineffective responses. As people learn to tolerate provocation and the experience of anger without engaging in reflexive actions, they may also begin to develop more flexible responses. As discussed later, expressive writing has the potential to achieve the same goals as such cue based exposure techniques and may provide certain advantages.

So Why Is Exposure Not a More Common Treatment for Anger? One of the primary and persistent sources of reluctance in the use of exposure for anger problems is the concern that it is too dangerous. The client may blow up or otherwise lose control and harm the therapist, or be subject to psychological harm themselves. However, several studies on exposure in clinical populations have been conducted without a single report of a violent or problematic incident (Brondolo, DiGiuseppe, & Tafrate, 1997). Clients report the procedures as well tolerated and typically actively help to make exposure more intense through providing suggestions (Brondolo, DiGiuseppe, & Tafrate, 1997).

Exposure:

A Successful Method for Addressing Emotional Dysregulation:

In the *Emotional Processing of Fear: Exposure to Corrective Information*, Foa & Kozak (1986) provide an excellent review of the theoretical and empirical foundations of exposure therapy, noting that "a common principle for the treatment of neuroses has emerged across schools of psychotherapy: the principle of exposure" (p. 20). It is essentially true that regardless of their theoretical orientation (behavioral, psychodynamic, existential), clinicians have long considered unpleasant emotions to play a central part in the etiology and maintenance of neurotic behavior. The most straightforward example of this broadly applicable conceptualization might be the behavioral view of anxiety in which anxiety disorders are essentially thought to be continuous attempts to avoid the confrontation of fear evoking stimuli. More generally, neurotic individuals can be considered to be avoiding information about themselves and internal experiences that are unpleasant. From this perspective, psychotherapy can be considered as providing a setting in which the confrontation of such unpleasant feelings

and information can occur. The ultimate goal of treatment being that such confrontation promotes therapeutically desired affective and/or behavioral change. Thus, one can circle back to the position stated by Foa and Kozak (1986) that the principle of exposure has become a common foundational aspect of nearly all therapeutic techniques.

Behavioral therapists expose their clients to specific stimulus cues that elicit the problematic response, such as fear, in order to extinguish the response in the presence of those cues. Psychodynamic therapists expose their clients to information about unconscious conflicts, painful memories, and unacceptable wishes for the purpose of achieving insight and the release of tension. Gestalt therapists expose their clients to unpleasant information through emphasis on the here and now and eliminating the avoidance of certain experiences and realities. The common underlying theme being that the client is confronting or being exposed to some aspect of their thoughts, emotions, behavior, or environment from which they have been attempting to distance themselves. There is a rich empirical history attesting to the effectiveness of exposure based treatment, and exposure based therapy is the treatment of choice for anxiety disorders with numerous outcome studies supporting their effectiveness (Abramowitz, 1998; Foa & Kozak, 1986).

Among the implications of these observations is that if exposure in its various forms is the foundation of treatment for neurotic emotional concerns, and that anger is a neurotic emotion, then it is reasonable to think exposure could serve as the building block for any anger management approach.

How Exposure Works:

There is little debate regarding whether or not exposure is a beneficial treatment strategy for anxiety, but there is a long running debate as to the mechanisms through which exposure operates to reduce fear and thus how to enhance its effectiveness. Exposure has commonly been conceptualized as resulting in stimulus response dissociation (Foa & Kozak, 1986); however, there have always been competing ideas regarding the manner by which exposure results in the elimination of a fear response. The idea that the process of exposure creates a dissociation, a breaking of the connection between the conditioned stimulus and the fear response, is just one proposal.

Exposure As New Learning: The primary competing perspective is that exposure and the extinction of a fear response represents new learning. The basic idea being that a new non-fearful association interferes with the retrieval of the prior fear based association. The old connections among the conditioned stimulus, the unconditioned stimulus, and the fear response are not really destroyed or even replaced. The fearful association is still present in memory. What has changed is that the new non-fear based association is overriding the original association. Basically, a new learned association has become more readily accessible. More specifically, extinction likely represents inhibitory learning. The new non-fearful association is inhibiting activation of the memory representations of the unconditioned stimulus, which negates the prior fear response (Bouton, et al. 2011; Lang, Craske, & Bjork, 1999).

The perspective that extinction represents new leaning and that the original association is not erased has its roots in the common finding that following successful extinction the original conditioned response frequently returns with the passage of time, a

phenomena Pavlov (1927) termed *spontaneous recovery*. Other experimental paradigms in which an extinguished response has been shown to return include *reinstatement,* when the presence of the unconditioned stimulus alone revives the response, and *renewal,* the return of a fear response to the conditioned stimulus when the individual is returned to the original conditioning context after extinction in a separate context (Bouton, et al. 2011; Lang, Craske, & Bjork, 1999). Rachman (1989) described the return of fear as the reappearance of a fear response that has undergone extinction and described the return of fear as a "robust and common phenomenon" (pg. 147). The implication of such a return in conditioned responding is that if exposure breaks the association between the stimulus and response and thus eliminates the prior association, how does one explain the return of fear? Therefore it is thought the original learning must remain intact (Bouton, et al. 2011; Lang, Craske, & Bjork, 1999).

The clinical concern associated with these commonly found returns in conditioned responding is the long term effectiveness of treatment. Some have concluded that both experimental extinction and exposure therapy fail to readily generalize to situations different from those in which treatment was conducted (Urcelay, Wheeler, & Miller, 2009). The return of fear to discrete stimuli following a successful reduction of fear has been described as a common occurrence in phobias, agoraphobia, and performance anxiety (Lang, Craske, & Bjork, 1999). It has thus been proposed that maintenance following cognitive behavior therapy is not as good as some assume and that long term maintenance could benefit from improvement (Lang, Craske, & Bjork, 1999). If exposure therapy represents a new learning experience then methods that increase the quality of that learning should produce better long term maintenance of outcomes.

The New Theory of Disuse: One potential theoretical explanation for how extinction training represents new memory formation in a manner that accounts for the return of fear, and provides potential insight regarding the possible ways to enhance exposure treatment, is the new theory of disuse (Bjork & Bjork, 1992; Lang, Craske, & Bjork, 1999). The new theory of disuse starts with the basic proposition that with time and disuse memories do not decay in terms of storage or become replaced but that instead what is lost in forgetting is access to the memory. One of the foundations for this is the proposition that an item in memory can be characterized by two distinct strengths: a storage strength and a retrieval strength. *Storage strength* reflects how well something is learned. *Retrieval strength* reflects the probability that the specific information or associations can be recalled. Storage strength grows as a function of opportunities to study or recall an item. The more frequently a memory is rehearsed and recalled, the stronger the storage strength of the memory. Additionally, once accumulated, storage strength is never lost and there is no known capacity limit for storage in long term memory (Bjork & Bjork, 1992; Lang, Craske, & Bjork, 1999).

Retrieval capacity is differentiated from storage strength in several ways. The number of items that can be accessed and retrieved at any given point in time is limited and thus there is a functional limit to retrieval capacity. Also, retrieval capacity is weakened as a function of the study and retrieval of other items. Because there is no limit to storage strength, increasing the storage strength of other newly learned material has no identified impact on the storage strength of existing knowledge. Because retrieval strength does have limited capacity, as the retrieval strength of new information increases, that new information begins to interfere with and reduce the retrieval strength

of prior knowledge (Bjork & Bjork, 1992; Lang, Craske, & Bjork, 1999). One of the reasons for this is that memory recall is considered to be highly cue dependent. As new information is added and recalled in relation to specific cues, it can interfere and compete with the recall of prior information associated with similar cues. Thus, there is always a proposed trade off in retrieval strength such that if the retrieval strength of some things increase then the retrieval strength of others must decrease (Bjork & Bjork, 1992; Lang, Craske, & Bjork, 1999).

Furthermore there are important relevant interactions between storage and retrieval strength. Increments in storage strength are a decreasing function of retrieval strength, meaning that high retrieval strength limits the further accumulation of storage strength. As a result, highly accessible memories are not able to gain as much accumulation in storage strength, which may limit their long term retention. Conversely, higher storage strength works to enhance the gain and limit the loss of retrieval strength. When taken together the implications of the theory are that the act of retrieval results in greater strengthening of both retrieval and storage strength than does the act of studying an item. In particular, the more difficult the retrieval of a memory, the greater the increase in subsequent retrieval strength (Bjork & Bjork, 1992; Lang, Craske, & Bjork, 1999).

Implications of the New Theory of Disuse for Exposure Therapy: The new theory of disuse has implications for the application of exposure therapy and may explain the phenomenon of the return of fear. The non-fear response is a newly learned memory and the older fear response is left intact as a memory in storage. The return of fear is likely the result of the older memory once again becoming more accessible due to cues such as

context triggers or the deterioration of the retrievability of the newer memory (Brewin, 1989; Lang, Craske, & Bjork, 1999). More specifically, successful treatment involves identifying the cues that elicit fear and developing non-fear associations to those cues. During treatment the storage strength of the fear memory remains unchanged but its retrieval strength is weakened as the competing exposure learning gains retrieval strength. Thus, during the treatment process, the non-fear based memory gains both retrieval and storage strength (Lang, Craske, & Bjork, 1999). Ultimately, at the conclusion of treatment, the non-fear associations will have higher retrieval strength but the original fearful associations will retain relatively higher storage strength. What happens over time, without opportunities for retrieval, is that the retrieval strength of both the non-fearful and fearful responses decrease; however, higher storage strength slows the loss of retrieval strength such that the older fearful associations loose retrieval strength at a slower rate than the newer non-fearful memory. As a result, the retrieval strength of the fearful associations eventually exceeds that of the non-fearful associations, and thus conditioned fear behavior returns (Lang, Craske, & Bjork, 1999).

Enhancing Exposure Therapy:

Based on the arguments above, the goal of therapy should be to maximize the retrievability of the newly learned response. In their review of the new theory of disuse, as it can be applied to the treatment of emotional disorders, Lang et al. (1999) outlined techniques for the prevention of the return of fear. Treatment needs to be structured in a way that maximizes storage strength as well as retrieval strength at the end of treatment, because increased storage strength will support therapeutic changes long term through limiting the loss of retrieval strength. It is also important to bear in mind that high current

retrieval strength limits the growth of storage strength; therefore, it might be ideal to avoid treatments strategies, such as massed exposure trials and keeping the conditions of exposure constant, which may appear to increase the speed of the client's progress but likely undermine the growth of storage strength. Instead, to maximize the long term effectiveness of therapy it may be necessary to introduce more difficult retrievals of the new associations and other tactics that maximize storage strength (Lang, Craske, & Bjork, 1999).

Variation of Treatment: One way to improve long-term retrieval is to vary the learning task. Varying the task increases difficulty and provides practice in novel situations, which pairs more cues with the non-fearful response and facilitates generalization. Variation increases retrieval difficulty because the previous retrieval cues are not fully present. Variation additionally pairs learned information with more retrieval cues which ultimately leads to better retrieval. Varying the task leads to the participant generating and applying a rule across tasks and thus produces a broadly applicable coping strategy (Lang, Craske, & Bjork, 1999).

Overlearning and Repeated Learning: Bjork and Bjork (1992) noted that "it is a time-honored result in both the human and animal literature that additional learning trials given after perfect performance is achieved (overlearning), or additional relearning sessions where performance is brought back to the original criterion (repeated learning) act to slow the rate of subsequent forgetting". (p. 46). Clinically overlearning can be operationalized as continuing exposure beyond the point at which a minimal level of fear is being evoked. Booster sessions following the end of successful treatment could provide such a means of repetition in learning (Lang, Craske, & Bjork, 1999).

Manipulating Contextual Cues: Bouton (1988) suggested "One way to prevent reinstatement is to extinguish fear of the CS in a context that also predicts the US. These observations may imply that exposure therapy would be slow, but perhaps more successful in the long run, if it were conducted in a frightening context". (p. 140). By conducting treatment in the presence of fear provoking cues, those cues, which were previously associated with the fearful response, become paired and associated with the non-fearful response (Lang, Craske, & Bjork, 1999).

Timing of Treatment Sessions: The temporal spacing or massing of treatment sessions is the potential manipulation to enhance exposure that the current study investigated. The spacing of exposure sessions is operationalized in the form of the inter trial interval (ITI) typically measured from conditioned stimulus offset to the next onset of the conditioned stimulus (Urcelay, Wheeler, & Miller, 2009). It is expected, and has been observed, that if the retention interval is brief in the form of closely spaced or massed training sessions, better short term performance in the form of more rapid extinction is achieved due to the rapid growth of retrieval strength. If the retention interval is lengthened in the form of distributed training sessions, extinction might be slower but results in better long term retention with a reduced likelihood of spontaneous recovery (Lang, Craske, & Bjork, 1999; Urcelay, Wheeler, & Miller, 2009).

The difference in retention and recovery is attributed to the distributed sessions producing higher storage strength of the new non-fearful association. Partial forgetting occurs in the increased interval between learning episodes, which weakens retrieval strength, making retrieval more challenging, creating additional learning opportunities. The combined influence is the slowing of rapid increases in retrieval strength that would

otherwise limit increases in storage strength, thus creating a learning pattern that results in better long term storage strength (Lang, Craske, & Bjork, 1999). Thus, increasing the interval between sessions may produce better long term maintenance of treatment outcome.

There are, however, competing arguments in favor of massed extinction trials. One very clinically relevant argument is that massed sessions reduce the likelihood of counterproductive accidental exposure and the potential for reinforced avoidance (Foa, Jameson, Turner, & Payne, 1980). Others have argued that massed sessions have the advantage of getting treatment over with and expediting positive outcome; however, on that note, massed treatment may be too demanding (Lang, Craske, & Bjork, 1999).

Some views of extinction contend that the level of responding during extinction should positively correlate with the amount of extinction, thus massed trials should produce more robust results (Rescorla, 2001). Specifically, in the case of massed extinction trails, the amount of fear from the immediately prior trial should summate with the fear evoked during the subsequent trial. Thus, massed trials should produce higher levels of fear responding and result in more effective extinction (Urcelay, Wheeler, & Miller, 2009). For example, the Rescorla – Wagner (1972) model predicts that if the same number of extinction trials are implemented in sessions of differing lengths that the shorter sessions should result in more extinction learning than the longer sessions. In support of this proposition, Rescorla and Durlach (1987) extinguished two cues in two separate contexts with different session lengths and found that massed extinction was more effective than spaced; however, it is important to note that the use of different session lengths produced a confound of trial spacing and context exposure. The total

amount of exposure time to the extinction context was different between groups (Urcelay, Wheeler, & Miller, 2009).

By contrast, there is empirical evidence and sound arguments in support of the spacing of exposure sessions. It has been reported that in excitatory conditioning, the massing of training trials has been shown to have a detrimental effects on the acquisition of behavioral control (Barela, 1999). Bouton (1993) proposed that during extinction participants form a new inhibitory association between the CS and US, and thus the spacing of trials, which has a known effect upon excitatory conditioning, should have a similar effect in inhibitory learning. One series of studies in particular provides strong support for the benefit of distributed learning trials in extinction. The experiments were designed to investigate the consequences of conducting extinction treatment with massed or spaced trials while keeping the total session length constant. The authors conducted both renewal (Experiment 2) and spontaneous recovery (Experiment 3) tests, the latter with a 22-day retention interval (Urcelay, Wheeler, & Miller, 2009).

Experiment 1: The researchers tested four groups of rats including a spontaneous forgetting control and three experimental extinction groups. The difference between the three experimental groups was the spacing of extinction trials. The massed extinction group received a 6 sec ITI. An intermediate spacing group a 120 sec ITI. And a group identified as spaced trials a 600 sec ITI. All groups experienced extinction in a single 220 minute long session. For this first experiment, training took place in one context (context A), whereas extinction and testing occurred a second context (context B) creating an ABB design. The results showed that as trial spacing increased, extinction was more effective. There was a significant difference in suppression ratio between the massed and

spaced groups. The intermediate ITI group did not significantly differ from the other two groups; however, there was an observable pattern of increasing suppression ratio from massed to intermediate to spaced (Urcelay, Wheeler, & Miller, 2009).

Experiment 2: This study sought to determine if extinction with massed trials or spaced trials would alter recovery from extinction when the test was conducted in the training context instead of the extinction context, providing a test of renewal. Thus, experiment 2 used 6 groups in pattern similar to experiment one. The primary difference with experiment 1 being that one pair of massed and spaced trials groups were tested in the extinction context and another pair of groups were tested in the initial fear conditioning context. The final groups were 2 spontaneous forgetting controls. The spontaneous forgetting groups thus served as renewal controls as well as the potential replication of the findings from experiment 1. When tested in the training context, the massed group did not differ from the control group indicating that renewal had occurred; however, renewal was not evident in the spaced group. The results of experiment 1 were successfully replicated as well (Urcelay, Wheeler, & Miller, 2009).

Experiment 3: This study tested whether spaced extinction trials limited the effect of spontaneous recovery. The authors predicted that when tested immediately after extinction, spaced trials should produce a small benefit; however the benefit of spaced trails should be much larger when testing is delayed. Massed and spaced extinction groups were thus tested either 2 or 22 days after the extinction treatment. With the shorter test interval (2 days) the results displayed the same pattern as experiment 1, indicating more robust exposure results with spaced trials. With the longer testing interval (22 days) the massed group displayed significantly more fear and did not differ from the control

group indicating spontaneous recovery had occurred. The spaced group displayed significantly less fear and did not differ from the results for the spaced group with the short interval (Urcelay, Wheeler, & Miller, 2009). These findings add support to the theory that instead of erasing prior learning extinction represents new learning that interferes with the retrieval of the original fear memory, and that procedures to increase long term storage strength, such as the distribution of sessions, are beneficial in extinction learning.

There are several additional sources of empirical support for an advantage to spaced exposure sessions. One study trained a conditioned emotional response in rats using the "lick suppression methodology" and pairing a light with a brief foot shock. The rats were put on three separate exposure schedules. A massed schedule (1 trial of 180s), which produced extinction with spontaneous recovery, and two spaced conditions (6 trials of 30s each and 18 trials of 10s each). The spaced trials produced significantly better extinction and the longest spaced condition (18 trials of 10s) produced the best results, although not significantly different from the other spaced trials condition (Baum, Andrus, & Jacobs, 1990). Westbrook et al. (1985) found that a long ITI between extinction trials produced more long-term loss of a conditioned taste aversion than did a short ITI; however, as would be expected based upon the new theory of disuse, massed presentations during extinction facilitated the rate of extinction. Additionally, Morris, Furlong, and Westbrook (2005) reported more robust extinction with spaced than with massed trials.

Some have argued that not only do spaced trials produce better results with extinction but that the ideal schedule is an expanding spaced schedule, were the ITI

increases following each session (Lang, Craske, & Bjork, 1999; Rowe, & Craske, 1998). One study in particular compared massed vs. expanding spaced exposure schedules in spider fearful participants. Massed exposure consisted of 4 exposure trials in the same day. For the expanding spaced group, the 4 sessions were distributed in a 1 – 2 – 4 – 8 pattern so that the number of days between trials doubled each time (e.g. Monday, Tuesday, Thursday, and Monday). The massed exposure group produced significantly more rapid habituation across trials but also showed a clear return of fear at one month follow-up. The expanding spaced exposure group did not show a return of fear at one month follow-up. Additionally, at both post-test and the one month follow-up, the massed exposure group displayed fear in response to novel spiders whereas the expanding spaced group did not (Rowe, & Craske, 1998). The current study is not using an expanding spaced group simply because it is not practical at this time. It also makes more sense to first investigate differences in spaced vs. massed exposure and then in the future longer studies can compare evenly spaced vs. expanding spaced sessions across a greater time period.

As describe in further detail later, the current study was intended to test the proposition that spaced exposure sessions are beneficial in extinction. In particular, the current study asked some participants to engage in expressive writing in a massed format by asking them to write multiple times in the same session, and other participants will write only once in each of three spaced sessions (one to two days apart). Additionally, one group wrote in a massed format with a short delay prior to the final testing session and another group experienced a longer delay between their massed writing session and the final testing session. It was predicted that spaced sessions of writing would produce

greater reductions in the amount of anger evoked by writing when compared to the massed sessions, and further that an increased delay between massed writing exposure and subsequent writing in the final test session would result in partial spontaneous recovery.

Expressive Writing:

Story-telling is prevalent throughout society as a means of addressing and processing important emotional events. By telling a story, an individual can organize and process the details of the narrative in beneficial ways. One beneficial method through which a story can be formed, enhanced, and ultimately communicated is through written narrative. Thus, one potential treatment approach for dealing with traumatic or stressful experiences is to use emotionally expressive writing. Emotionally expressive writing paradigms ask participants to write about important emotionally relevant events and when writing to be sure to include their deepest thoughts and feelings, including material they may not have previously shared with others, and to write continuously for 20 minutes at a time (Pennebaker, 1997).

When individuals write about very emotional and personally upsetting topics, they report reduced stress and significant health improvements in a variety domains and these changes are demonstrated in both self-report and physiological measures (Graybeal, et al., 2002; Pennebaker 1997; Pennebaker & Seagal, 1999; Ramirez-Esparza & Pennebaker, 2006). In a review of the therapeutic benefits of expressive writing, Pennebaker (1997) concluded that writing has been consistently demonstrated to improve health and well-being and enhance immune functioning. Such health benefits have been displayed in physiological measures (e.g. heart rate, blood pressure), reduced reports of

physical symptoms, reduced distress, and decreased frequency of doctor visits and sick days. Overall, writing has been well demonstrated as a therapeutic means of reducing stress and improving health (Graybeal, et al., 2002; Pennebaker 1997; Pennebaker et al., 1990; Pennebaker & Seagal, 1999; Ramírez-Esparza & Pennebaker, 2006).

The utility of expressive writing in moderating affect and producing therapeutic benefits has been explored beyond stress reduction and health improvement. Most notably, expressive writing has been used to successfully address trauma related concerns. Pennebaker and Beall (1986) found that participants who wrote about a past traumatic experience, in an emotionally disclosive manner, displayed short term physiological arousal in response to the writing procedure but subsequently displayed long term reductions in reported health concerns, including reduced frequency of doctor visits. A control group that wrote about non-emotional daily activities and a group that wrote about a past trauma in a strictly factual manner, avoiding emotional content, did not differ from each other and did not display any significant benefits from writing (Pennebaker & Beall, 1986). More recently, Sloan and Marx (2004, 2005) recruited undergraduate students who reported multiple traumatic experiences and continued to exhibit trauma related symptoms. Following Pennebaker's procedures, they asked participants to write about either a traumatic experience or unemotional daily activities for 20 minutes at a time across multiple sessions. In the first study, at a 4 week follow-up assessment, it was found that those participants who wrote about a traumatic experience displayed significantly decreased trauma symptoms, fewer depressive symptoms, fewer physical health complaints, and reported fewer sick days; however, only the reduction in depressive symptoms was clinically meaningful (Sloan & Marx, 2004). In a second

study, the authors sought to further investigate the relationship between expressive writing and exposure by testing whether or not the effects are dependent upon writing about the same traumatic experience. Once again, a control group wrote about unemotional daily activities. One emotional disclosure group wrote about a single traumatic experience multiple times, and another group wrote about different traumatic experiences each time. The results showed that only those participants who wrote about the same traumatic event displayed the psychological and physiological benefits of writing (Sloan & Marx, 2005). The authors concluded that emotional disclosure tasks function in a manner very similar to the exposure techniques that are well validated for the treatment of PTSD (Sloan & Marx, 2004; 2005). The benefits of expressive writing in the reduction of stress and trauma have also been extended to specific populations such as caregivers (Barton & Jackson, 2008) and those living with HIV/AIDS (O'Cleirigh, et al., 2008).

Theories About How Expressive Writing Works:

The potential reasons for why writing is therapeutic and beneficial for health include disclosure, labeling the problem, and cognitive benefits such as abstraction and problem solving (Pennebaker 1997). One potential reason for the finding that expressive writing reduces negative emotion is that the mere act of disclosure can be a powerful therapeutic tool. It has been hypothesized that stress impacts health through the process of inhibition. Inhibiting and withholding stressful material and negative emotions may serve as a low to moderate level stressor that over time impacts health. The act of disclosure may lead to the removal of such inhibition; however, Pennebaker (1997) cites that the empirical evidence for this model is inconclusive.

Other potential reasons for why writing is therapeutically beneficial include cognitive processing factors that may mediate the reduction of stress and lead to insight. Abstraction and perspective taking, as evidenced through the number of positive and negative emotion words used within a narrative, appear to relate to the therapeutic benefits of writing. More specifically, a high number of positive emotion words and moderate level of negative emotion words was found to moderate the amount of health improvement and stress reduction following writing (Pennebaker 1997). The positive therapeutic benefits of writing have also been related to a process that is akin to problem solving. Research has found that increased use of causal words to describe the relationships between events and increased quality of narrative organization are associated with increased benefit (Pennebaker 1997). Thus, cognitive benefits such as abstraction and problem solving might be a mechanism through which expressive writing is therapeutic. Overall, it appears that certain aspects of writing quality and certain types of processes such as organization, detailed storytelling, and perspective, are closely related to the therapeutic benefits of writing (Graybeal, et al., 2002; Pennebaker 1997; Pennebaker & Seagal, 1999; Ramírez-Esparza & Pennebaker, 2006).

Expressive Writing as a form of Exposure:

It may be that writing, as means of storytelling, creates imaginal exposure by evoking not only the memory of events but also the emotions and other experiential aspects of the content. Through activating the various emotions and thoughts associated with an event, habituation to the relevant emotions and associated cues may occur. In keeping with the new theory of disuse, it is possible that writing about an event allows

the person to develop an alternative memory of events that is less disturbing and competes with the original memory for expression.

Another proposed mechanism through which expressive writing is thought to reduce stress is the act of disclosure and the subsequent removal of inhibition of difficult emotions (Pennebaker, 1997). Disclosure and disinhibition of difficult emotions requires the recognition and confrontation of those emotions. One cannot write about their deepest feelings regarding a very emotionally upsetting or traumatic event without first facing the thoughts and feelings associated with that material. Therefore, it is possible that exposure may interact with the disclosure/disinhibition hypothesis. Perhaps the inhibition of negative emotions leads to stress and poorer adjustment both in terms of physical and mental health as a result of experiential avoidance. The therapeutic benefits of expressive writing may largely relate to the process of exposure to the internal experience of the thoughts and emotions related to a stressful event. As described in more detail later, the current study includes a measure of experiential avoidance with the intention of exploring the possibility that reduced experiential avoidance is mechanism of change associated with expressive writing.

Taken together the process of expressive writing is very much consistent with the tradition of remediating neurotic emotions through asking clients to confront them. If expressive writing does function as a form of exposure, it can be predicted that as an individual continues to write about an emotionally evocative topic over time, the act of writing about the topic will evoke lessened emotional responding. This proposition represents the central goal of the current study.

Aside from the mechanistic nature of how expressive writing moderates emotional experiences, current questions of interest include the extent to which expressive writing can be applied to specific emotional experiences, such as anger, and the degree to which such writing can serve as a supplement to current psychological treatments for disorders related to emotional regulation. The ultimate goal of this line of research is to test the possibility of using expressive writing as therapeutic tool to reduce the experience of problematic anger. Therefore, as described in more detail later, the current study asked participants to write about angry or emotional neutral memories. It was predicted that the first time participants write about an angry memory that their current experience of anger will sharply increase; however, after writing about an angry memory multiple times, writing will elicit less anger.

Writing as an Exposure Treatment for Anger:

Asking people to write about their angriest memory should activate not only the emotion of anger but the associated memory content and other cognitive mediators. Therefore, by having people write for prolonged periods, such as 20 minutes at a time, on multiple occasions, they are being exposed to an aversive emotional response in the form of anger and to the cognitive content that triggers that response. In time the response of anger to those associated cognitions should habituate. Figure 3 provides a visual representation of the proposed process of exposure from expressive writing reducing the experience of anger.

Compared to the current role play techniques that are used for exposure to anger, expressive writing is a different procedure in that relaxation techniques are not used and also the exposure is more to the overall emotional experience of anger as opposed to

more specific cues. Thus, expressive writing may provide habituation to the emotional experience of anger in a more global sense that may produce more generalized changes in the ability to tolerate anger as an affective experience. In terms of response prevention and breaking a habitual pattern of maladaptive behavior, writing does not facilitate and will actually directly interfere with a lot of habitual responses. Writing can provide response prevention by making physical aggression against a desired target inaccessible, taking away the opportunity for verbal processes such as yelling, and preventing the suppression of anger. Writing also provides the potential for therapeutically beneficial cognitive processing changes related to the tendency for writing to become more organized and insightful with time. Instructions can even be manipulated to increase the potential cognitive benefits. In the end, writing may also serve as skill building through teaching thoughtful processes, organization, and insight as coping strategies.

Figure 3:
Model of Expressive Writing as a form of Exposure

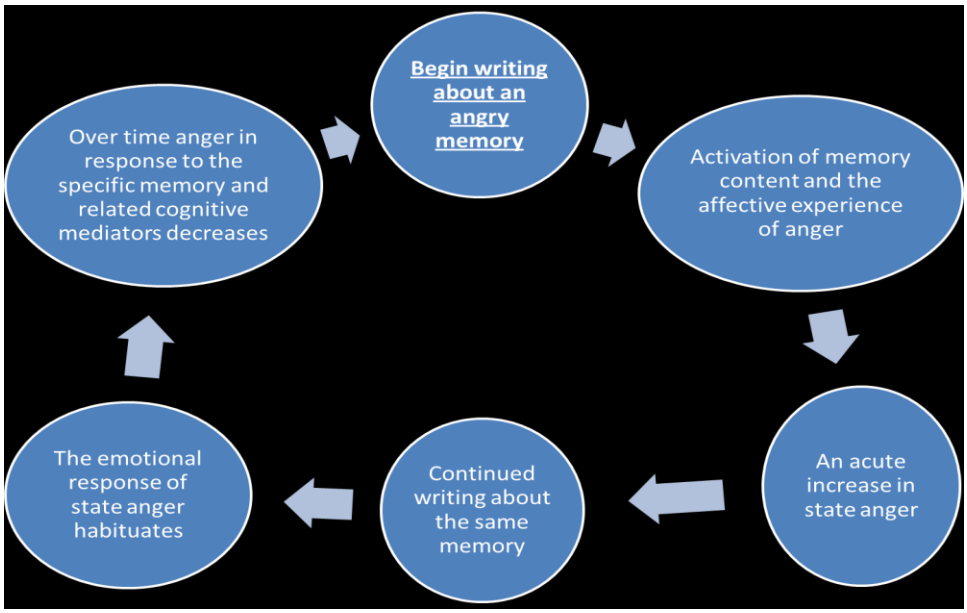


Figure 3: A representation of the proposed process of exposure from expressive writing reducing the experience of anger.

Writing and exposure may also serve as a good starting point for treatment. The initial exposure processes may provide habituation to facilitate adherence to more complex treatment approaches and facilitate insight. People often feel their anger is justified, and thus clients often begin therapy without the insight that their anger is problematic. Instead, other people are often considered to be the problem and the client often wishes to know how to make them stop their frustrating behavior. For such individuals who do not see anger as their problem, or firmly believe that their anger is a justified and appropriate response to the environment, readiness to change approaches, such as the stages of change model by Prochaska and DiClemente (1988) have been recommended (Digiuseppe, Tafrate, & Eckhardt, 1994). Exposure could be ideal for these individuals. Does one have to be insightful about an emotional response as problematic for habituation to occur? Emphasizing exposure may reduce anger in such cases where more cognitively driven approaches fail. It may also be amenable to the client who wishes to vent. Writing provides a means of expression, which the client desires. Future research could explore the potential for expressive writing to lead to movement from a pre-contemplative stage of change to an increased readiness for change.

Additionally for those concerned about the risk of harm from exposure, writing may provide an even safer form of exposure than the standard role play procedure, because writing is not as interactive and confrontational. The therapist and others are less likely to be seen as provocative. The process of writing may actually temper hostile and violent reactivity. Writing may also serve as exposure and habituation to ready someone for more confrontational and interactive role plays.

Returning to the prior discussion of methods for enhancing exposure treatment: In terms of *Varying Treatment* to enhance outcome, although not a goal of the current project, as a future direction of research it may be wise to start participants off writing about a singular angry topic and over time continue to introduce other various topics related to anger in order to facilitate generalization. Given the manner in which people's expressive writing tends to evolve over time, becoming more complex, identifying causal relationships, and gaining insight, it may be possible that such writing naturally provides a means of variation in task as it changes over time. In cases where such variation does not occur naturally, instructions may be used to promote such beneficial changes. In the future more long-term treatment based studies could investigate such processes associated with expressive writing as a form of exposure. *Overlearning and Repeated Learning:* Future research could examine the usefulness of having participants continue to write about an angry memory, occasionally, even after writing about that particular memory no longer evokes any state anger change. *Manipulating Contextual Cues:* In the future writing as exposure for anger could be conducted and tested in varying contexts, such as at home, at work, at school, or wherever anger may occur and thus serve as a relevant exposure context. Clinically, writing can be readily used as exposure in varying contexts through the use of writing as homework.

<u>Our Preliminary Data on Expressive Writing and Anger:</u>

The proposed study represents the continuation of a developing line of research examining the ability of expressive writing to therapeutically alter emotional responding. In an initial study (Cahill et al., unpublished data) the acute effects of writing about an angry memory (anger induction) were able to be dissociated from the effects of repeated

writing about the same angry memory (a reduction in anger). A group of undergraduate participants identified a specific anger eliciting memory, a specific happy memory, a number of specific neutral memories, and were randomly assigned to an experimental or control condition. The experimental group (Ang-Ang) wrote about the same angry memory on each of four occasions over a two week period. Participants in the control condition (Neut/D-Ang) wrote about a series of different neutral events on each of days 1 – 3, and then wrote about the previously identified angry memory on the fourth day. Prior to and immediately after writing on each day, participants completed ratings of their levels of state anger. The critical finding is presented in Figure 4 which displays the pre- and post-writing state anger scores on Day 1 and Day 4. The dependent variable in the figure is the State-Anger score from the State-Trait Anger Expression Inventory (STAXI; Spielberger, 1988).

The key difference between groups is that on Day 4 group Ang-Ang was writing about the same angry memory for the fourth time, whereas group Neut/D-Ang was writing about the angry memory for the first time. Results from Day 1 indicated that writing about the angry memory resulted in an acute increase in state anger compared to no change in the group writing about a neutral memory. Thus there was an initial induction of anger in the experimental group the first time they wrote about an angry memory. Results from Day 4 indicated that participants writing about the angry memory for the fourth time were significantly less angry than they were on Day 1, and significantly less angry than participants in the control group who were writing about an angry memory for the first time. This initial study was thus able to demonstrate that initially writing about an angry memory resulted in the activation of state anger but that

with subsequent writing such induced anger decreased, suggesting the possibility of habituation.

Figure 4:
Primary finding of Cahill et al. (unpublished data)

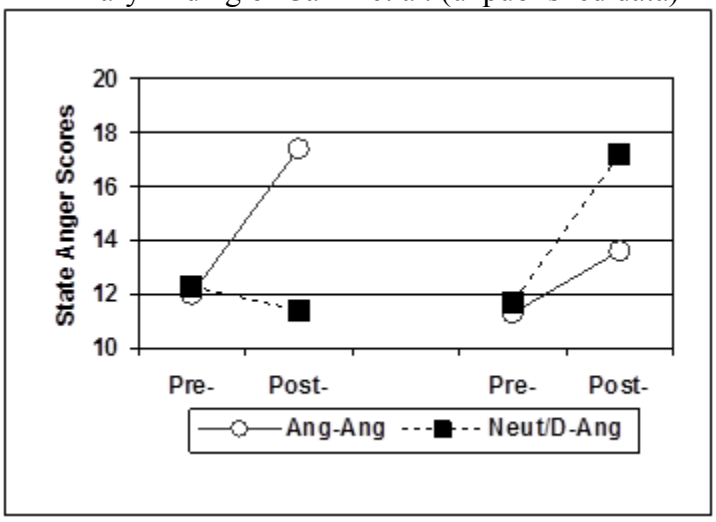


Figure 4: Displays the key finding from Cahill et al. (unpublished data). The left side of the graph displays the results from Day 1. The experimental group (Ang-Ang) displayed a sharp increase in state anger following writing about an angry memory. The control group (Neut/D-Ang) showed no change in state anger following writing about an emotionally neutral memory. The right side of the graph displays the results from day 4. The experimental group, having written about the angry memory four times, displays a significant decrease in state anger compared to Day 1. The control group, having written about an angry memory for the first time, displays a sharp increase in state anger.

A second study (Patrick et al., 2010) sought to both replicate and extend the findings of Cahill et al. (unpublished). Given that cognitive changes related to abstraction, organization, and problem solving appear to currently be the most empirically supported model for how expressive writing produces beneficial outcomes, it was considered that one potential method of enhancing the effectiveness of therapeutic writing would be through encouraging such cognitive processes. Patrick et al. (2010) attempted to enhance such outcomes through the manipulation of writing instructions. One potential enhancement was in the form of empathetic perspective taking, in which participants were instructed to include content about the perceived thoughts, feelings, and

point of view of the individual who angered them. Another possible enhancement was problem solving, in which participants were asked to include a description of the things they could do to functionally improve the situation or reduce their anger (Patrick et al., 2010).

Ninety undergraduate students at the University of Wisconsin – Milwaukee completed the STAXI and the Positive and Negative Affect Scale (PANAS). Participants then completed an initial writing task by writing about an angry memory. Participants then completed a second writing task by writing about the same angry memory. Based on random assignment, one group was given the same writing instructions as in the first writing task; a second group was instructed to include content about the perceived experiences and intentions of the person who angered them; a third group was asked to include content about what could be done to solve the problem or reduce their anger. Following each writing task, participants completed the State Anger portion of the STAXI (STAXI-S) and the PANAS (Patrick et al. 2010).

Table 1 displays the means and standard deviations for the three measures of interest at each completion time point. Separate 3 (writing instructions) X 3 (completion time point) mixed factor ANOVAs were performed on the STAXI-S, PANAS Negative Affect Scale (PANAS-NA), and PANAS Positive Affect Scale (PANAS-PA). The results show significant main effects of completion time point for all three measures; however, no significant main effects of writing instruction group nor interactions were found. The results are displayed in Tables 2 – 4 and Figures 5 – 7 (Patrick et al., 2010).

Subsequent post-hoc t-tests produced significant findings that elucidate the main effects. The results are displayed in Tables 5 – 7. *STAXI-S:* State anger significantly

increased from baseline following the first writing and significantly decreased following the second writing; however, state anger was still significantly higher than baseline. *PANAS-NA:* Negative affect significantly increased from baseline following the first writing and significantly decreased following the second writing, at which point negative affect did not differ from baseline. *PANAS-PA:* Positive affect significantly decreased from baseline following the first writing and continued to decrease following the second writing (Patrick et al., 2010).

The results demonstrate the induction of negative affect including anger following initial expressive writing; however after writing only a second time, in a short time frame, repeated writing demonstrated an ability to reduce anger and negative affect. Writing about an angry memory also decreased positive affect, further supporting the ability of expressive writing to influence current emotional states. The observation that repeated expressive writing reduced anger and negative affect while positive affect continued to decrease indicates that that the experiences of positive and negative affective states are relatively independent, and further indicates that exposure may be the active mechanism trough which expressive writing decreases negative affect.

Table 1:
Descriptive Data from Patrick et al. (2010)

	Baseline: Mean (sd)	Post 1st Writing: Mean (sd)	Post 2nd Writing: Mean (sd)
STAXI-S	11.09 (2.17)	16.36 (6.35)	14.83 (6.41)
PANAS-NA	14.92 (5.91)	17.47 (6.83)	16.02 (6.56)
PANAS-PA	26.24 (8.13)	22.65 (8.81)	20.60 (8.76)

Table 1: Displays the means and standard deviations for the outcome measures used in the Patrick et al. (2010) study. STAXI-S = State Trait Anger Expression Inventory, State Anger Score. PANAS-NA = Positive and Negative Affect Scale, Negative Affect Score. PANAS-PA = Positive and Negative Affect Scale, Positive Affect Score.

Figure5:
ANOVA Results: Main Effect of Time from Patrick et al. (2010).

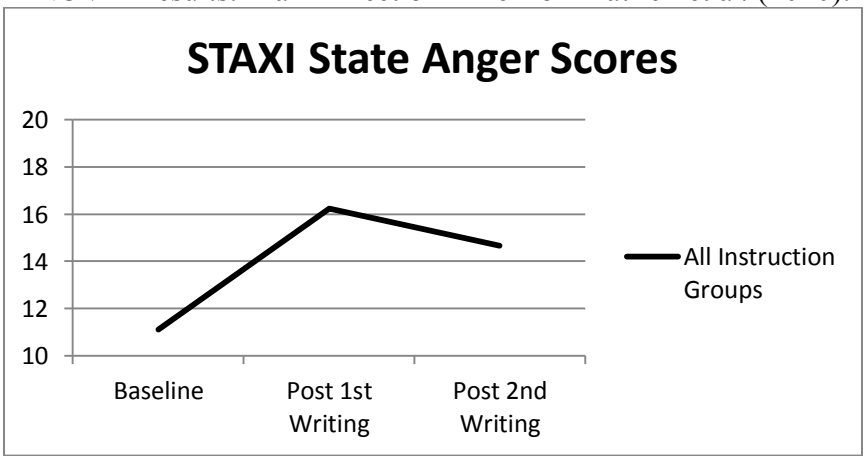


Figure 5: The three writing instruction groups did not display any differences and were thus combined into one group. The figure displays the significant main effect of completion time point. State anger significantly increased from baseline following the first writing and significantly decreased following the second writing; however, state anger was still significantly higher than baseline.

Table 2:
ANOVA Results from Patrick et al. (2010)

STAXI – State Anger		
Main Effect: Completion Time Point	Main Effect: Writing Condition	Interaction: Completion Point X Writing Condition
$F(2,84) = 38.80$; $p < .001$	$F(2,84) < 1.0$; $p = .643$	$F(4,84) = 1.10$; $p = .363$

Table 2: Displays the results of a 3 (writing instructions) X 3 (completion time point) mixed factor ANOVA performed on STAXI – State Anger Scores. The results show a significant main effect of completion time point, no main effect of writing condition, and no significant interaction.

Figure 6:
ANOVA Results: Main Effect of Time from Patrick et al. (2010).

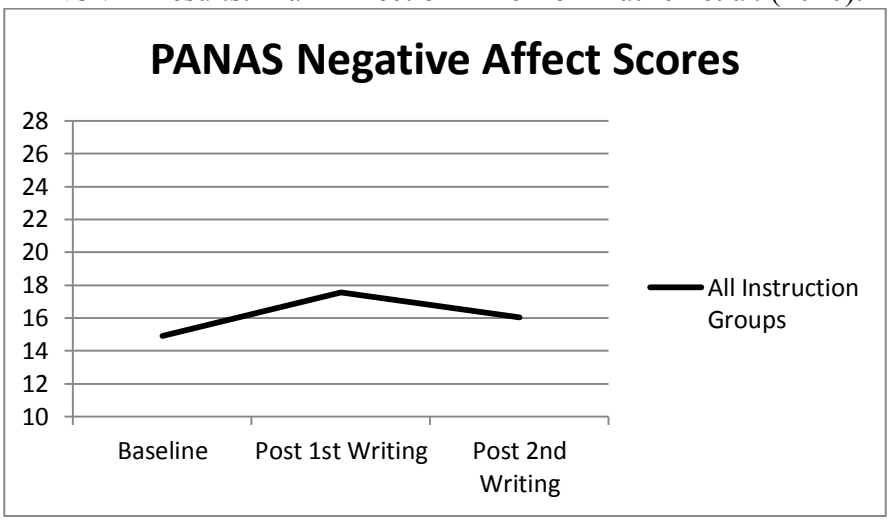


Figure 6: The three writing instruction groups did not display any differences and were thus combined into one group. The figure displays the significant main effect of completion time point. Negative affect significantly increased from baseline following the first writing, significantly decreased following the second writing and was no longer different from baseline.

Table 3:
ANOVA results from Patrick et al. (2010)

PANAS – Negative Affect		
Main Effect: Completion Time Point	Main Effect: Writing Condition	Interaction: Completion Point X Writing Condition
$F(2,83) = 12.54$; $p < .001$	$F(2,83) < 1.0$; $p = .572$	$F(4,83) = 1.35$; $p = .255$

Table 3: Displays the results of a 3 (writing instructions) X 3 (completion time point) mixed factor ANOVA performed on PANAS – Negative Affect Scores. The results show a significant main effect of completion time point, no main effect of writing condition, and no significant interaction.

Figure 7:
ANOVA Results: Main Effect of Time from Patrick et al. (2010).

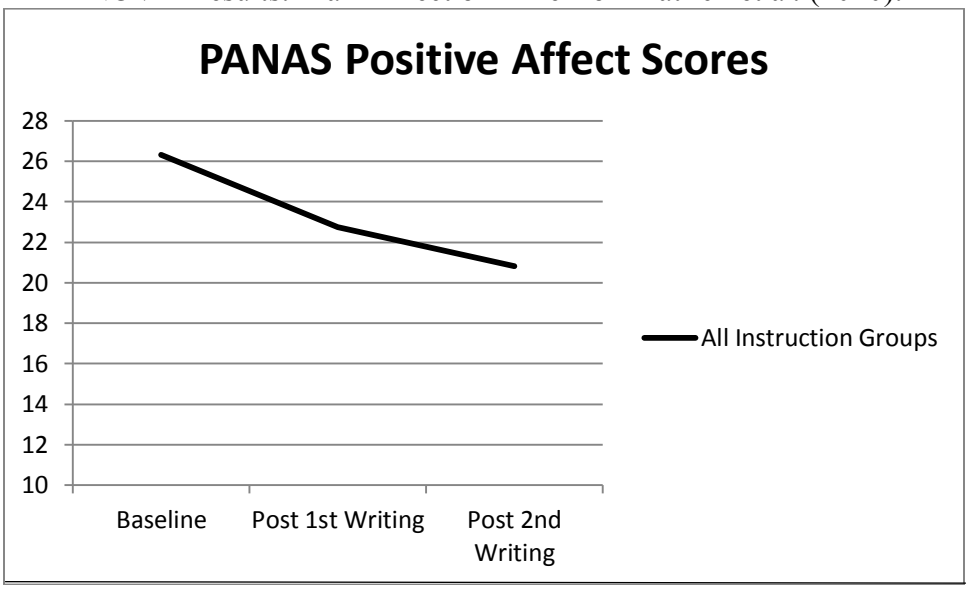


Figure 7: The three writing instruction groups did not display any differences and were thus combined into one group. The figure displays the significant main effect of completion time point. Positive affect significantly decreased from baseline following the first writing and further decreased significantly following the second writing.

Table 4:
ANOVA results from Patrick et al. (2010)

PANAS – Positive Affect		
Main Effect: Completion Time Point	Main Effect: Writing Condition	Interaction: Completion Point X Writing Condition
$F(2,83) = 34.37$; $p < .001$	$F(2,83) < 1.0$; $p = .379$	$F(4,83) < 1.0$; $p = .937$

Table 4: Displays the results of a 3 (writing instructions) X 3 (completion time point) mixed factor ANOVA performed on PANAS – Positive Affect Scores. The results show a significant main effect of completion time point, no main effect of writing condition, and no significant interaction.

Table 5:
Post-hoc t-test results from Patrick et al. (2010).

Baseline – Post 1st Writing	Post 1st Writing – Post 2nd Writing	Baseline – Post 2nd Writing
$t(87) = -8.29$; $p < .001$; $d = 1.13$	$t(86) = 3.26$; $p = .002$; $d = .25$	$t(88) = -5.19$; $p = <.001$; $d = .72$

Table 5: Displays the results from post-hoc t-tests for the STAXI – State Anger Scores. State anger significantly increased from baseline following the first writing, significantly decreased following the second writing; however, state anger was still significantly higher than baseline.

Table 6:
Post-hoc t-test results from Patrick et al. (2010).

Baseline – Post 1st Writing	Post 1st Writing – Post 2nd Writing	Baseline – Post 2nd Writing
t(87) = -8.29; p < .001; d = 1.13	t(86) = 3.26; p = .002; d = .25	t(85) = -1.83; p = .071; d = .18

Table 6: Displays the results from post-hoc t-tests for the PANAS – Negative Affect Scores. Negative affect significantly increased from baseline following the first writing, significantly decreased following the second writing and was no longer significantly different from baseline.

Table 7:
Post-hoc t-test results from Patrick et al. (2010).

Baseline – Post 1st Writing	Post 1st Writing – Post 2nd Writing	Baseline – Post 2nd Writing
t(87) = -8.29; p < .001; d = 1.13	t(86) = 3.26; p = .002; d = .25	t(85) = 7.44; p < .001; d = .65

Table 5: Displays the results from post-hoc t-tests for the PANAS – Positive Affect Scores. Positive affect significantly decreased from baseline following the first writing and further decreased significantly following the second writing.

Comparing repeating the same writing instructions with enhanced instructions targeting empathy and problem solving did not produce any significant effects. If the beneficial effects of writing are related to cognitive process such as organization and abstraction than one would expect that enhancing instructions to include processes such as empathetic perspective taking and functional problem solving would increase the therapeutic benefit of writing, which the present data does not indicate. It is possible, however, that the cognitive benefits of expressive writing require more repetitions over a longer time fame than the present study employed.

Behavioral Dependent Measures of Anger/Aggression:

Why Behavioral Measures Would Be Highly Beneficial:

The Cahill et al. (unpublished) and Patrick et al. (2010) studies relied on self-report measures of anger. Although the primary dependent variable used, the STAXI, is a well-validated instrument, the purpose is relatively transparent. Thus exclusive reliance on self-report data in such a face-valid task leaves open the possibility that the results

reflect a demand characteristic of the situation. Thus one purpose of the present line of research is to identify an alternative behavioral measure of aggressive behavior that can be included as a dependent measure in future research.

A brief review of the literature indicated that the field could benefit from more options in terms of such laboratory measures of aggression. It was difficult to find published research of behavioral measures that did not use deception and/or direct aggressive behavior. Specifically, it was found that the most commonly used laboratory procedure for studying aggression is a variation of the procedure used in the classic Milgram (1963, 1974) studies on obedience to authority. In this procedure, some participants (the "teachers") are supposed to help another participant (the "learner") learn some task by punishing mistakes through administration of electric shock. The learner in this situation is often a confederate of the study and does not actually receive any shocks. The dependent variable is the willingness or the extent to which the teacher administers the shocks, often in the face of (bogus) feedback that the learner finds the shock unpleasant (e.g., scripted statements involving the expression of pain or emotional distress by the learner) (Verona & Sullivan, 2008). It therefore seems that a behavioral measure of aggression that does not rely on deception and such direct aggression toward another would be a useful tool in studying anger.

The Prisoner's Dilemma:

One possibility is to use a competitive game such as the Prisoner's Dilemma (Axelrod & Hamilton, 1981; Scodel & Minas, 1960). The Prisoner's Dilemma is a competitive game that asks participants to engage in a process of decision making in which they can cooperate with someone else, such that both parties benefit, but at the risk

of having the partner take advantage of them. Or they may choose to compete ("defect" in the parlance of economic game theory) against the other party with the possibility of a larger benefit, but at a cost to the other party. The classic game scenario for a traditional Prisoner's Dilemma is as follows:

> *You and another person have been arrested for Robbing the North Shore Bank. The police have placed you in separate isolation cells. You have to decide whether you want to confess to the robbery or remain silent. The prosecuting attorney walks into your cell and explains to you the following set of options. 1) If you confess and your accomplice remains silent, I will drop all the charges against you – in exchange for your testimony – and you will be set free. Your accomplice will receive the maximum sentence of 15 years in prison. 2) If you remain silent and your accomplice confesses, I will drop all the charges against your accomplice who will go free and you will receive the maximum sentence of 15 years in prison. 3) If you both confess, I will make sure that you both receive a reduced sentence of 10 years in prison. 4) If you both remain silent, I will not have enough evidence to obtain convictions for the bank robbery charges. As a result I would only be able to charge you both with illegal possession of firearms and receiving stolen property. You would both receive 5 years in prison, at the most.*

Such classic Prisoner Dilemma tasks are primarily intended to examine cooperative social behavior within the context of a one-time decision. An alternative approach is to use an iterative version, where there is a succession of many decisions that summate. We have developed an iterative economic version for the current study in

which the decisions to cooperate or compete lead to the acquisition of hypothetical gold coins. An additional aspect in this format is that a person's decision to compete also occurs at the risk of being punished on subsequent trials for having defected. The game is designed in a manner such that cooperation is a safe long-term strategy but presents the temptation of greater benefits for occasional defection. In fact, the key defining characteristic of a Prisoner's Dilemma is that of a competitive game that uses the standard payoff matrix displayed in Table 8. Table 9 displays the actual payoff matrix for the version of the Prisoner's Dilemma that has been adapted for the current study. The game scenario for our economic version is as follows:

> *A fiendish millionaire has locked you and another person into a competitive game. You do not know the other person and cannot see them. You only know the other person's decision after you've made your decision and you do not know when the game will end. On each trial, you and the other person will each have to decide whether to cooperate or compete with one another. These decisions will determine the number of solid gold coins you each receive. If you both choose to cooperate you each receive 3 gold coins. If one of you chooses to cooperate and the other chooses to compete, the competitor will receive 5 gold coins and the cooperator will receive 0 gold coins. If you both decide to be competitive you will each receive 1 gold coin.*

The Prisoner's Dilemma has been used extensively in research on such topics as cooperation, economic decision making, and game theory; however, the sensitivity of the Prisoner's Dilemma to anger or other emotional processes has received little empirical attention. One study (Kassinove et.al. 2002) examined the relationship between trait

anger and competitive attack responses in a "Wartime" version of a Prisoner's Dilemma game, where the decisions involved troop deployment and victory at the cost of troops lost. The results found that those participants higher in trait anger experienced greater increases in state anger as a result of playing the game and were more likely to engage in competitive responses, especially if they were playing against another participant who was also high in trait anger (Kassinove et.al. 2002).

Table 8:
Standard Payoff Matrix for the Prisoner's Dilemma Game

	Player 2	
Player 1	Cooperate	Compete
Cooperate	*Reward* Reward	*Sucker's Bet* Temptation
Compete (Defect)	*Temptation* Sucker's Bet	*Punishment* Punishment

Table 8: Represents the standard payoff of structure for decisions made in the Prisoner's Dilemma game.

Table 9:
The Payoff Matrix for the version of the Prisoner's Dilemma used in the current study.

	Player 2	
Player 1	Cooperate	Compete
Cooperate	Both players receive 3 "Gold Coins".	*Player 1 receives 0 "Gold Coins".* Player 2 receives 5 "Gold Coins".
Compete (Defect)	*Player 1 receives 5 "Gold Coins".* Player 2 receives 0 "Gold Coins".	Both Players Receive 1 Gold Coin

Table 9: Displays the payoff structure for the iterative economic version of the Prisoner's Dilemma that has been adapted for use in the current study.

A pilot study conducted as part of the current line of research recruited 96 undergraduate students at the University of Wisconsin – Milwaukee. Participants were randomly assigned to write about either an angry memory or an emotionally neutral memory. Participants were then randomly assigned to play the Prisoner's Dilemma game against another participant who had written about either an angry or a neutral memory. The goal was to determine if those participants who wrote about an angry memory, and thus experienced state anger induction, would engage in more competitive responses, especially if paired with another participant who had experienced anger induction.

As with our prior research, participants completed the STAXI and PANAS before and after the writing exercise. The STAXI and PANAS results confirmed the activation of state anger and negative affect through expressive writing. Compared to those participants who wrote about an emotionally neutral memory, those participants who wrote about an angry memory displayed a sharp initial increase in both state anger ($F[1,88] = 7.49$, $p = .007$) and negative affect ($F[1,83] = 14.16$, $p < .001$). The results are displayed in Tables 10 and 11 and Figures 8 and 9.

Figure 8:
ANOVA Results STAXI – State Anger Scale; Prisoner's Dilemma Pilot Study

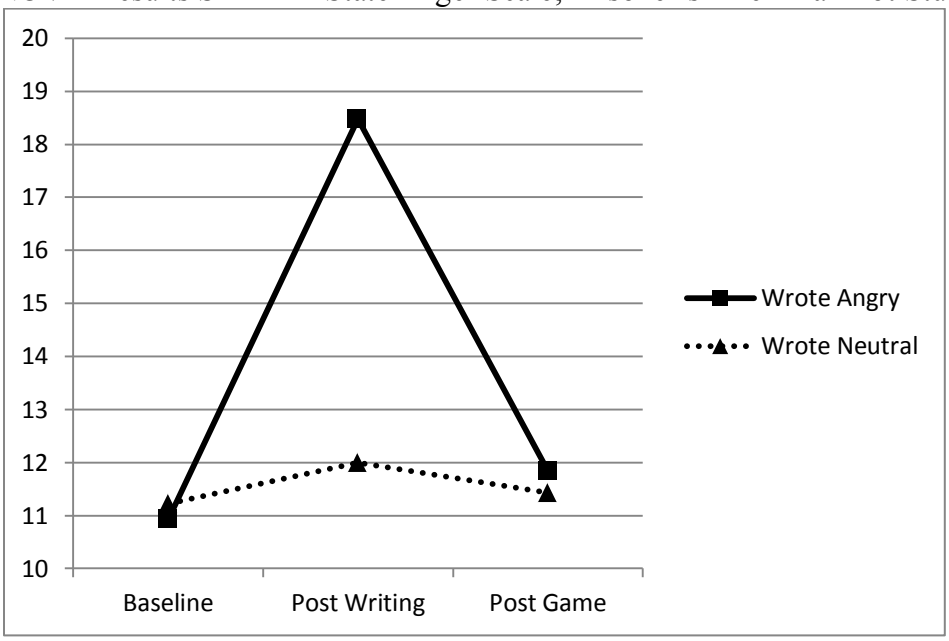


Figure 8: Displays the results of an ANOVA of state anger scores compared across writing topics. Those participants who wrote about an angry memory show a significant increase in state anger following writing. Participants who wrote about an emotionally neutral memory show no change in state anger.

Table 10:
STAXI – State Anger Descriptive Data from Prisoner's Dilemma Pilot Study

	Baseline: Mean (sd)	Post Writing: Mean (sd)	Post Prisoner's Dilemma Game: Mean (sd)
Wrote Angry	10.93 (1.37)	18.48 (7.31)	11.84 (3.34)
Wrote Neutral	11.22 (2.83)	12.00 (5.05)	11.43 (4.58)

Table 10: Displays the means and standard deviations for the STAXI – State Anger Scale for both writing conditions.

Figure 9:
ANOVA Results PANAS – Negative Affect Scale; Prisoner's Dilemma Pilot Study

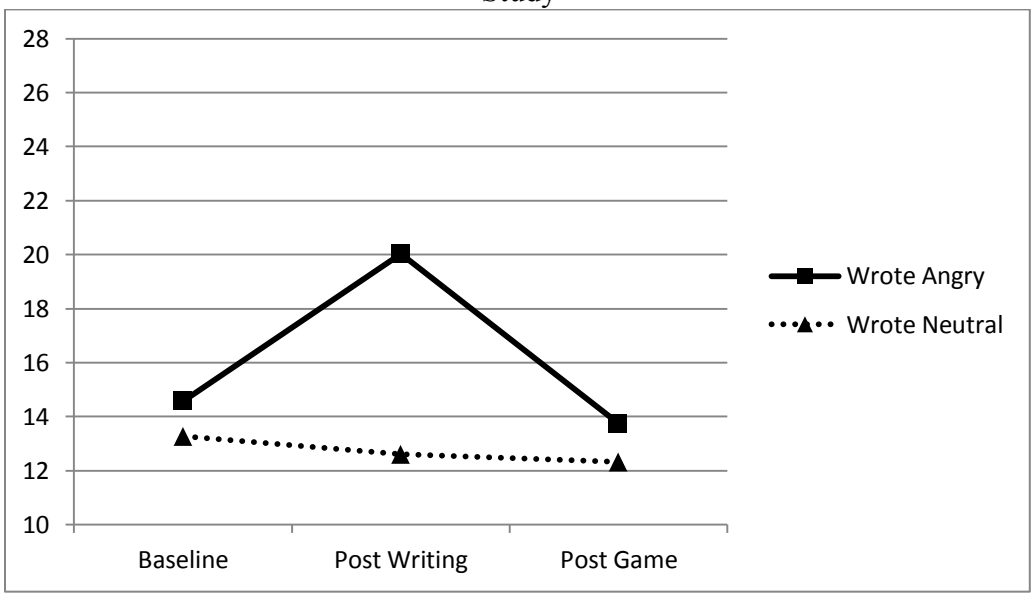


Figure 9: Displays the results of an ANOVA of state anger scores compared across writing topics. Those participants who wrote about an angry memory show a significant increase in negative affect following writing. Participants who wrote about an emotionally neutral memory show no change in negative affect.

Table 11:
PANAS – Negative Affect Descriptive Data from Prisoner's Dilemma Pilot Study

	Baseline: Mean (sd)	Post Writing: Mean (sd)	Post Prisoner's Dilemma Game: Mean (sd)
Wrote Angry	14.58 (4.75)	20.02 (7.73)	13.75 (4.51)
Wrote Neutral	13.26 (3.66)	12.60 (3.65)	12.33 (4.09)

Table 11: Displays the means and standard deviations for the PANAS – Negative Affect Scale for both writing conditions.

The results found suggestive but far from conclusive evidence that the iterative economic version of the Prisoner's Dilemma responds to manipulations of state anger. Those participants who wrote about an angry memory did not consistently engage in more competitive responses, but potentially informative group differences were found. The pairing of participants based on writing condition created four groups of game partners (neutral-neutral, neutral-angry, angry-neutral, and angry-angry). A single-factor

ANOVA on the cumulative number of competitive responses for each of the four groups produced a significant finding (F[3,92] = 3.21; p = .027). The results are displayed in Table 12.

Table 12:
Main Effect of Study Condition from Prisoner's Dilemma Pilot Study

Partner Condition Participant Condition	Neutral Neutral	Neutral Angry	Angry Neutral	Angry Angry
	21.7 (16.45)[a]	33.7 (14.89)[b]	34.0 (15.07)[b]	26.0(16.15)[a, b]

Table 12: Displays the significant main effect (F[3,92] = 3.21; p = .027) of study condition on cumulative number of competitive responses in the Prisoner's Dilemma. The mean and (sd) is displayed for each group. Means that share an alphabetic superscript are not statistically different.

Separate paired t-tests for independent samples revealed the following: The neutral-neutral group engaged in significantly fewer competitive responses compared to the neutral-angry group (t = -12.00; p = .015) and the angry-neutral group (t = -12.31; p = .013). Thus, the two mixed groups in which one partner wrote about a neutral memory and the other wrote about an angry memory differed from the group in which both wrote about a neutral memory; however, the two mixed groups did not differ from each other. Additionally, the group in which both participants wrote about an angry memory did not differ from any of the other groups.

A chi-square analysis revealed that the standard response on the first trial was a cooperative response, with 75% of participants cooperating of the first trial. However, for those who did provide a competitive response on the first trial, 62.5% of them had written about an angry memory. This difference was not statistically significant ($\chi^2 = 2.0$; p = .16). One note of interest is that participants played the game against one another in a mostly uncontrolled, naturalistic manner. Therefore, with cooperation being the standard initial response, there may have been limited opportunity for competitive behavior if participants generally maintained cooperative responses. The current study seeks to

expand upon and further test these findings and the potential for an iterative economic version of the Prisoner's Dilemma to serve as an effective behavioral measure by increasing the opportunity for the initiation of mutual competition. As described in more detail in the methods section, participants will play the game against a confederate who will provide competitive responses on select trails in an attempt to lure the participant into competition. The purpose of such a procedure is to see in more angry individuals, those who have written less about their angry memory, are more easily pulled into competition than less angry participants.

The Current Study: Purpose and Empirical Questions

Our pilot data had shown that state anger is successfully activated through expressive writing about an angry memory and that this activation of state anger is diminished with repeated writing about the same memory. These results suggested that expressive writing could provide a means of treating anger through exposure and habituation. Yet there were remaining questions, some of which the proposed study was designed to address. Is the observed decrease in state anger following repetitions of writing due to the content of the writing and behavioral mechanisms such as exposure to the anger provoking content and the habituation of the emotional state of anger, or is state anger reduced through the mere passage of time? This question will be answered through the inclusion of an emotionally neutral writing control group (Neutral Writing Control).

What are the effects of different temporal patterns of writing and exposure? Is there a benefit to temporally spaced writing sessions, compared to massed writing? These questions speak to the therapeutic mechanisms of exposure therapy. Are the effects of massed writing stable over time or does spontaneous recovery occur? This question

speaks to the durability of behavioral changes and whether variations in how treatment is delivered might reduce relapse. The inclusion of the following experimental groups was intended to inform these questions: Spaced Exposure, Massed Exposure with Long Retention, Massed Exposure with Brief Retention. Do the changes in anger and negative affect that occur with expressive writing coincide with changes in experiential avoidance? A measure of experiential avoidance, the Acceptance and Action Questionnaire (AAQ), was included in the initial baseline assessment and re-administered following the final writing task in order to explore this question. Does a revised iterative economic version of the Prisoner's Dilemma game respond to state anger manipulations allowing it to be used as a dependent measure of changes in anger?

Hypotheses:

The following specific hypotheses were proposed. A breakdown of all hypotheses and related predictions can also be found in Table 13.

Hypothesis 1 – Anger Activation: Those participants writing about an angry memory for the first time will show an acute activation of state anger and negative affect, reflected by a significant increase in STAXI State Anger and PANAS Negative Affect scores, compared to those participants writing about an emotionally neutral memory.

Hypothesis 2 – Anger Habituation: After repetitive writing about the same angry memory, participants will show a reduction in the activation of state anger and negative affect. In the three exposure conditions, participants' state anger and negative affect scores will be significantly lower following their second time writing about their angriest memory compared to their first time writing. Following writing about an angry memory during the final session, those participants writing about the angry memory for the third

time (Spaced Exposure, Massed Exposure – Long Retention, and Massed Exposure – Brief Retention) will display lower levels of state anger and negative affect than participants writing about their angriest memory for the first time (Neutral Writing Control). The Neutral Writing Control Group will be writing about an angry memory for the first time during the third session and therefore is expected to display activation of state anger and negative affect.

Hypothesis 3 – Spaced v. Massed Exposure: Spaced sessions of writing compared to massed writing in a single session will produce differential effects in the reduction of state anger and negative affect, reflecting differential rates of habituation. Massed writing will produce a more rapid reduction in state anger and negative affect than spaced writing sessions such that: Upon writing about their angriest memory for the second time, those participants in a massed writing condition (Massed Exposure – Long Retention, and Massed Exposure – Brief Retention) will display significantly lower state anger and negative affect scores compared to participants in the Spaced Exposure condition. The Massed Exposure – Long Retention Condition will display partial spontaneous recovery evidenced by the following: Upon writing about their angriest memory for the third and final time, participants in the Massed Exposure – Long Retention Condition will display significantly higher levels of state anger and negative affect compared to the other two exposure conditions (Spaced Exposure, and Massed Exposure – Brief Retention); however, their scores will remain significantly lower than following their initial angry writing task. Upon writing about their angriest memory for the third time, the groups Spaced Exposure and Massed Exposure – Brief Retention will not differ in their activation of State Anger and Negative Affect, displaying equivalent levels of

habituation; however, in both groups, participant's scores will be significantly lower than following their first time writing about their angriest memory, and their scores will no longer differ from baseline.

Hypothesis 4 – Competitive Responses in the Prisoner's Dilemma Game: Those participants with higher levels of State Anger will give significantly more competitive responses in the Prisoner's Dilemma game. During the first session, the Spaced Exposure group will display significantly more competitive responses compared to the other three groups (Massed Exposure – Long Retention, Massed Exposure – Brief Retention, and Neutral Writing Control), reflecting the acute activation of state anger without habituation. During the final session, the Neutral Writing Control group, having written about an angry memory for the first time, will display the highest number of competitive responses, which will be significantly more than the other three groups. During the final session, the Massed Exposure – Long Retention group will display significantly more competitive responses than the other two exposure groups (Spaced Exposure and Massed Exposure Brief Retention), reflecting partial spontaneous recovery of anger. The Spaced Exposure group will display significantly fewer competitive responses during the 3rd session than during the 1st session, reflecting reduced anger in response to writing about the previously anger evoking topic.

Exploratory Aims:

The following are Exploratory Aims that are not associated with specific hypotheses and are stated instead as open questions.

Experiential Avoidance: Do the changes in anger and negative affect that occur with expressive writing coincide with changes in experiential avoidance, as would be

expected if exposure and habituation to the private experience of emotion is a mechanism of change? A measure of experiential avoidance, the Acceptance and Action Questionnaire (AAQ), is being included in the initial baseline assessment and re-administered following the final writing task in order to explore this question.

Trait Anger Change: Can expressive writing, within the relatively short time period of less than a week, influence reported levels of Trait Anger? If so, do spaced writing sessions have a differential effect than massed writing? If so, how does that inform Trait Anger as a construct? The full version of the STAXI is being re-administered following the final writing task in order to explore this question.

Table 13: Hypotheses, Exploratory Aims, and Predictions

Hypothesis or Aim	**Specific Related Predictions**
Hypothesis 1 – Anger Activation: The first time participants write about an angry memory the activation of state anger and negative affect will be evident in self-report measures.	• Those participants writing about an angry memory for the first time will show an acute activation of state anger and negative affect compared to those participants writing about an emotionally neutral memory.
Hypothesis 2 – Anger Habituation: After repetitive writing about the same angry memory, participants will show a reduction in the activation of state anger and negative affect.	• In the three exposure conditions participants state anger and negative affect scores will be significantly lower following their second time writing about their angriest memory compared to their first time writing. • Following writing about an angry memory during the final session, those participants writing about the angry memory for the third time will display lower levels of state anger and negative affect than participants writing about their angriest memory for the first time. • The Neutral Writing Control Group, writing about an angry memory for the first time during the third session, will display activation of state anger and negative affect.
Hypothesis 3 – Spaced v. Massed Exposure: Spaced sessions of writing compared to massed writing in a single session will produce differential effects in the reduction of state anger and negative affect, reflecting differential rates of habituation.	• Massed writing will produce a more rapid reduction in state anger and negative affect than spaced writing sessions. • The Massed Exposure – Long Retention Condition will display partial spontaneous recovery. • Upon writing about their angriest memory for the third time, the groups Spaced Exposure and Massed Exposure – Brief Retention will not differ in their activation of State Anger and Negative Affect, displaying equivalent levels of habituation.

Table 13: Hypotheses, Exploratory Aims, and Predictions cont.…

Hypothesis or Aim	**Specific Related Predictions**
Hypothesis 4 – Competitive Responses in the Prisoner's Dilemma Game: Those participants with higher levels of State Anger will give significantly more competitive responses in the Prisoner's Dilemma game.	• During the first session, the Spaced Exposure group will display significantly more competitive responses compared to the other three groups, reflecting the acute activation of state anger without habituation. • During the final session, the Neutral Writing Control group, having written about an angry memory for the first time, will display the highest number of competitive responses, which will be significantly more than the other three groups. • During the final session, the Massed Exposure – Long Retention group will display significantly more competitive responses than the other two exposure groups reflecting partial spontaneous recovery of anger. • The Spaced Exposure group will display significantly fewer competitive responses during the 3rd session than during the 1st session, reflecting their reduced anger.
Exploratory Aim 1 – Experiential Avoidance: Do the changes in anger and negative affect following expressive writing coincide with changes in experiential avoidance, as would be expected if exposure and habituation to the private experience of emotion is a mechanism of change?	• Is exposure and habituation to the private experience of emotion a mechanism of change? • A measure of experiential avoidance, The Acceptance and Action Questionnaire (AAQ), is being included in the initial baseline assessment and re-administered following the final writing task in order to explore this question.
Exploratory Aim 2 – Trait Anger: Can expressive writing, within the relatively short time period of less than a week, influence reported levels of Trait Anger?	• If so, do spaced writing sessions have a differential effect than massed writing? • If so, how does that inform Trait Anger as a construct? • The full version of the STAXI is being re-administered following the final writing task in order to explore this question.

METHOD

Participants

One hundred and twenty students recruited from psychology courses at the University of Wisconsin – Milwaukee. Participants were required to be at least 18 years of age and received extra credit for their participation at the discretion of their instructor. Participants were assigned to one of four study groups utilizing a blocked-randomization procedure to insure 30 participants in each of the four study groups. Data from participants who did not complete all three study visits were not included in the primary study analyses.

Materials (Copies of all study materials may be found in Appendix A).

State-Trait Anger Expression Inventory (STAXI). The STAXI is a 44-item self-report measure designed to assess multiple aspects of the emotional experience of anger (Spielberger, 1988). The STAXI was initially developed as *The State-Trait Anger Scale (STAS)* to assess individual differences in the experience of anger. *State Anger* was conceptualized as *"a psychobiological state or condition consisting of subjective feelings of anger that vary in intensity from mild irritation or annoyance to intense fury and rage"* (Spielberger & Sydeman, 1994, p. 302). It was additionally assumed that *State Anger* is characterized by frequent fluctuation over time in response to perceived affronts or injustice (Spielberger & Sydeman, 1994). The *State Anger* scale consists of 10 items that evaluate the intensity of anger experienced when answering the items. The participant rates statements such as "I am furious" on a 4 point scale (1= Not at all; 4 = Very much so) on the basis of "How I Feel Right Now," resulting in scores ranging from 10 to 40 (Spielberger, 1988).

Trait Anger was conceptualized as measuring individual differences in the extent to which state anger is experienced over time. Thus, it is assumed that individuals higher in *Trait Anger* experience a wider range of situations as anger provoking and thus experience state anger more frequently (Spielberger & Sydeman, 1994). The *Trait Anger* scale consists of 10 items that measure the general tendency to experience anger as an emotional response. The participant rates items such as "I am quick tempered" on a 4 point scale (1= Not at all; 4 = Very much so) according to "How I Generally Feel," resulting in scores ranging from 10 to 40 (Spielberger, 1988).

The state and trait anger scales are each scored by summing the participant's responses. During development both the state (α = .93) and trait (α = .87) anger scales displayed high internal consistency (Spielberger & Sydeman, 1994). The test-retest reliability of the trait anger scale has been found to be adequate over a two week period for both males (r = .70) and females (r = .77); however, as would be expected for a measure of transitory emotion, the state anger scale displays lower stability over time (r = .27 for males; r = .21 for females). The state and trait anger scales have been found to display adequate validity through several studies examining concurrent, discriminant, predictive, and construct validity (Spielberger & Sydeman, 1994).

The *Anger Expression* scale consists of 24 items that assess how frequently an individual engages different coping strategies (Anger In; Anger Out; Anger Control) in response to the experience of anger. For all expression subscales, participants rate the statements on a 4 point scale (1= Not at all; 4 = Very much so) on the basis of "When angry or furious…". The *Anger In* subscale consists of 8 items that relate to the internalization of angry feelings (e.g., "*I keep things in*", "*I withdraw from people*"). The *Anger Out* subscale consists of 8 items that relate to the externalization and outward expression of feelings of anger (e.g., "*I do things like slam doors*", "*I strike out at whatever infuriates me*"). The *Anger Control* subscale consists of 8 items that relate to the effortful suppression and control of angry feelings (e.g., "*I control my temper*", "*I try to be tolerant and understanding*"). The anger expression scale yields a composite score by adding the scores for Anger In and Anger Out, subtracting the score for Anger Control, and then adding a constant of 16 to eliminate negative numbers, resulting in scores ranging from 0 to 72 (Spielberger, 1988; Spielberger & Sydeman, 1994).

The Anger In and Anger Out subscales both display adequate internal consistency with alpha coefficients ranging from .73 to .84, with a tendency for the Anger In scale to produce higher coefficients (Spielberger & Sydeman, 1994). The Anger In and Anger Out scales produce test-retest correlations ranging from .64 to .86 and the two subscales have been repeatedly found to be essentially uncorrelated (Spielberger & Sydeman, 1994). Thus, the two primary expression subscales of Anger In and Anger Out have been found to be empirically reliable measures of two independent aspects of anger expression style. The Anger Control subscale has been found to negatively correlate with the Anger Out subscale (r = - .59) and has been found to be a stable and separate factor from the other scales in multiple factor analytic studies, with each subscale item displaying a significant loading on the Anger Control factor. In fact, these studies have repeatedly confirmed that the factor structure of the STAXI reflects the structure of the separate scales and the items within those scales (Forgays et al., 1997; Fuqua et al., 1991; Spielberger & Sydeman, 1994).

Positive and Negative Affect Scale (PANAS). The PANAS is a 20-item self-report measure that assesses the degree to which an individual is experiencing both positive and negative emotions at the time of completion (Watson, et al., 1988). *Positive Affect* is conceptualized as feelings of being enthusiastic, active, and alert. *Negative Affect* is conceptualized as a dimension of subjective distress that includes several aversive mood states such as anger, contempt, disgust, guilt, and fear. Participants are instructed to rate 20 emotion related adjectives on a 5 point scale (1 = slightly or not at all; 5 = extreme) on the basis of "to what extent you feel this way RIGHT NOW". The 20 items are equally divided into positive emotion adjectives (e.g. interested, proud) and negative emotion

adjectives (e.g. irritable, ashamed). The PANAS is scored by summing the participant's responses for the two scales separately. Each participant thus produces a positive affect score and a negative affect score. High scores on the positive affect scale are thought to represent high energy, full concentration, and pleasurable engagement and low scores are characterized by lethargy. High scores on the negative affect scale are associated with the experience of distress such as anger or sadness, with low scores being thought to reflect a state of serenity (Watson, et al., 1988).

During development and validation research, the PANAS was found to display adequate internal consistency for both the positive affect ($\alpha = .89$) and negative affect ($\alpha = .85$) scales and appropriate test-retest reliability, positive affect ($r = .54$), negative affect ($r = .45$) (Watson, et al., 1988). Factor analyses have demonstrated that the PANAS provides reliable and independent measurement of positive and negative affect. It is important to note that psychometric analyses consistently find that positive and negative affect are independent constructs, as opposed to being opposite ends of the same dimension. Comparisons of the PANAS with existing measures of distress and psychopathology demonstrated adequate convergent and discriminant validity (Watson, et al., 1988).

Acceptance and Action Questionnaire (AAQ). The AAQ is a 9-item questionnaire designed to measure the degree to which a respondent engages in experiential avoidance (Hayes et al., 2004). Experiential avoidance is conceptualized as a behavioral process by which an individual *"is unwilling to remain in contact with particular private experiences"* (p. 554). Thus, an individual high in experiential avoidance responds to certain private experiences (e.g., emotions, thoughts, memories, images) with attempts to

alter the frequency or manner in which those experiences occur. Experiential avoidance additionally includes the avoidance of contexts and situations that are associated with such undesirable private experiences. The AAQ items (e.g. "I'm not afraid of my feelings"; "If I could magically remove all the painful experiences I've had in my life, I would do so") are rated on a 7-point scale (1 = never true; 7 = always true), with total scores ranging from 9 to 63 (Hayes et al., 2004). Higher scores on the AAQ indicate greater levels of experiential avoidance. The AAQ has been found to display adequate internal consistency ($\alpha = .70$). Hayes et al. (2004) additionally found that higher scores on the AAQ significantly correlated with higher levels of general psychopathology, depression, anxiety, trauma related symptoms, various specific fears (e.g., agoraphobia, blood/injury phobia), and lower quality of life. Test-retest reliability was $r = .64$ for a four-month period.

Memory Identification Form. The Memory Identification Form is designed to assist participants in clearly identifying and recalling specific memories that they are later asked to write about in detail. All participants are asked to identify both an anger evoking memory and two emotionally neutral memories at the beginning of the study, and whenever subsequently asked to write about an emotionally neutral memory or their angriest memory they are to refer back to the appropriate memory they have previously identified. The instructions for identifying each of the memories are as follows. *Angry Memory:* "Please identify a memory for an event in your life that made you feel very angry. This memory should not just be of an event that made you angry at the time it happened, but it should also be one that still makes you feel very angry as you currently think about it. For example, an angry memory might be of a fight with a parent, close

friend, significant other, or roommate. The important thing is that you think of the memory that makes you the angriest". *Neutral Memory:* "Please identify two memories for events that were not associated with any particular emotional experience. These memories should not just be of emotionally neutral events that did not produce any strong feelings at the time they happened, but they should also be ones that still do not make you have any particular strong feelings as you currently think about them. For example, an emotionally neutral memory might be what you had for breakfast yesterday or what clothes you decided to wear to class today. The important thing is that you think of two memories that did not evoke any particularly strong feelings at the time they happened or as you currently think about them." For each memory, participants are further instructed to "please write down a few words that summarize the memory you have identified. If necessary, the experimenter will use these words to remind you of the memory you have identified in this and following sessions."

Iterative Prisoner's Dilemma Game. The research assistant directing the game will follow a standardized script that describes to participants the game's scenario, rules, payoff matrix, and instructions. The research assistant directing the game will use a standardized recording form to track the decisions made and the subsequent outcome of each trial, as well as the number of "coins" won by each person up to that point in the game. Each participant will be given a copy of the standardized instructions, description of the game, and payoff matrix. In order to track their progress in the economic competition, each participant will be given a Participant Game Recording Form, which consists of a single sheet of paper with four labeled columns for the participants to record the following information after each trial: trial number; decision; number of "coins" won

on that trail; total number of "coins" won to that point. The confederate research assistant will be given a copy of the Research Assistant Game Recording Form, which will include the knowledge that the game ends after 30 trials. The confederate will also have an instruction page to remind them of the strategy they are to adopt during the game.

Procedure

The current study consisted of four participation conditions (Spaced Exposure; Massed Exposure Long Retention; Massed Exposure Brief Retention; Neutral Writing Control) that determined the timing and nature of the study tasks that took place over the course of three participation sessions. All participants completed equivalent tasks and total participation time was equivalent for all participants. The three participation sessions were spaced two to four days apart (e.g. Monday – Wednesday – Friday, or Monday – Thursday – Monday). The longest scheduled period of time between participation sessions was four days (e.g. Monday – Friday, or Thursday – Monday). Table 14 outlines the activities of the four participation groups over three sessions. During the first participation session, all participants began by completing the following forms: informed consent, general instructions, a demographics questionnaire, the full STAXI, PANAS, AAQ, and memory identification form. Subsequent study activities and tasks were determined by random assignment to one of four study conditions.

In two conditions (*Spaced Exposure and Massed Exposure-Long Retention*), the participants continued by writing about their angriest memory, followed by playing the Prisoner's Dilemma Game. A third group (*Massed Exposure-Brief Retention*) also played the Prisoner's Dilemma game but did not begin writing until the next session. The fourth group (*Neutral Writing Control*) continued by writing about an emotionally neutral

memory, followed by playing the Prisoner's Dilemma Game. With one noted exceptions, study tasks such as narrative writing and the Prisoner's Dilemma were immediately followed by completing the following self-report measures: STAXI State Anger and PANAS. The exception was following the final writing task when participants will complete the AAQ, the full version of the STAXI, and the PANAS.

For each participation session, participants were given a binder that contained instructions, questionnaires, and all other task related materials to be completed during that session. Each set of questionnaires and task related materials were separated by dividers and STOP pages. After completing one part of the binder, the research assistant instructed the participant to continue on to the next section in the binder. At the conclusion of each session, the participant was asked to deposit the entire binder into a large box with an open slot in top.

Expressive Writing. The primary purpose of the four participation groups was to manipulate the topic of writing and the temporal pattern in which participants completed the writing tasks. When asked to write about their angriest memory or an emotionally neutral topic, participants were instructed to refer back to the memories they identified at the beginning of the study. If necessary, the experimenter used the brief reminder words previously identified by the participant to help remind them of the memory that was identified. Each time participants were asked to write, they were instructed to write continuously for 20 minutes and that if they ran out of material they were to repeat what they had already written. The research assistant running the participation session timed the writing exercise(s) and, after 20 minutes of continuous writing, instructed the participant that she/he was to continue on the next section of the binder.

Table 14:
Outline of session by session participations tasks for each study condition.

Condition	Session 1	Session 2	Session 3
Spaced Exposure	Consent, Demographics, Full STAXI, PANAS, AAQ, Memory ID (angry & 2 neutral), **Write Angry Memory** STAXI-S, PANAS *PD Game w/ Confederate* STAXI-S, PANAS	STAXI-S, PANAS **Write Angry Memory** STAXI-S, PANAS	STAXI-S, PANAS **Write Angry Memory** Full STAXI, PANAS, AAQ *PD Game w/ Confederate* STAXI-S, PANAS
Massed Exposure-Long Retention	Consent, Demographics, Full STAXI, PANAS, AAQ, Memory ID (angry & 2 neutral), **Write Angry Memory** STAXI-S, PANAS **Write Angry Memory** STAXI-S, PANAS *PD Game w/ Confederate* STAXI-S, PANAS	STAXI-S, PANAS	STAXI-S, PANAS **Write Angry Memory** Full STAXI, PANAS, AAQ *PD Game w/ Confederate* STAXI-S, PANAS
Massed Exposure-Brief Retention	Consent, Demographics, Full STAXI, PANAS, AAQ, Memory ID (angry & 2 neutral), *PD Game w/ Confederate* STAXI-S, PANAS	STAXI-S, PANAS **Write Angry Memory** STAXI-S, PANAS **Write Angry Memory** STAXI-S, PANAS	STAXI-S, PANAS **Write Angry Memory** Full STAXI, PANAS, AAQ *PD Game w/ Confederate* STAXI-S, PANAS
Neutral Writing Control	Consent, Demographics, Full STAXI, PANAS, AAQ, Memory ID (angry & 2 neutral), **Write Neutral Memory 1** STAXI-S, PANAS *PD Game w/ Confederate* STAXI-S, PANAS	STAXI-S, PANAS **Write Neutral Memory 2** STAXI-S, PANAS	STAXI-S, PANAS **Write Angry Memory** Full STAXI, PANAS, AAQ *PD Game w/ Confederate* STAXI-S, PANAS

The Spaced Exposure group wrote about their angriest memory once in each of the three sessions. The Massed Exposure-Long Retention wrote about their angriest memory twice in the first session, did not write during the second session, and wrote again about their angriest memory once during the final session. By varying the interval length between the second writing task and the final writing task, comparison the of Spaced Exposure and Massed Exposure-Long Retention conditions provided an evaluation of the effect of massed vs. spaced trials while controlling for the interval between the first writing and the final writing tasks. The Massed Exposure-Brief Retention did not write during the first session, wrote about their angriest memory twice during the second session, and wrote about their angriest memory once during the final session. Comparison of the Spaced Exposure and Massed Exposure-Brief Retention conditions provided another evaluation of massed vs. spaced trials; however, in this comparison the interval length between the first and final writing tasks is varied, while the interval between the second and the final writing tasks is controlled.

The Neutral Writing Control group wrote about an emotionally neutral memory once during the first session, wrote about a different emotionally neutral memory once during the second session, and then wrote about their angriest memory once during the final session. The inclusion of an emotionally neutral control group allowed us to determine whether any changes in state-anger or negative affect was due to the differential content of the writing assignments during sessions one and two. In addition, this condition provided for a critical control for the passage of time influencing anger and negative affect. Instructing participants to write about different neutral memories, as opposed to writing about the same neutral memory, was implemented in response to past

observations that asking participants to write repetitively about an emotionally neutral event, which is also likely to be a rather uninteresting topic to write extensively about, can be quite irritating for the participant and such irritation could serve to spoil the emotionally neutral control group by inadvertently creating an affective manipulation.

Iterative Prisoner's Dilemma Game. All participants in all conditions played the economic Prisoner's Dilemma game during the first and final sessions. All participants played the game with a confederate research assistant. Both times the game was played, the confederate was instructed to adopt a modified "tit-for-tat" strategy. Conventionally, the tit-for-tat strategy is when a player makes a cooperative response on the very first trial, and, thereafter, responds on each trial in the manner the opponent responded on the prior trial. For example, if the participant provides a cooperative response on trial one, the confederate provides a cooperative response on trial two; however, had the participant given a competitive response on trial one, the confederate would provide a competitive response on trial two. This is a strategy that has been shown to generally promote relatively high levels of cooperative responding.

One of the goals of the present study was to insure that all participants faced an equivalent opportunity to become engaged in a competitive interaction. The purpose of insuring such opportunity for competition was to evaluate if more angry participants would be more likely to respond to the confederate's competitive behavior with further additional competitive responses compared to less angry participants. Accordingly, the tit-for-tat strategy was modified in the following manner: The confederate began with a cooperative response on the first trial, followed with the tit-for-tat strategy on trials 2 – 5,

provided competitive responses on trials 6 and 7 (regardless of the participants' responses), and then returned to the tit-for-tat strategy for the remaining trials.

The participant and confederate were be separated by a room divider. They were able to hear each other and thus were aware of each other's presence; however, the participant was kept from visually identifying the confederate and both the confederate and participant were instructed not to speak aloud during the game. The purpose of these procedures was to provide the participant with the clear understanding that they were playing the game against another person. Anger is a social emotion and therefore it is desirable that participants perceive a social contingency; however, participants were kept uniformed about any specific characteristics of the confederate such as gender or age in order to avoid other contingent behavior, such as a male participant being more or less competitive with a female confederate. These procedures also kept the participant from identifying the other person as a confederate of the study.

Game playing occurred in a room already occupied by the participant located on the far side of a room divider. The RA directing the game stepped out of the room, leaving the door open, and verbally invited the confederate in for the game. The confederate entered the room and remained in the near side without crossing the divider, thus remaining unseen by the participant.

The game procedure began with the research assistant directing the game reading a standardized description and set of instructions for the game. The RA instructed the participant and confederate to turn to the section of their binders containing the game materials, which included the instructions and description for the Prisoner's Dilemma game as well as a response form so that the participant could record her/his ongoing

results during the game. The participant and confederate were instructed that the game would continue until they were told to stop. Participants were not explicitly informed how long the game would last in order to prevent participants from responding differently to the contingency demands of knowing the last trial. Specifically, if a participant knows that they have reached the last trial, the participant also knows there can be no subsequent retaliation for a competitive response. Therefore, participants may be more likely to succumb to temptation if they know they are playing their final trial.

Both the participant and confederate were given a pair of green and red paddles labeled cooperate and compete, respectively. The participant and confederate were instructed to raise the green paddle if they chose to cooperate and the red paddle if they chose to compete. The participants were instructed to make their first decision to compete or cooperate and to raise the appropriate signal once their decision was made. The RA started a stop watch immediately after asking the participant to make a decision and after 10 seconds had passed the RA requested a decision if necessary. The RA recorded each decision, coins earned on that trial, and running total of coins earned. The RA then announced the results to both the participant and confederate, allowing them time to record the information and then asked for the next decision. The RA directing the game referred to the confederate and participant as player 1 and player 2 respectively. Each time the RA announced the outcome of a trial a standardized script was used and the RA varied which player's outcome was announced first.

The game continued until 30 trials were completed. After finishing the Prisoner's Dilemma game, the participant was instructed to turn to the next section of the binder and

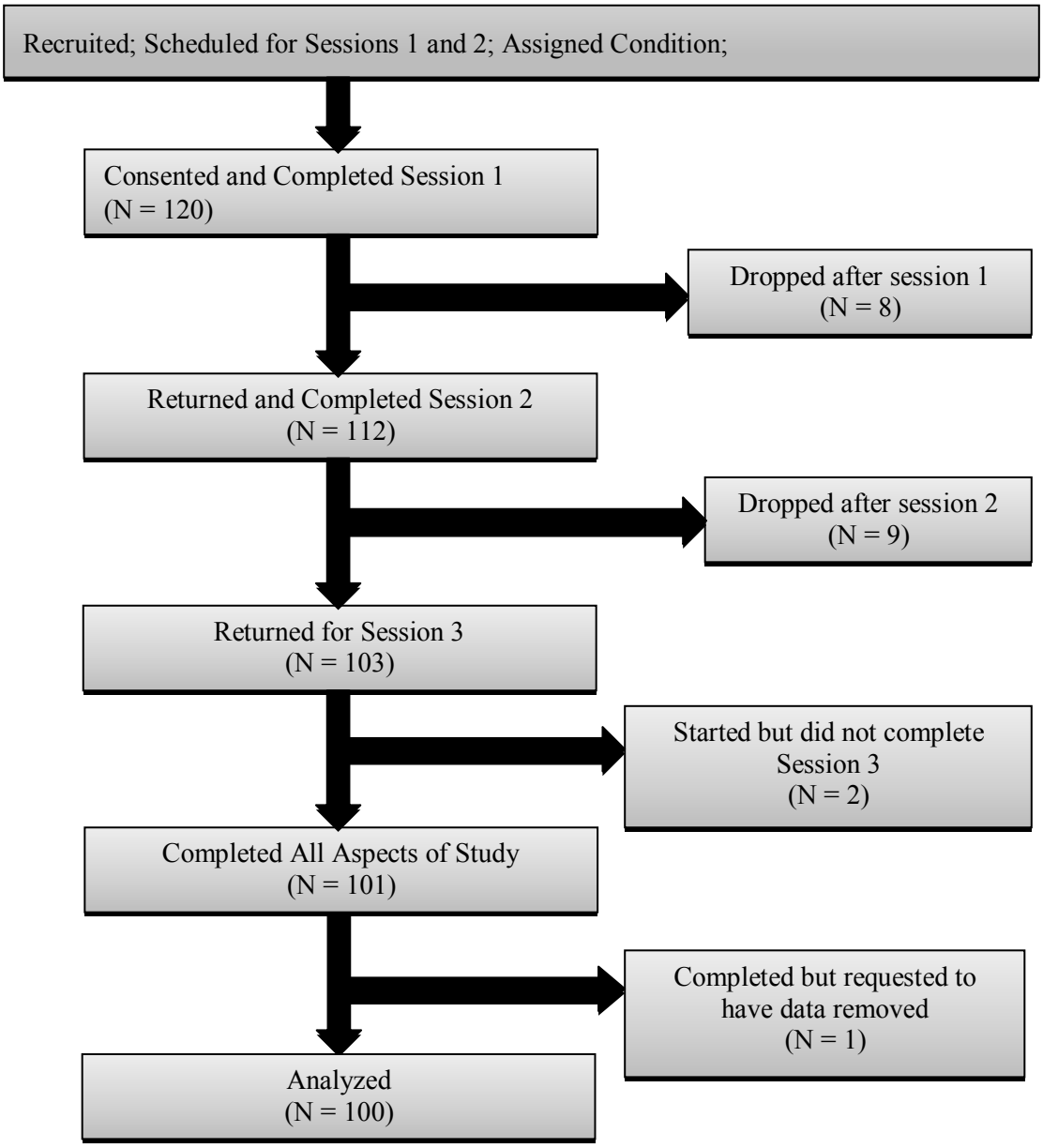
complete self-report measures. The confederate was instructed to return to their original room to finish the rest of the study, at which point the confederate left the room.

Results

Sample Characteristics

A total of 120 students were recruited from psychology courses at the University of Wisconsin – Milwaukee. Of the 120 participants who began the study, 100 (83.3%) completed all aspects of the study and their data was included in final analyses, 19 participants (15.8%) dropped out prior to completing the study, and 1 participant (<1%) completed the study but requested to have their data removed from analyses. That participant's data was destroyed as requested and no information about the participant, including demographic data, is reported. The participant's request and the associated incident were reported to the Institutional Review Board of the University of Wisconsin – Milwaukee. Participant flow is summarized in Figure 10, indicating the number of participants who dropped out at different time points during the study. Analyses comparing completers and non-completers on demographic factors and baseline measures did not reveal any group differences. Therefore, there are no apparent systematic group differences between those participants who completed the study and those who dropped out. The results of these analyses can be found in Table 15.

Figure 10: Participant Flow



Note: One hundred and twenty participants were consented and initiated study procedures. Eight participants dropped after the first session without beginning session two. Nine participants dropped after the second session without beginning session three. Two participants started but were unable to complete the 3rd and final session due to the absence of a confederate for the Prisoner's Dilemma Game. One participant requested to have their data removed from the study after completing all three sessions. Data from 100 participants were included in the primary study analyses.

All subsequent analyses are based on the 100 participants who completed all aspects of the study. Demographic data is included in Table 15. The sample consisted of

78 (78%) women, 22 men (22%). Of the 100 participants, 98 (98%) participants chose to identify their race and 2 (2%) did not disclose their race. The sample racial demographics were as follows: 70 (71.4%) Caucasian, 12 (12.2%) African American or Black, 6 (6.1%) Asian or Pacific Islander, 2 (2%) Native American, and 8 (8.2%) identified as other. Additionally, 9 (9.2%) participants identified their ethnicity as Hispanic. The average age of the sample was 22 years old and age ranged from 18 to 53 years old.

Table 16 displays the means and standard deviations for State Anger, Trait Anger, PANAS, and AAQ scores for each group across administration time points. Figures 11 – 13 display arrays of figures for the STAXI State Anger, PANAS Negative Affect, and PANAS Positive Affect pre and post writing scores for each session by condition.

The same analytic strategy was used for the STAXI and PANAS data. Analyses for each measure began with an omnibus ANOVA testing for group differences in pre- to post-writing levels of state anger, negative affect, and positive affect between groups following their first and final writing sessions. Follow-up analyses were then used to test for specific group differences related to the activation and reduction of affect across time with writing. Finally, analyses were used to test whether any group differences can be attributed to differences in writing content, the temporal spacing of writing conditions, or merely the passage of time.

Table 15

Demographics, Initial Baseline Measures, and Analyses of completers and non-completers

Variable	Overall (N = 119)	Completers (n = 100)	Dropouts (n = 19)	Statistic (df), Value, p
Demographics				
Gender: Freq (%) female	95 (79.8%)	78 (78.0%)	17 (89.5%)	χ^2 (1) = 1.305, p = .253
Race: Freq (%)				Fisher's Exact, p =0.5778, ns*
White	84 (70.0%)	70 (71.4%)	14 (82.4%)	
African American/Black	12 (10.0%)	12 (12.2%)	0	
Asian or Pacific Islander	7 (5.8%)	6 (6.1%)	1 (5.9%)	
Native American	2 (1.7%)	2 (2%)	0	
Other	10 (8.3%)	8 (8.2%)	2 (11.8%)	
Ethnicity: Freq (%) Hispanic	10 (8.3%)	9 (9.2%)	1 (5.6%)	χ^2 (1) = .254, p = .614
Age: Mean (SD) years	22.6 (6.4)	22.6 (6.2)	22.7 (7.4)	t(116) = .030, p = .976
BL Variables				
STAXI-State Anger	10.90 (2.50)	10.72 (1.60)	11.84 (5.07)	t(18.6) = .956, p = .351**
STAXI-Trait Anger	17.02 (4.81)	16.91 (4.75)	17.58 (5.20)	t(117) = .555, p = .580
AAQ	33.63 (8.60)	33.91 (8.68)	32.21 (8.22)	t(113) = .784, p = .435
PANAS:NA	13.87 (4.25)	13.82 (4.27)	14.16 (4.23)	t(117) = .316, p = .752
PANAS-PA	27.32 (9.31)	27.30 (9.29)	27.42 (9.67)	t(117) = .052, p = .959

Note: STAXI-State Anger = State-Trait Anger Expression Scale, State-Anger score; STAXI-Trait Anger = State-Trait Anger Expression Scale, Trait-Anger score; AAQ = Acceptance and Avoidance Questionnaire.; PANAS-NA = Positive and Negative Affect Scale, Negative Affect score; PANAS-PA = -Positive and Negative Affect Scale, Negative Affect score. *Fisher's Exact was calculated and reported because the expected frequency in 5 cells is less than 5. **Degrees of freedom adjusted to account for unequal variance.

Table 16

Summary of STAXI, PANAS, and AAQ Scores for Each Group Across Repeated Administration

	Session 1				Session 2			Session 3		
Group	Baseline	Post-Write1	Post-Write2	Post-Game	Baseline	Post-Write1	Post-Write2	Baseline	Post-Write	Post-Game
STAXI-State Anger										
Ang-Ang Spaced (n = 23)	10.83 (1.50)	15.45 (4.87)	-----	10.78 (1.20)	10.71 (1.29)	14.65 (5.08)	-----	10.96 (2.03)	14.91 (4.90)	11.74 (3.52)
Ang-Ang Massed w/ Long Delay (n = 27)	10.70 (1.61)	16.63 (4.72)	15.04 (4.33)	10.48 (0.64)	10.38 (0.75)	-----	-----	10.50 (1.21)	13.95 (3.09)	10.68 (0.99)
Ang-Ang Short Delay (n = 26)	10.58 (.90)	-----	-----	10.88 (1.84)	10.38 (.80)	13.97 (3.40)	14.12 (3.77)	10.81 (1.60)	12.92 (4.10)	10.50 (4.67)
Neut-Ang Spaced (n = 24)	10.79 (2.25)	10.88 (2.05)	-----	10.58 (1.14)	10.91 (1.81)	10.63 (1.17)	-----	11.08 (3.67)	15.00 (5.76)	11.43 (2.97)
PANAS-NA										
Ang-Ang Spaced (n = 23)	13.70 (3.60)	19.13 (6.31)	-----	12.74 (3.03)	12.91 (4.95)	17.48 (7.10)	-----	13.04 (3.80)	16.35 (6.66)	14.17 (5.77)
Ang-Ang Massed w/ Long Delay (n = 26)	14.74 (6.06)	19.89 (7.55)	17.65 (7.56)	12.63 (4.12)	13.19 (4.31)	-----	-----	13.27 (4.45)	14.77 (4.36)	12.31 (4.45)
Ang-Ang Short Delay (n = 26)	14.08 (3.49)	-----	-----	12.72 (3.18)	12.65 (3.45)	14.77 (2.57)	14.73 (3.48)	12.50 (2.89)	12.96 (2.99)	11.62 (1.58)
Neut-Ang Spaced (n = 24)	12.63 (2.98)	12.17 (3.07)	-----	11.08 (1.28)	12.21 (2.69)	11.67 (2.76)	-----	12.25 (5.48)	14.96 (7.87)	13.25 (5.87)

Table 16 (cont'd)
Summary of STAXI, PANAS, and AAQ Scores for Each Group Across Repeated Administration

	Session 1				Session 2			Session 3		
Group	Baseline	Post-Write1	Post-Write2	Post-Game	Baseline	Post-Write1	Post-Write2	Baseline	Post-Write	Post-Game
PANAS-PA										
Ang-Ang Spaced (n = 23)	28.26 (8.87)	25.00 (10.44)	-----	26.48 (10.28)	24.00 (9.75)	22.30 (10.41)	-----	21.74 (8.54)	19.96 (9.70)	22.91 (10.52)
Ang-Ang Massed w/ Long Delay (n = 26)	24.85 (9.37)	20.67 (9.65)	19.35 (8.70)	24.22 (9.90)	24.08 (10.68)	-----	-----	21.08 (8.87)	19.31 (8.39)	21.42 (9.71)
Ang-Ang Short Delay (n = 26)	27.00 (9.85)	-----	-----	28.12 (10.40)	24.08 (9.30)	21.15 (10.08)	20.12 (9.85)	20.54 (11.06)	20.54 (10.34)	22.00 (11.60)
Neut-Ang Spaced (n = 24)	29.46 (8.84)	22.14 (9.09)	-----	23.71 (10.36)	23.00 (9.74)	20.13 (10.20)	-----	22.71 (10.16)	20.50 (9.97)	20.39 (10.09)
STAXI-Trait Anger										
Ang-Ang Spaced (n = 23)	17.55 (5.51)	-----	-----	-----	-----	-----	-----	-----	18.26 (5.56)	-----
Ang-Ang Massed w/ Long Delay (n = 27)	16.83 (4.18)	-----	-----	-----	-----	-----	-----	-----	16.91 (4.15)	-----
Ang-Ang Short Delay (n = 26)	17.08 (4.67)	-----	-----	-----	-----	-----	-----	-----	17.19 (4.36)	-----
Neut-Ang Spaced (n = 24)	16.21 (4.87)	-----	-----	-----	-----	-----	-----	-----	16.46 (4.97)	-----

Table 16 (cont'd)
Summary of STAXI, PANAS, and AAQ Scores for Each Group Across Repeated Administration

	Session 1				Session 2			Session 3		
Group	Baseline	Post-Write1	Post-Write2	Post-Game	Baseline	Post-Write1	Post-Write2	Baseline	Post-Write	Post-Game
AAQ										
Ang-Ang Spaced (n = 23)	34.23 (8.99)	-----	-----	-----	-----	-----	-----	-----	34.04 (9.47)	-----
Ang-Ang Massed w/ Long Delay (n = 26)	33.69 (9.21)	-----	-----	-----	-----	-----	-----	-----	32.62 (8.61)	-----
Ang-Ang Short Delay (n = 24)	35.13 (8.75)	-----	-----	-----	-----	-----	-----	-----	34.65 (9.78)	-----
Neut-Ang Spaced (n = 24)	35.63 (8.09)	-----	-----	-----	-----	-----	-----	-----	31.58 (8.12)	-----

Note: STAXI-State Anger = State-Trait Anger Expression Scale, State-Anger score; PANAS-NA = Positive and Negative Affect Scale, Negative Affect score; PANAS-PA = Positive and Negative Affect Scale, Negative Affect score; STAXI-Trait Anger = State-Trait Anger Expression Scale, Trait-Anger score; AAQ = Acceptance and Avoidance Questionnaire. Baseline refers to the measurement point immediately prior to the first time the participant wrote about an angry or neutral memory, which for some participants is different from the true baseline from the initial study session.

Figure 11: Figures of STAXI State Anger Scores for each session by condition

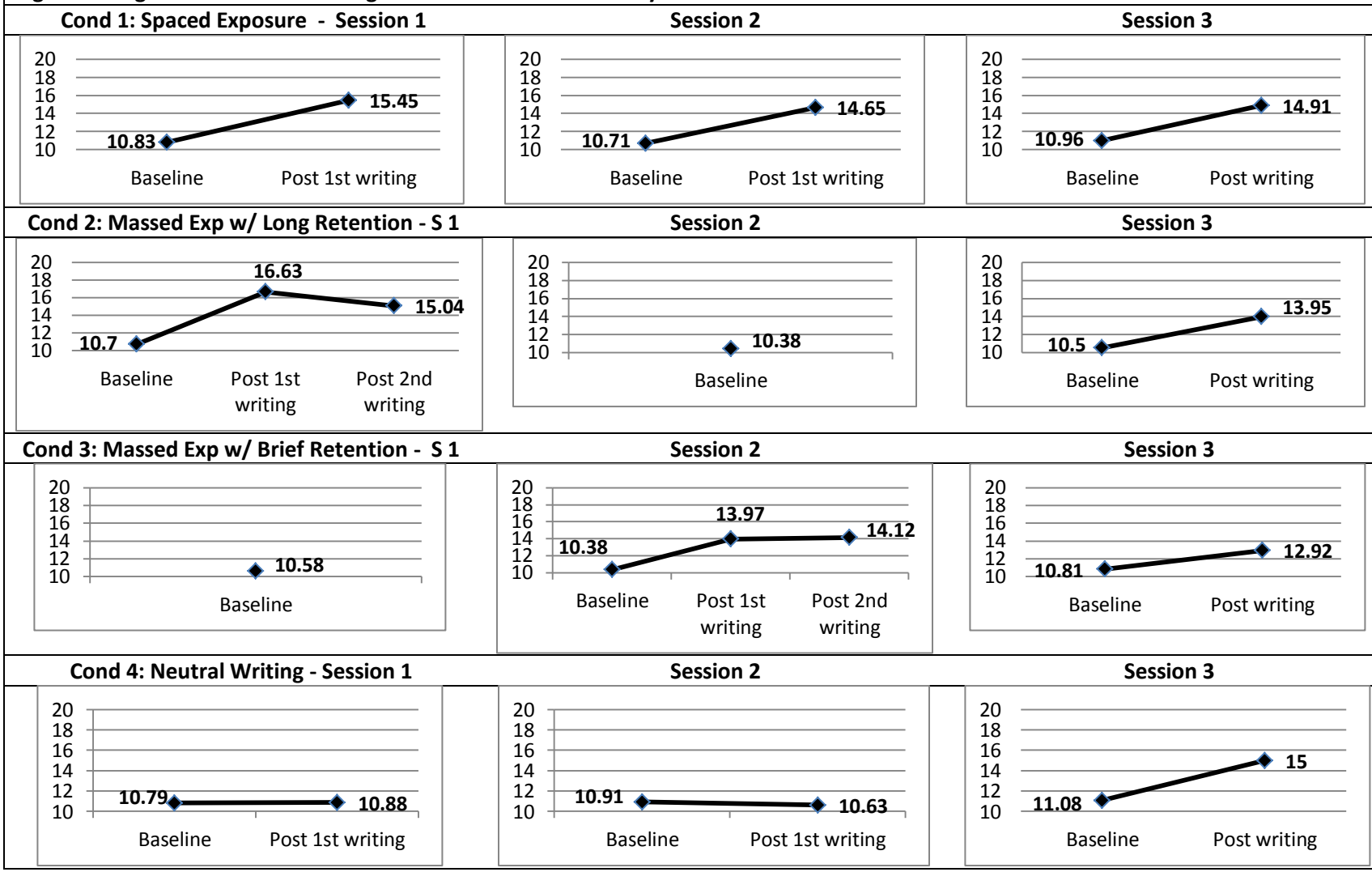


Figure 12: PANAS Negative Affect Scores for each session by condition

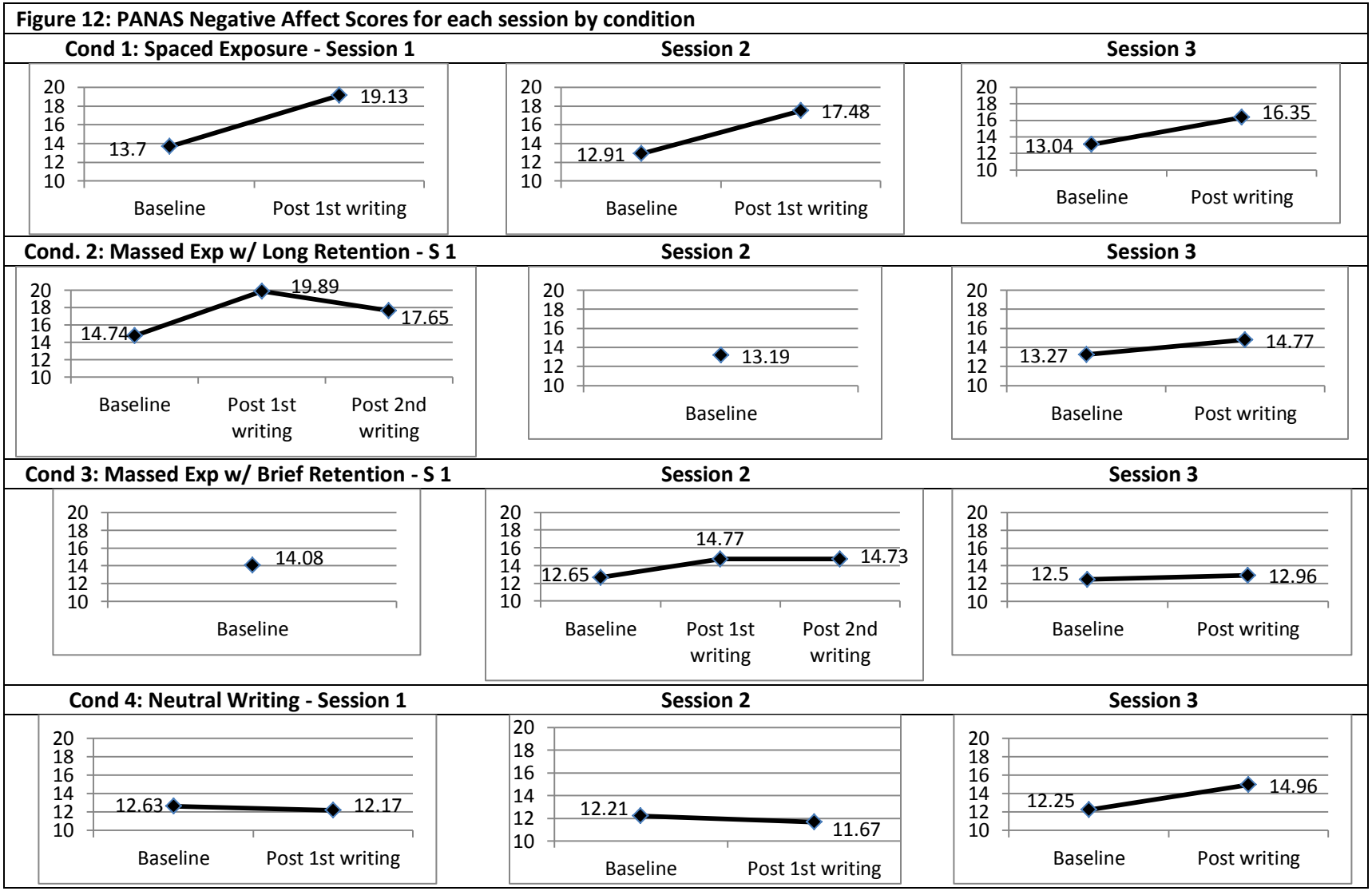
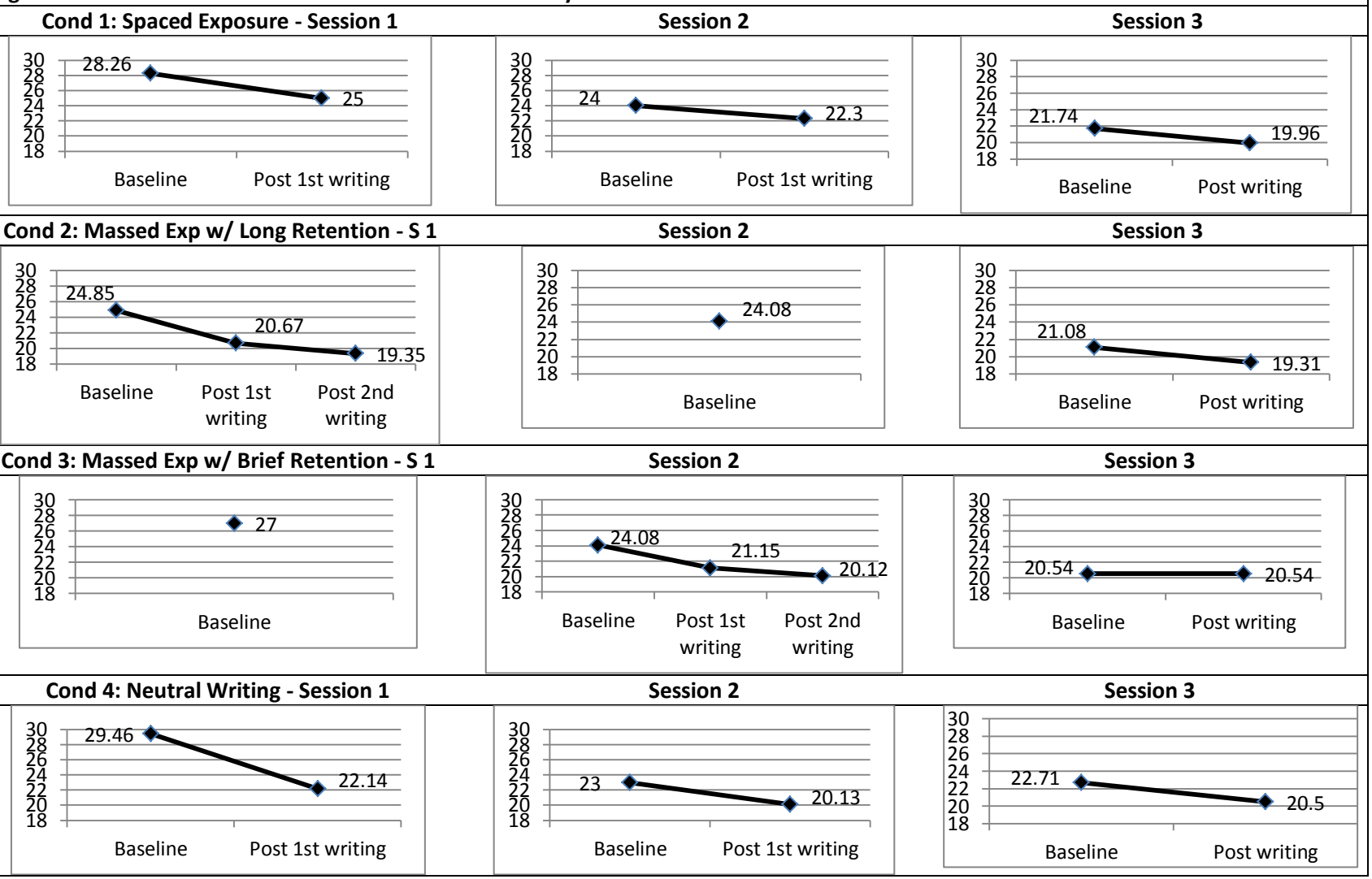


Figure 13: PANAS Positive Affect Scores for each session by condition



STAXI – State Anger

Testing for group differences in state anger across the length of the study that would indicate the activation and reduction of state anger, a 4 (condition) X 2 (writing session: first and last) X 2 (assessment time point: pre – post writing) ANOVA of STAXI State Anger Scores found a significant main effect of assessment time point ($F[1, 94] = 126.193$, $p < .001$), a significant interaction of assessment time point and condition ($F[3, 94] = 4.472$, $p = .006$), a significant interaction of writing session and condition ($F[3, 94] = 5.730$, $p = .001$), and a significant three way interaction ($F[3, 94] = 10.464$, $p < .001$). Main effects for condition ($F[3, 94] = 2.152$, $p = .099$) and writing session ($F[1, 94] < 1$, $p = .994$) were non-significant. The interaction of writing session and assessment time point was also non-significant ($F[1, 94] < 1$, $p = .495$). The significant three-way interaction is depicted in Figure 14. Table 16 displays the means and SDs for STAXI State Anger Scores at each assessment point.

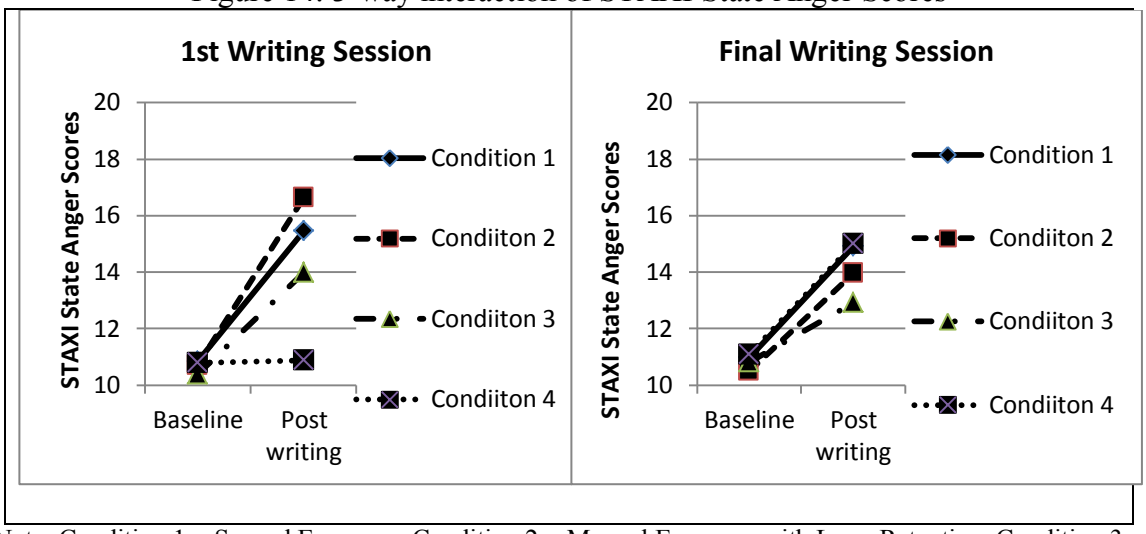
Given the presence of a significant three-way interaction, follow-up tests were conducted to test specific hypotheses related to anger activation, within and between session reduction of anger activation, and whether any observed anger reduction can be attributed to the mere passage of time or is better interpreted as habituation of anger. A separate omnibus ANOVA and follow up tests were also conducted to examine group differences that would indicate differential rates of reduction in state anger activation between massed and spaced writing conditions.

Hypothesis 1 – Anger Activation

Review of Figure 14 suggests that, for the first writing session (left-hand panel), participants who wrote about an angry memory (conditions 1 – 3) showed an increase in

state anger from pre- to post-writing (anger activation) whereas participants who wrote about a neutral memory (condition 4) did not show any increase. For the last writing session (right-hand panel), all four groups wrote about an angry memory and all four groups appear to show an increase in anger from pre- to post-writing.

Figure 14: 3-way interaction of STAXI State Anger Scores



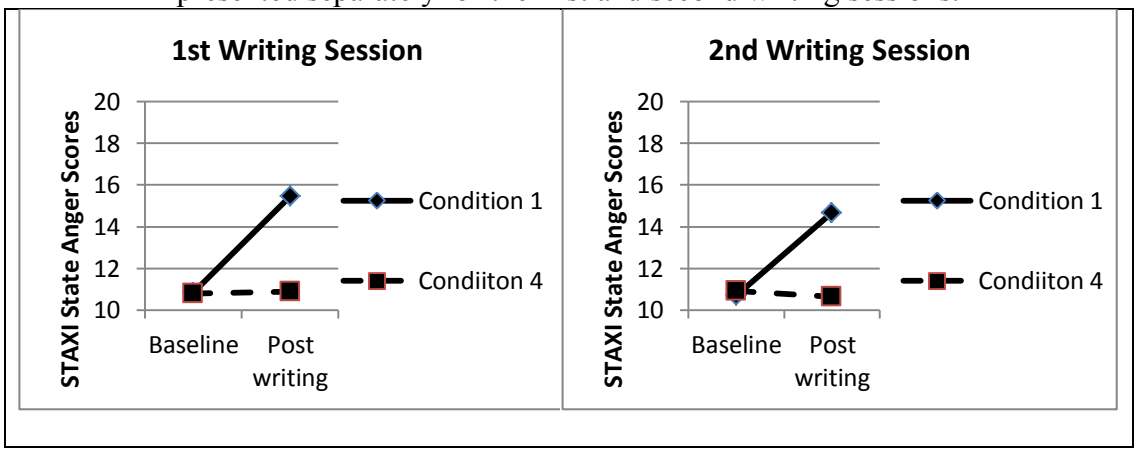
Note: Condition 1 = Spaced Exposure, Condition 2 = Massed Exposure with Long Retention, Condition 3 = Massed Exposure with Brief Retention, Condition 4 = Neutral Writing Control.

Consistent with these observations, paired t-tests comparing STAXI State Anger scores prior to and following the first writing task show that in all of the angry memory writing conditions (conditions 1, 2, and 3) participants displayed a significant increase in state anger following their first time writing about an angry memory (condition 1: Spaced Exposure Group, $[t[22] = 5.012, p < .001]$; condition 2: Massed Exposure with Long Retention $[t[26] = 6.509, p < .001]$; condition 3: Massed Exposure with Brief Retention $[t[25] = 5.480, p < .001]$. Participants in condition 4, who initially wrote about an emotionally neutral memory, showed no change in state anger scores following the initial writing ($t[23] < 1.0, p = .692$). During the final writing session, in which all participants wrote about the angry memory, all four groups showed significant increases in STAXI

State Anger scores: Spaced Exposure Group [t(22) = 4.229, p < .001], condition 2 [t(24) = 5.853, p < .001], condition 3 [t(25) = 3.060, p = .005], and condition 4 [t(23) = 4.060, p < .001].

Testing for group differences in state anger, between the first two sessions of the spaced writing conditions, a 2 (condition: 1 and 4) X 2 (writing session: first and second) X 2 (assessment time point: pre and post writing) ANOVA of state anger scores was completed. The results produced a significant main effect of condition (F[1, 44] = 11.381, p = .002), a significant main effect of assessment time point (F[1, 44] = 20.272, p < .001), and a significant interaction of condition and assessment time point (F[1, 44] = 21.546, p < .001). The main effect of writing session (F[1, 44] = < 1.0, p = .640), interaction of writing session and condition (F[1, 44] = < 1.0, p = .529), interaction of writing session and assessment time point (F[1, 44] = 2.129, p = .152), and the three way interaction (F[1, 44] < 1.0, p = .695) were all non-significant. The means for the condition X assessment time point interactions are presented separately for the first and second writing sessions in the left and right panels of Figure 15, respectively.

Figure 15: STAXI State Anger Scores; condition X assessment time point interactions presented separately for the first and second writing sessions.



Note: Condition 1 = Spaced Exposure, Condition 4 = Neutral Writing Control.

Review of the Figure 15 suggests that writing about an angry memory (condition 1: Spaced Exposure Group) resulted in an increase in state-anger on both writing days, whereas writing about a neutral memory resulted in no change in anger on either day. The magnitude of the increase in anger for the Spaced Exposure Group appeared to be similar across both days. Paired t-tests comparing STAXI State Anger scores for the second day of writing (see Figure 15, right hand panel) show that participants who wrote about an angry memory (Spaced Exposure Group) displayed a significant increase in state-anger [$t(22) = 3.863$, $p = .001$], whereas participants writing about a neutral memory did not [$t(22) < 1.0$, $p = .388$].

Hypothesis 2 – Anger Habituation

Between Session Anger Reduction: Comparison of the left- and right-hand panels of Figure 14 suggest that anger activation decreased from the first to last writing sessions for the three groups that wrote repeatedly about the angry memory, particularly for condition 2 – Massed Exposure with Long Retention. A paired samples test comparing state anger change scores (post-writing minus pre-writing STAXI State Anger scores) following the first writing task with state anger change scores following the final writing task in all three angry writing groups (conditions 1, 2, and 3) combined was conducted and found a significant decrease in anger activation ($t[73] = 3.392$, $p = .001$) from the first (mean change of 4.85 points) to last writing (mean change of 3.13 points). Similar analyses for each of conditions 1 – 3 separately found a significant reduction in anger activation for condition 2 – Massed Exposure with Long Retention ($t[24] = 3.762$, $p = .001$) from the first (mean change of 6.36 points) to last writing (mean change of 3.43 points) and trend for a decrease in condition 3 – Massed Exposure with Brief Retention

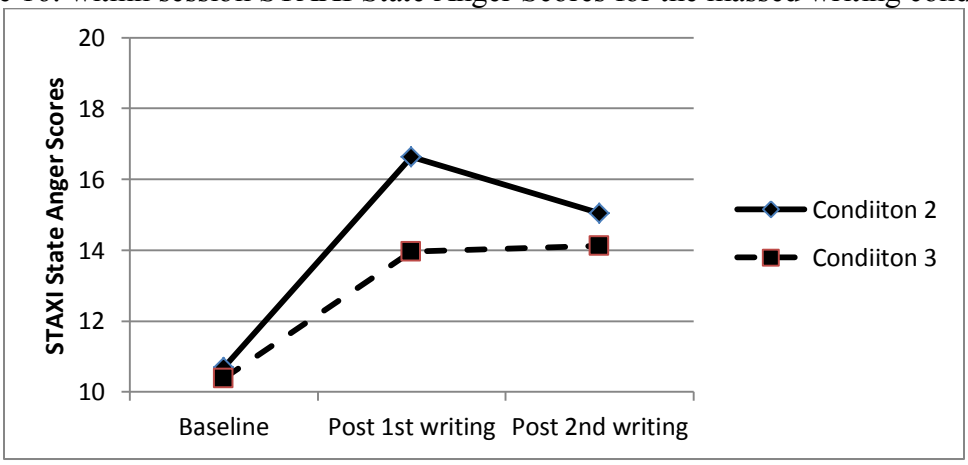
(t[25] = 1.778, p = .088) from the first (mean change of 3.59 points) to last writing (mean change of 2.1 points). For the Spaced Exposure Group the decrease in anger activation from the first (mean change of 4.62 points) to last writing session (mean change of 3.96 points) was non-significant (t[22] < 1.0, p = .512).

Within Session Anger Reduction: To test for within session reductions in state anger among participants in the massed writing conditions during their first writing session, a 2 (condition: 2 and 3) X 3 (assessment time point: pre-writing, post 1st writing, post 2nd writing) ANOVA of state anger scores was completed. The results indicated a significant main effect of assessment time point (F[1] = 50.083, p < .001). The main effect of condition (F[1] = 3.552, p = .065) was non-significant but did trend toward significance. The interaction of assessment time point and condition (F[1] = 2.405, =.280) was non-significant. The mean scores at each time point plotted separately by condition are presented in Figure 16. Paired comparisons showed the same pattern in both groups: a significant increase pre to post in state anger following the first writing task (condition 2: Massed with Long Retention [t[26] = 6.509, p < .001]; condition 3: Massed with Brief Retention [t[25] = 5.480, p <.001) and no significant difference in state anger following the second writing task compared to after the first writing (condition 2 [t[26] = 1.699, p = .101]; condition 3 [t[25] < 1.0, p = .750).

To test for the habituation of anger with expressive writing as opposed to reductions in anger that can be attributed to the passage of time, a 4 (condition) X 2 (session 3 assessment time point: pre-writing and post-writing) ANOVA of state anger scores was completed to examine level of state anger following the final writing task. The results produced a significant main effect of assessment time point (F[1, 94] = 70.214, p

< .001). However, the main effect of condition (F[3, 94] < 1.0, p =.461) and the interaction of condition and assessment time point (F[3, 94] = 1.189, p = .318) were non-significant. Therefore, levels of state anger following the final writing task, as displayed in the right side panel of Figure 14, did not differ between groups.

Figure 16: within session STAXI State Anger Scores for the massed writing conditions



Note: Condition 2 = Massed Exposure with Long Retention, Condition 3 = Massed Exposure with Brief Retention.

Hypothesis 3: Differences Between Spaced and Massed Writing Groups

An interaction contrast comparing the degree of change in state anger following the final writing task between the three angry writing groups combined and the neutral writing control group found no difference in activation (t[96] < 1.0, p = .403). A series of independent t-tests were completed to test for any differences between groups in level of state anger following the final writing. All results were non-significant: spaced exposure (condition 1) v. massed exposure (conditions 1 & 2) [t[72] = 1.290, p = .201]; spaced exposure v. neutral writing control (condition 4) [t[45] < 1.0, p = .977]; massed exposure v. neutral writing control (t[73] = 1.230, p = .223); massed with long retention (condition 2) v. massed with brief retention (condition 3) [t[49] = 1.446, p = .154]; massed with long

retention v. neutral writing control ($t[47] < 1.0$, $p = .666$); massed with brief retention v. neutral writing control ($t[48] = 1.535$, $p = .131$.) .

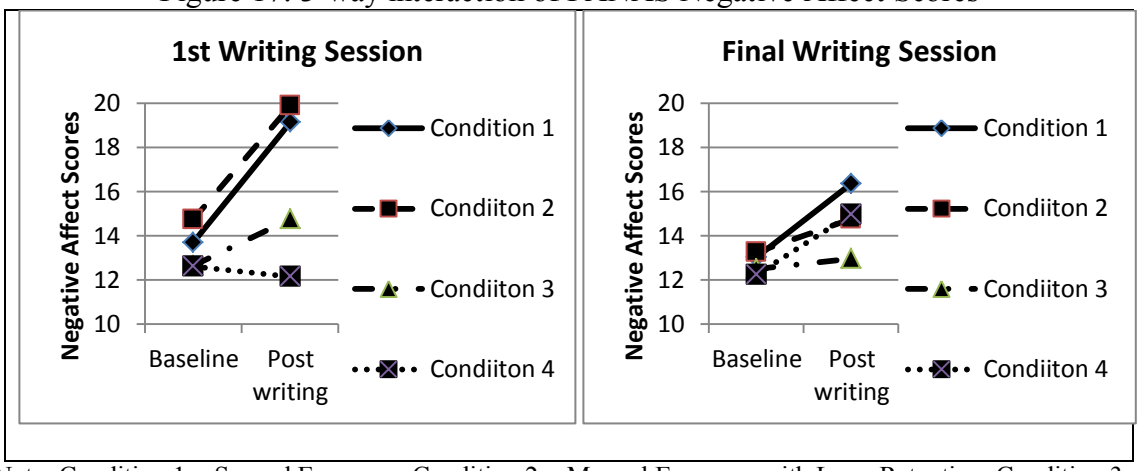
In summary, consistent with expectations, each time participants wrote about an angry memory, there was a significant increase in STAXI State Anger scores. By contrast there was no significant change in state anger any time participants wrote about a neutral memory. There was some evidence of between session reductions in state anger activation across the study; however, these reductions can be attributed to the passage of time. The was no evidence of within session reductions in state anger for the massed writing conditions. There was no evidence of differences in the activation or reduction of state anger based on the temporal spacing of writing.

PANAS – Negative Affect

The same analyses as those above for state anger were used to test changes in negative affect. Testing for group differences in negative affect across the length of the study that would indicate the activation and reduction of negative affect, a 4 (condition) X 2 (first or last writing session) X 2 (assessment time point: pre – post writing) ANOVA was conducted examining the PANAS Negative Affect data. The results indicated a significant main effect of condition ($F[3, 95] = 4.108$, $p = .009$), a significant main effect of writing session ($F[1, 95] = 8.602$, $p = .004$), a significant main effect of assessment time point ($F[1, 95] = 41.016$, $p < .001$), a significant interaction of condition and writing session ($F[3, 95] = 5.294$, $p = .002$), and a significant three way interaction ($F[3, 95] = 6.351$, $p = .001$). The interactions of assessment time point and condition ($F[3, 95] = 3.957$, $p = .010$), and writing session and assessment time point ($F[1, 95] = 3.523$, $p = .064$) were non-significant. The significant three-way interaction is depicted in Figure 17.

Table 16 displays the means and SDs for PANAS Negative Affect Scores at each assessment point.

Figure 17: 3-way interaction of PANAS Negative Affect Scores



Note: Condition 1 = Spaced Exposure, Condition 2 = Massed Exposure with Long Retention, Condition 3 = Massed Exposure with Brief Retention, Condition 4 = Neutral Writing Control.

Given the presence of significant two- and three-way interactions, follow-up tests were conducted to test specific hypotheses related to the activation of negative affect, within and between session reduction of negative affect, and whether any observed anger reduction can be attributed to the mere passage of time or is better interpreted as habituation of negative affect.

Hypothesis 1 – Activation of Negative Affect

Review of Figure 17 suggests that, for the first writing session (left-hand panel), participants who wrote about an angry memory (conditions 1 – 3) showed an increase in negative affect from pre- to post-writing (activation of negative affect) whereas participants who wrote about a neutral memory (condition 4) did not show any increase. For the last writing session (right-hand panel), all four groups wrote about an angry

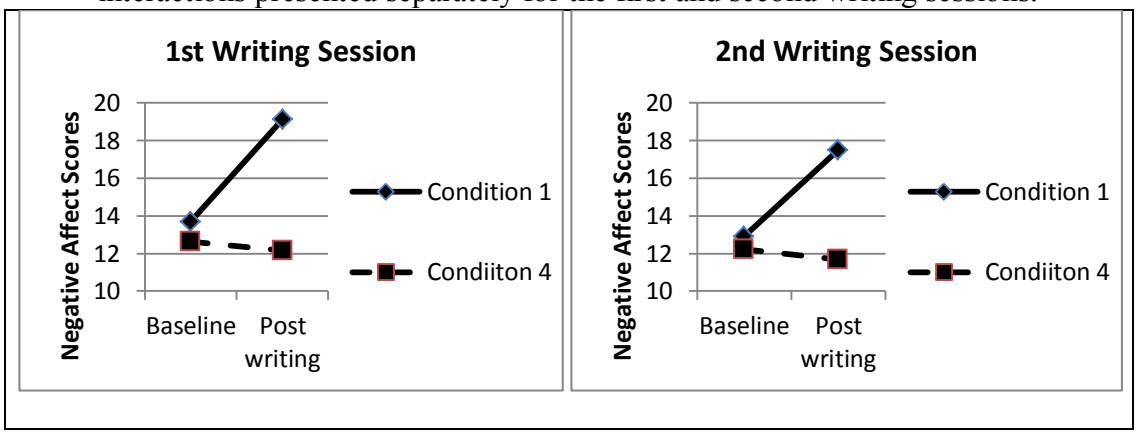
memory and three out of the four groups (conditions 1, 2, and 4) appear to show an increase in negative affect from pre- to post-writing.

Consistent with these observations, paired t-tests comparing PANAS Negative Affect scores prior to and following the first writing task show that in all of the angry memory writing conditions (conditions 1, 2, and 3) participants displayed a significant increase in negative affect following their first time writing about an angry memory (condition 1: Spaced Exposure Group, [$t[22] = 3.918$, $p = .001$]; condition 2: Massed Exposure with Long Retention [$t[26] = 4.231$, $p < .001$]; condition 3: Massed Exposure with Brief Retention [$t[25] = 2.661$, $p = .013$]. Participants in condition 4, who initially wrote about an emotionally neutral memory, showed no change in negative affect scores following the initial writing ($t[23] = 1.204$, $p = .241$). During the final writing session, in which all participants wrote about the angry memory, condition 1: Spaced Exposure ($t[22] = 2.601$, $p = .016$) and condition 2: Massed Exposure with Long Retention ($t[25] = 2.862$, $p = .008$) displayed significant increases in negative affect. Condition 4: Neutral Writing Control, in which participants did write about an angry memory, showed a borderline significant increase in negative affect ($t[23] = 2.053$, $p = .052$). The change in negative affect observed in condition 3: Massed Exposure with Brief Retention was non-significant ($t[25] < 1.0$, $p = .416$).

Testing for group differences in negative affect, between the first two sessions of the spaced writing conditions, a 2 (condition: 1 and 4) X 2 (writing session: first and second) X 2 (assessment time point: pre and post writing) ANOVA of negative affect scores was completed. The results produced a main effect of condition ($F[1, 45] = 13.947$, $p = .001$), a main effect of assessment time point ($F[1, 45] = 13.020$, $p = .001$),

and a significant interaction of condition and assessment time point (F[1, 45] = 19.449, p <.001). The main effect of writing session (F[1, 45] = 2.627, p = .112), interaction of condition and writing session (F[1, 45] < 1.0, p = .467), interaction of writing session and assessment time point (F[1, 45] < 1.0, p = .417), and the three way interaction (F[1, 45] < 1.0, p = .502) were all non-significant. The means for the condition X assessment time point interactions are presented separately for the first and second writing sessions in the left and right panels of Figure 18, respectively.

Figure 18: PANAS Negative Affect Scores condition X assessment time point interactions presented separately for the first and second writing sessions.



Note: Condition 1 = Spaced Exposure, Condition 4 = Neutral Writing Control.

Review of the figure suggests that writing about an angry memory (Spaced Exposure Group) resulted in an increase in negative affect on both writing days, whereas writing about a neutral memory resulted in no change in negative affect on either day. The magnitude of the increase in negative affect for the Spaced Exposure Group appeared to be similar across both days. Paired t-tests comparing PANAS Negative Affect scores for the second day of writing (Figure 18, right hand panel) show that participants who wrote about an angry memory (Spaced Exposure Group) displayed a

significant increase in negative affect [t(22) = 3.654, p = .001], whereas participants writing about a neutral memory did not [t(23) = 1.013, p = .322].

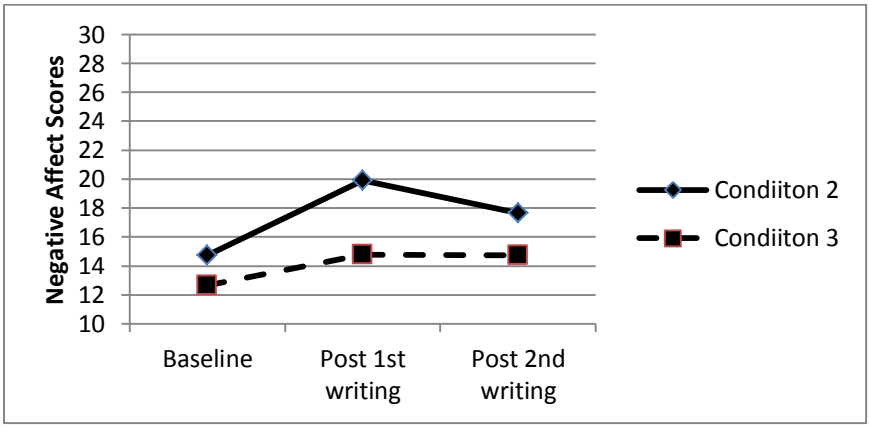
Hypothesis 2 – Habituation of Negative Affect:

Between Session Negative Affect Reduction: Comparison of the left- and right-hand panels of Figure 17 suggest that negative affect activation decreased from the first to last writing sessions for the three groups that wrote repeatedly about the angry memory. A paired samples test comparing negative affect change scores (post-writing minus pre-writing PANAS Negative Affect scores) following the first writing task with negative affect change scores following the final writing task in all three angry writing groups (conditions 1, 2, and 3) combined was conducted and found a significant decrease in activation (t[74] = 3.940, p < .001) from the first (mean change of 4.25 points) to last writing (mean change of 1.69 points). Similar analyses for each of conditions 1 – 3 separately found a significant reduction in negative affect activation for condition 2: Massed Exposure with Long Retention (t[25] = 3.563, p = .002) from the first (mean change of 5.35 points) to last writing (mean change of 1.50 points) and a trend for a decrease in condition 1: Spaced Exposure (t[22] = 1.803, p = .085) from the first (mean change of 5.44 points) to last writing (mean change of 3.30 points). For condition 3: Massed Exposure with Brief Retention, the decrease in negative affect activation from the first (mean change of 2.12 points) to last writing session (mean change of 0.46 points) was non-significant (t [25] = 1.482, p = .151).

Within Session Negative Affect Reduction: To test for within session reductions in negative affect among participants in the massed writing conditions during their first writing session, , a 2 (condition: 2 and 3) X 3 (assessment time point: pre-writing, post 1st

writing, post 2nd writing) ANOVA of negative affect scores was completed. The results produced significant main effects of condition ($F[1, 50] = 8.539$, $p = .005$) and assessment time point ($F[1, 50] = 7.165$, $p = .010$). The interaction of assessment time point and condition ($F[1, 50] = < 1.0$, $p = .717$) was non-significant. The mean scores at each time point plotted separately by condition are presented in Figure 19. As indicated by the main effect of condition, overall participants in condition 2: Massed Exposure with Long Retention reported significantly higher negative affect ($M = 17.43$) than those in condition 3: Massed Exposure with Brief Retention ($M = 14.06$). Paired comparisons showed the same pattern in both groups: a significant increase pre to post in negative affect following the first writing task (condition 2: Massed Exposure with Long Retention [$t[26] = 4.231$, $p < .001$]; condition 3: Massed Exposure with Brief Retention [$t[25] = 2.661$, $p = .013$) and no significant difference in negative affect following the second writing task compared to after the first writing (condition 2: Massed Exposure with Long Retention [$t[25] = 1.835$, $p = .078$]; condition 3: Massed Exposure with Brief Retention [$t[25] < 1.0$, $p = .952$), although condition 2 did trend toward significance.

Figure 19: within session PANAS Negative Affect Scores for the massed writing conditions



Note: Condition 2 = Massed Exposure with Long Retention, Condition 3 = Massed Exposure with Brief Retention.

To test for the habituation of negative affect with expressive writing as opposed to reduction in negative affect attributable to the passage of time, a 4 (condition) X 2 (session 3 assessment time point: pre-writing and post-writing) ANOVA of negative affect scores was completed to examine level of negative affect following the final writing task. The results produced a significant main effect of assessment time point ($F[1, 95] = 17.266$, $p < .001$). However, the main effect of condition ($F[3, 95] < 1.0$, $p = .471$) and the interaction of condition and assessment time point ($F[3, 95] = 1.743$, $p = .163$) were non-significant. Therefore, the levels of negative affect following the final writing task, as displayed in the right side panel of Figure 17, did not differ between groups.

Hypothesis 3: Differences Between Spaced and Massed Writing Groups

An interaction contrast comparing the degree of change in negative affect following the final writing task between the three angry writing groups combined and the neutral writing control group found no difference in activation ($t[97] < 1.0$, $p = .372$). A series of independent t-tests were completed to test for any specific differences between groups in negative affect activation following the final writing. The difference between the spaced exposure (condition 1) and massed exposure conditions (conditions 2 & 3 combined) was significant [$t[73] = 2.277$, $p = .026$] with the massed exposure groups showing less negative affect at the end of the study. All other results were non-significant: spaced exposure and neutral writing control [$t[45] < 1.0$, $p = .747$]; massed exposure and neutral writing control ($t[74] = 1.635$, $p = .106$); massed with long retention (condition 2) and massed with brief retention (condition 3) [$t[50] = 1.356$, $p = .181$]; massed with long retention and neutral writing control ($t[48] < 1.0$, $p = .385$); massed with brief retention and neutral writing control ($t[48] = 1.612$, $p = .113$) .

In summary, consistent with expectations, there was general pattern in which writing about an angry memory was followed by a significant increase in PANAS Negative Affect scores. By contrast there was no significant change in negative affect any time participants wrote about a neutral memory. There was some evidence of reduction in negative affect activation with expressive writing across the study; however, these reductions can be attributed to the passage of time. The was no evidence of within session reductions in negative affect for the massed writing conditions. There was evidence of differences in level of negative affect between the massed and spaced writing groups at the end of the study. However, neither spaced nor massed angry writing groups differed from the neutral writing control group.

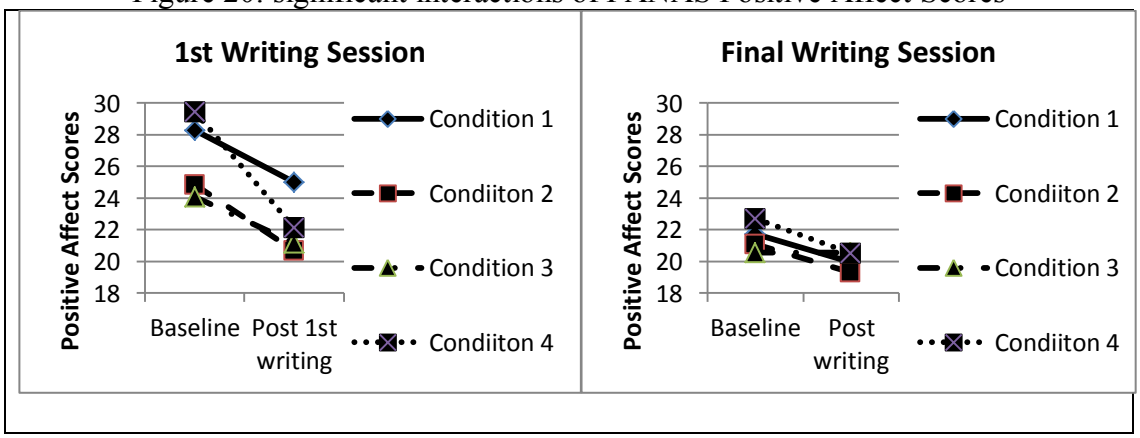
PANAS – Positive Affect

The same 4 (condition) X 2 (first or last writing session) X 2 (assessment time point: pre – post writing) ANOVA was conducted examining the PANAS Positive Affect data. For positive affect the results indicated a significant main effect of writing session ($F[1, 95] = 38.213$, $p < .001$), a significant main effect of assessment time point ($F[1, 95] = 58.453$, $p < .001$), a significant interaction of condition and assessment time point ($F[3, 95] = 3.178$, $p = .028$), and a significant interaction of writing session and assessment time point ($F[1, 95] = 22.233$, $p < .001$). The main effect of condition was non-significant ($F[3, 95] < 1$, $p = .687$). The interaction of condition by writing session ($F[3, 95] = 1.856$, $p = .142$) and the three way interaction were non-significant ($F[3, 95] = 1.322$, $p = .272$). The significant interactions are displayed in figure 20. Otherwise the pattern of results for positive affect scores are best represented in Figure 13. . Table 16 displays the means and

SDs for PANAS Positive Affect Scores at each assessment point. Given the presence of significant interactions, further follow-up tests were used to elucidate these effects.

Paired comparisons of PANAS Positive Affect scores, with t-tests for independent samples between groups, found a significant difference (t[48] = 2.093, p = .042) prior to writing between condition 3 (massed writing with brief retention; m = 24.077) and the neutral writing condition (M = 29.458). The difference prior to writing between condition 2 (massed writing with long retention; M = 24.852) and the neutral writing condition also trended toward significance (t[49] = 1.800, p = .078). There were no other differences observed for level of positive affect prior to writing between groups.

Figure 20: significant interactions of PANAS Positive Affect Scores



Note: Condition 1 = Spaced Exposure, Condition 2 = Massed Exposure with Long Retention, Condition 3 = Massed Exposure with Brief Retention, Condition 4 = Neutral Writing Control.

Paired t-tests show that for all four groups positive affect significantly decreased pre – to – post following the initial writing task, (condition 1: Spaced Exposure [t[22] = 2.760, p = .011]; condition 2: Massed Exposure with Long Retention [t[26] = 3.380, p = .002]; condition 3: Massed Exposure with Brief Retention [t[25] = 2.718, p = .012]; condition 4: Neutral Writing Control [t[23] = 6.248, p < .001) with the emotionally neutral writing group displaying the largest decrease in positive affect. An interaction

contrast comparing the amount of change in positive affect from pre to post writing during participants' initial writing session found that those participants who wrote about an emotionally neutral memory (mean change of -7.315 points; t [98] = 2.821, p = .006) displayed a significant decrease in positive affect when compared to those participants who wrote about an angry memory for the first time (conditions 1 – 3; mean change of -3.474 points). Following the final writing task, condition 2: Massed Exposure with Long Retention (t[25] = 2.356, p = .027) and condition 4: Neutral Writing Control (t[23] = 2.378, p = .026) displayed a significant pre to post writing decrease in positive affect. For the Spaced Exposure Group, condition 1 (t[22] = 1.846, p = .078) and condition 3: Massed Exposure with Brief Retention (t[25] = 0, p = 1.0) the pre to post change in positive affect for the final writing task was non-significant.

A paired samples test comparing positive affect change scores (post-writing minus pre-writing PANAS Positive Affect scores) following the first writing task with positive affect change scores following the final writing task in all three angry writing groups (conditions 1, 2, and 3) combined was conducted and found a significant decrease in the reduction of positive affect (t[74] = 3.657, p < .001) from the first (mean change of -3.55 points) to last writing (mean change of -1.16 points). Analyses of each condition found that in all conditions the change in positive affect was less following the final writing and this difference was significant for conditions 2, 3, and 4. Condition 2: Massed Exposure with Long Retention went from a mean change of -4.42 to a mean change of -1.77 [t[25] = 2.302, p = .030]; condition 3: Massed Exposure with Brief Retention from a mean change of -2.92 to a mean change of 0 [t[25] = 2.797, p = .010]; condition 4: Neutral Writing Control from a mean change of -7.32 to a mean change of -2.21 [t[23] =

3.034, p = .006). In the Spaced Exposure Group (condition 1) the amount of change in positive affect between the first (mean change of -3.26) and the final writing (mean change of -1.78) was non-significant (t[22] = 1.205, p = .241). For the massed writing conditions, positive affect did not significantly change within session from after the first writing to after the second writing: condition 2: Long Retention (t[25] = 1.946, p = .063); condition 3: Brief Retention ([t[25] = 1.602, p = .122).

To test for changes in positive affect with expressive writing as opposed to changes attributable to the passage of time, a 4 (condition) X 2 (session 3 assessment time point: pre-writing and post-writing) ANOVA of positive affect scores was completed to examine level of negative affect following the entire writing protocol. The results produced a significant main effect of assessment time point (F[1, 95] = 12.876, p = .001). However, the main effect of condition (F[3, 95] < 1.0, p = .960) and the interaction of condition and assessment time point (F[3, 95] = 1.542, p = .209) were non-significant.

In summary the general pattern across groups was that positive affect significantly decreased following writing, regardless of writing content, and continued to remain low and even decrease across the study. However, decreases in positive affect following writing lessened as time passed and can be attributed to the passage of time.

Prisoner's Dilemma Game:

One-way ANOVAs were used to compare the mean total number of competitive responses given in the game for each day between groups. For both session one (F[3, 96] < 1.0, p = .573) and session three (F[95] < 1.0, p = .996), the results found no significant difference between groups in the number of competitive response given during the game.

Table 17 displays the means and SDs for the number of competitive responses for each group on each day.

Table 17: Prisoner's Dilemma Game Competitive Responses

	Session 1 M (SD)	Session 3 M (SD)
Spaced Exposure Group	18.52 (8.81)	19.65 (9.13)
Massed w/ Long Retention	19.78 (7.63)	20.23 (9.15)
Massed w/ Brief Retention	18.69 (8.61)	18.92 (9.03)
Neutral Writing Control	16.38 (9.82)	19.75 (9.624)

Experiential Avoidance:

A 4 (condition) X 2 (assessment time point: baseline, post final writing) ANOVA of AAQ scores found non-significant main effects of condition ($F[3, 91] < 1.0$, $p = .697$) and assessment time point ($F[1, 91] = 1.207$, $p = .275$) and a non-significant interaction ($F[3, 91] < 1.0$, $p = .866$). Table 16 displays the means and SDs for AAQ scores for baseline and post final writing.

Trait Anger:

A 4 (condition) X 2 (assessment time point: baseline, post final writing) ANOVA of STAXI Trait Anger scores found non-significant main effects of condition ($F[3, 94] < 1.0$, $p = .692$) and assessment time point ($F[1, 94] = 1.116$, $p = .294$) and a non-significant interaction ($F[3, 94] < 1.0$, $p = .895$). Table 16 displays the means and SDs for STAXI Trait Anger scores for baseline and post final writing.

Discussion and Limitations

The results of the current study produced some significant findings demonstrating the ability of expressive writing to alter emotional experiences. In particular the activation of state anger and negative affect with expressive writing is supported.

However, there is no clear evidence of expressive writing resulting in any systematic habituation of state anger or negative affect, and thus no support for the use of expressive writing as a form of exposure. The results are discussed in relation to each hypothesis and limitations related to each hypothesis are discussed. Some broader study limitations and potential other empirical directions are discussed.

Hypothesis 1 – Anger Activation: Those participants writing about an angry memory for the first time will show an acute activation of state anger and negative affect compared to those participants writing about an emotionally neutral memory.

The general pattern of the results was that writing about an angry memory elicits an increase in both state anger and negative affect. Following the first occasion of writing about an angry memory, all groups showed a significant increase in state anger from pre to post writing. Additionally, three of four groups displayed a significant increase in negative affect following the first time writing about an angry memory. The one exception was the neutral writing condition in which participants wrote about an angry memory for the first time on the final day and the result was a borderline significant increase in negative affect ($t[23] = 2.053$, $p = .052$).

The spaced writing group, which wrote about an angry memory once each session, displayed a significant increase in both state anger and negative affect following each writing occasion. Furthermore, the massed writing with long retention group displayed a significant increase in state anger and negative affect following their final time writing about an angry memory on the final day of participation. The massed writing with brief retention group also displayed a significant increase in state anger following

the final writing task; however their increase in negative affect after the final writing task was non-significant.

The overall pattern is that, more often than not, throughout the course of the study, writing about an angry memory led to meaningful increases in state anger and negative affect. Thus, emotionally expressive writing is clearly an effective means of activating the experience of anger and negative affect in general.

Corresponding Reductions is Positive Affect: In all groups positive affect significantly decreased following the initial writing task, regardless of writing topic. The general pattern across all groups was that positive affect continued to decrease, or least did not rebound, with continued writing. The ongoing lessened positive affect seen throughout the study may reflect the burden of participation, or that writing regardless of topic decreases positive affect. However, the observed decreases in positive affect are also attributable to uncontrolled factors included in the passage of time.

The lessened decreases in positive affect may simply represent a floor affect. However, it is also possible that the burden of the study or an aversive quality that led to decreases in positive affect had less impact over time. As there were no systematic differences in positive affect change between groups, the most parsimonious explanation is that positive affect simply decreased with time. Other possibilities are presented for the sake of suggesting and exploring those possibilities but should not be considered likely explanations for the obtained results.

Additionally, even though observed changes in positive affect are attributable to the passage of time, it is worthwhile to consider ways in which the study protocol and the process of writing may have led to such changes. It is also worth noting that the neutral

writing group, serving as a control condition, displayed the largest change in positive affect following the initial writing task and that change was significantly greater than the change in the combined angry writing conditions. The neutral writing group did display significantly higher pre-writing levels of positive affect compared to the massed writing with brief retention group. The difference in pre-writing positive affect between the neutral writing condition and the massed writing with long retention group also trended toward significance. Thus, it may simply be the case that the neutral writing condition displays a significantly greater decrease in positive affect post writing because there was greater room for reduction. However, it is worth noting that this is a significant affect change occurring within the control group, suggesting the possibility that the control group may not have provided an adequate control, potentially compromising internal validity. It is thus prudent to consider if certain aspects of the study, particularly within the neutral writing control group are burdensome or aversive in manner that led to affect change.

Perhaps the overall burden of participating in three study sessions, with sessions potentially lasting up to 90 minutes, was displeasing enough to significantly decrease positive affect. Therefore, future studies might benefit from considerations of how to decrease the participant burden or least minimize the appearance of burden. It may also be the case that the prospect and then action of writing for 20 consecutive minutes about an emotionally neutral topic was boring enough to become significantly unpleasant. Modifying writing instructions to suggest that participants choose a topic that will not be overly boring or burdensome to write about for 20 minutes might improve the integrity of the control condition. It is worth noting again that overall changes in positive affect

throughout the study are attributable to the passage of time. The investigator raises the aforementioned concerns in order to consider the critically important possibility that design aspects of the study may have undermined the integrity of the control group, even if those concerns cannot be adequately confirmed or ruled out.

Hypothesis 2 – Anger Habituation: After repetitive writing about the same angry memory, participants will show a reduction in the activation of state anger and negative affect.

The results found evidence for between session reductions in the activation of both state anger and negative affect with some groups showing significantly less activation after the final writing task compared to the first writing task. Paired samples tests comparing state anger and negative affect change scores (post-writing minus pre-writing scores) following the first writing task with change scores following the final writing task in all three angry writing groups (conditions 1, 2, and 3) combined found a significant decrease in activation for both state anger and negative affect. Condition 2, massed writing with a longer delay, displayed significantly less activation of both state anger and negative affect following the final writing task when compared to change after the first writing task. . The other massed writing group, condition 3, displayed a trend toward a significant decrease in the activation of state anger but a non-significant change in the activation of negative affect. The spaced angry writing group (condition 1) displayed a decrease in the activation of negative affect that trended toward significance, and a non-significant decrease in state anger. However, the results of tests examining group differences found no significant differences between groups for levels of state anger or negative affect following the final writing task. Thus, the topic of writing is not

shown to influence reductions in state anger or negative affect and the observed reductions can be attributed to uncontrolled factors that occur with the passage of time. The lack of evidence for between session habituation may indicate that expressive writing modifies affect through cognitive processes such as insight and problem solving that take longer time periods to produce results. It is also possible that three writing tasks does not provide sufficient exposure to produce the desired effect. Thus, increased volume of writing may increase the therapeutic benefits.

The results of analyses examining within session reductions of state anger and negative affect showed the same pattern in both massed writing groups (conditions 2 and 3): significant increases pre to post in state anger and negative affect following the first writing task and no significant difference in state anger or negative affect following the second writing task when compared to after the first writing. Condition 2, massed exposure with long retention, did display a decrease in negative affect following the second writing, compared to negative affect after the first writing that trended toward significance. Ultimately, the results did not find any evidence of within session reductions of state anger or negative affect. This is in sharp contrast to the earlier pilot study, in which participants wrote twice about an angry memory in one session, and showed significant decreases in both state anger and negative affect after the second writing. It is however important to note that the pilot study did not include a neutral writing control and therefore the within session reductions in state anger and negative affect were can be attributed to the passage time. Yet, the fact still remains that the pilot study found significant within session reductions in affect that were not seen in the current study.

The lack of within-session habituation could account for the failure to obtain between-session habituation. Emotional processing theory traditionally holds that exposure leads to both within and between session habituation. Between session habituation is often thought to be dependent, to at least some degree, upon the occurrence of within session habituation.

Hypothesis 3 – Spaced v. Massed Exposure: Spaced sessions of writing compared to massed writing in a single session will produce differential effects in the reduction of state anger and negative affect, reflecting differential rates of habituation.

The results did not find any within session reductions in state anger, and there were no observed group differences in state anger following the final writing task between the massed and spaced angry writing conditions. Therefore, there is no indication of any differential effects of massed and spaced writing in the alteration of state anger. For negative affect there was some evidence of groups differences. The difference in negative affect between the spaced exposure and massed exposure conditions was significant [$t[73] = 2.277$, $p = .026$] with the massed exposure groups showing less negative affect following the final writing task. The results thus suggest that massed writing could be more effective in reducing the degree to which expressive writing about an angry memory activates negative affect. However, because the massed writing conditions did not differ from the neutral writing control, this result can be attributed to the passage of time. Given the lack of evidence for habituation or reductions in state and negative affect not explained by the passage of time, it is consistent that there is no evidence of any advantage for different temporal patterns of expressive writing.

The lack of evidence for meaningful reductions in state anger and negative affect with repeated expressive writing is contrary to prior findings and difficult to explain. The Patrick et.al. (2010) study found significant within session reductions in the activation of state anger, however, a neutral writing control group was not included. Therefore, those results are also not separable from the influence of the passage of time. The Cahill (unpublished data) study did use a neutral writing control group and was able to demonstrate clear group differences in the activation and subsequent between session reduction of state anger with repetitive writing about an angry memory. It is possible that the Cahill (unpublished) results are anomalous and that repeated expressive writing does not consistently reduce that activation of state anger in manner consistent with habituation. It is also possible that the results of the current study are anomalous.

It is also possible that design aspects of the current study created unintended results. The observed reduction in positive affect following writing, even in the neutral writing condition, is an outcome not previously found. As previously discussed, perhaps certain aspects related to participation burden or the potential unpleasantness of the neutral writing task resulted in an aversive situation that led to reductions of positive affect. Similar factors may have also interfered with the reduction of state anger activation and negative affect activation.

One identifiable difference between the current study and prior studies is the inclusion of the Prisoner's Dilemma with multiple writing tasks. The pilot study examining the utility of the game as dependent measure of state anger included a single writing task intended to create group differences in the induction of state anger by asking participants to write once about an angry or neutral memory. The inclusion of the game in

a protocol that asked participants to write multiple times was novel to the current study. Therefore, although there is no specific empirical basis to suggest so, the inclusion of the game may have altered participants' experience in a way that interfered with the reduction of state anger and negative affect. One hypothetical possibility is that game includes strong enough cues for more rational decision making that interfere with or negate certain emotional experiences. It is also possible that the game and the prospect of playing it multiple times creates an affective response that interfered with anger reduction and was not detected by the questionnaires used in the study.

Hypothesis 4 – Competitive Responses in the Prisoner's Dilemma Game: Those participants with higher levels of State Anger will give significantly more competitive responses in the Prisoner's Dilemma game.

The results of a one-way ANOVA found no groups differences in competitive responding following either the first or final writing. Groups differences were seen in the activation of state anger following the initial writing task. Those participants who wrote about any angry memory did display a significant activation of state anger compared to the neutral witting control group. Thus, there was an adequate opportunity to observe differences in competitive responding that would correspond with differences in state anger. However, no differences in competitive behavior were observed.

An initial pilot study did not find any group differences in competitive responding corresponding to levels of state anger. However, it appeared that the modal response by participants was cooperation, limiting opportunities for mutual competition. The present study attempted to enhance the game by employing a confederate to provide deliberate competitive responses on select trials as an attempt to increase the opportunity for mutual

competition. The results did display much higher levels of competitive responding in all groups. However, the lack of any group differences in the present study suggest that the economic version of the Prisoner's Dilemma used for the study is not sensitive as a behavioral measure of state anger.

One possibility is that the iterative economic nature of the game provides strong stimuli cues that elicit more rational, cognitive decision making, negating potential emotional factors. One alternative would be to use a game scenario that more purposefully pulls for emotional process, such as the "Wartime" version (Kassinove et.al. 2002). One study (Kassinove et.al. 2002) examined the relationship between trait anger and competitive attack responses in a "Wartime" version of a Prisoner's Dilemma game, where the decisions involved troop deployment and victory at the cost of troops lost. The results found that those participants higher in trait anger experienced greater increases in state anger as a result of playing the game and were more likely to engage in competitive responses, especially if they were playing against another participant who was also high in trait anger (Kassinove et.al. 2002).

The Prisoner's Dilemma was initially developed as a single one-time decision process. It may also be worth considering a single decision format that pulls for more emotional responding. For example, a scenario could be presented in which a participant is asked to respond to some form of provocation in which the response options represent varying levels of cooperation and aggression.

Exploratory Aim 1 – Experiential Avoidance: Do the changes in anger and negative affect following expressive writing coincide with changes in experiential avoidance, as

would be expected if exposure and habituation to the private experience of emotion is a mechanism of change?

Comparing levels of experiential avoidance from baseline to after the final writing task found no changes or group differences. Therefore there is no evidence that expressive writing impacts experiential avoidance within the time frame of the present study. The results did not produce evidence to support the occurrence of exposure and habituation as a mechanism of change with expressive writing. In the absence of habituation, it is not surprising that there is no evidence of habituation to the private experience of emotion. There is also little reason to anticipate that experiential avoidance would be altered in the course of approximately one week.

Exploratory Aim 2 – Trait Anger: Can expressive writing, within the relatively short time period of less than a week, influence reported levels of Trait Anger?

Comparing levels of trait anger from baseline to after the final writing task found no changes or group differences. Therefore there is no evidence that expressive writing impacts trait anger within the time frame of the present study. Given the lack of clear evidence for reductions in state anger as a result of expressive writing as opposed to the passage of time, there would be little reason to anticipate any impact on trait anger. There is also little reason to anticipate that trait anger would be altered in the course of approximately one week.

Broad Limitations and Possible Future Directions:

One broad concern with this line of research is the reliance on self-report measures. The reliance on self-report measures was a factor in the goal to develop a behavioral dependent measure. Future research could focus on the development of other

behavioral measures or employ the oft used Milgram teacher and learner paradigm. The use of physiological data would also provide a dependent measure that does not rely on self-report. A potential confound related to self-report is the presence of demand characteristics. Given popular beliefs about the emotional benefits of catharsis and self-expression, there is a possibility that participants respond to demand characteristics by reporting increased or lessened affect according to their perception of what should happen. The lack of significant group differences in the reduction of anger and negative affect do however suggest that popular beliefs about catharsis did not play a major factor in the current data.

The inclusion of the Prisoner's Dilemma Game with a protocol that included multiple writing tasks was novel. It is possible that the behavior of playing the game and the prospect of playing it again altered the manner in which participants experienced affect during the study. Additionally, the game has not been found to be sensitive to changes in anger. Therefore, it probably advisable to study the game separately in the future. At this point it makes more empirical sense to examine the game's sensitivity to affect changes in simpler studies that focus on brief mood inductions, and to experiment with alternate game formats. If a game format is found to be sensitive to state anger inductions, then it would be beneficial to once again employ the game in studies examining differential reductions in anger across time.

There are also exposure formats that have not been examined. It might be worthwhile to examine the effects of multiple sessions of massed writing distributed across time. Additionally, empirical evidence suggests that the most effect exposure trial timing is an expanding spaced format in which the amount of time between exposure

sessions increases in a stepwise fashion. Other forms of exposure could be developed and compared to expressive writing as a means of studying the utility of writing as a form of exposure. Anger evoking material such as sounds, video clips, or social provocation could be employed to trigger anger and used repeatedly to test for habituation. If habituation were found, that exposure format could be compared to expressive writing to examine the comparative effects of different formats and whether or not writing functions as exposure.

Another future direction is longer studies that can examine the influence of writing across greater time periods. Such longer studies could be helpful in trying to manipulate cognitive process change that may serve as the mechanism of change in affect this expressive writing.

It is also possible that there are effects the current study did not measure. One possibility is that participants are still experiencing a significant affective response following writing about an angry memory multiple times but that other therapeutic benefits have taken place. For example, participants might be more able to manage their response to the emotional experience of anger. Consistent with the perspective of Acceptance and Commitment Therapy, participants might be more readily able to focus on values and productive goal directed behavior in spite of intense feelings of anger. Such changes would represent a therapeutically beneficial change and are not measured by the current study. Future studies could use measures designed to assess such behavioral processes and focus on goals. The development of dependent measures that assess such benefits is also a potential future line of related research.

Finally, it is worth considering how the overall complexity of the study and the burden of participation may have influenced the results. Further studies in this line of research may benefit from attempts to simplify procedures and make participation more efficient. Removing the game as a task serves this purpose. Additionally, it might be worth exploring strategies such as briefer writing times (writing for 10 minutes instead of 20 minutes) but asking participants to engage in more frequent writing, such as once or twice per day for 10 minutes at a time.

In summary, the results of the current study produced some significant findings demonstrating the ability of expressive writing to alter emotional experiences. In particular the activation of state anger and negative affect with expressive writing is supported. However, there is no clear evidence of expressive writing resulting in any systematic habituation of state anger or negative affect, and thus no support for the use of expressive writing as a form of exposure. There is also a lack of support for the Prisoner's Dilemma Game as a dependent measure of state anger.

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Appendix A: Study Materials

Contents

Cover Sheet and Demographics

ID #: _____

Condition: _____

Gender: _____
1 – Female
2 – Male
99 – I do not wish to disclose this

Age: _____ (99 – I do not wish to disclose this)

Race:
1 – Asian or Pacific Islander
2 – Black/African American
3 – Native American
4 – White
5 –Other (please specify): _____
99 – I do not wish to disclose this

Ethnicity: Are you Hispanic? _____
1 – Yes
2 – No
99 – I do not wish to disclose this

Participant Identification and Course Credit Form

Name (First & Last):

_____

Course Department and Course Number for which you would like to receive credit

_____

Course Professor and Teaching Assistant

_____

Have you participated in this study before?

____ Yes ____ No

You may participate in this study only once.

General Instructions

All the questionnaires and study tasks (e.g., writing assignments) are identified by a unique study identification (ID) number that will in no way be associated with your name. Your study ID number is (fill in the blank). As you complete the various questionnaires and writing assignments in this binder, please record your study ID number on the line designated for this purpose located at the top left-hand corner of each page.

Please carefully read and follow the instructions on each page of the materials. The questionnaires and study tasks have been designed to be as self-explanatory as possible. However, if you have any questions about the questionnaire or task instructions, please raise your hand and wait quietly until the research assistant is able to assist you.

Please focus on the questionnaires and study tasks that you are asked to complete. We ask that you refrain from any distracting activities such as texting or otherwise using personal electronic devices because such behaviors may inadvertently influence your responses to study questionnaires and impact the results of the research.

DO NOT PLACE YOUR NAME ON ANY MATERIAL IN THIS BINDER

ID #: _____

Self-Rating Questionnaire (STAXI)

DIRECTIONS: This questionnaire is divided into three Parts. Each Part contains a number of statements that people use to describe their feelings and behavior. Please note that each Part has different directions. Carefully read the directions for each Part before recording your responses. There are no right or wrong answers. In responding to each statement, give the answer that describes you best.

Part 1 Directions (STAXI-S)

A number of statements that people use to describe themselves are given below. Read each statement and then circle that number to the right of the statement that indicates how you feel right now. Remember that there are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to best describe your present feelings.

How I Feel Right Now

	Not at all	Somewhat	Moderately So	Very Much So
1. I am furious	1	2	3	4
2. I feel irritated	1	2	3	4
3. I feel angry	1	2	3	4
4. I feel like yelling at somebody	1	2	3	4
5. I feel like breaking things	1	2	3	4
6. I am mad	1	2	3	4
7. I feel like banging on the table	1	2	3	4
8. I feel like hitting someone	1	2	3	4
9. I am burned up	1	2	3	4
10. I feel like swearing	1	2	3	4

ID #: _____

Part 2 Directions (STAXI-T)

A number of statements that people use to describe themselves are given below. Read each statement and then circle the number to the right of the statement that indicates how you generally feel. Remember that there are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to best describe how you generally feel.

How I Generally Feel

		Almost Never	Sometimes	Often	Almost Always
11.	I am quick tempered	1	2	3	4
12.	I have a fiery temper	1	2	3	4
13.	I am a hotheaded person	1	2	3	4
14.	I get angry when I'm slowed down by others' mistakes	1	2	3	4
15.	I feel annoyed when I am not given recognition for doing good work	1	2	3	4
16.	I fly off the handle	1	2	3	4
17.	When I get mad, I say nasty things	1	2	3	4
18.	It makes me furious when I am criticized in front of others	1	2	3	4
19.	When I get frustrated, I feel like hitting someone	1	2	3	4
20.	I feel infuriated when I do a good job and get a poor evaluation	1	2	3	4

ID #: _____

Part 3 Directions (STAXI-X)

Everyone feels angry or furious from time to time, but people differ in the ways that they react when they are angry. A number of statements are listed below which people use to describe their reactions when they a feel angry or furious. Read each statement and then circle the number to the right of the statement that indicates how often you generally react or behave in the manner described when you are feeling angry or furious. Remember that there are no right or wrong answers. Do not spend too much time on any one statement.

When Angry or Furious…

		Almost Never	Sometimes	Often	Almost Always
21.	I control my temper	1	2	3	4
22.	I express my anger	1	2	3	4
23.	I keep things in	1	2	3	4
24.	I am patient with others	1	2	3	4
25.	I pout or sulk	1	2	3	4
26.	I withdraw from people	1	2	3	4
27.	I make sarcastic remarks to others	1	2	3	4
28.	I keep my cool	1	2	3	4
29.	I do things like slam doors	1	2	3	4
30.	I boil inside, but don't show it	1	2	3	4
31.	I control my behavior	1	2	3	4
32.	I argue with others	1	2	3	4
33.	I tend to harbor grudges that I don't tell anyone about	1	2	3	4
34.	I strike at whatever infuriates me	1	2	3	4
35.	I can stop myself from losing my temper	1	2	3	4
36.	I am secretly critical of others	1	2	3	4

ID #: _____

Part 3 Directions (STAXI-X) Cont'd

When Angry or Furious…

		Almost Never	Sometimes	Often	Almost Always
37.	I am angrier than I am willing to admit	1	2	3	4
38.	I calm down faster than most people	1	2	3	4
39.	I say nasty things	1	2	3	4
40.	I try to be tolerant and understanding	1	2	3	4
41.	I'm irritated a great deal more than people are aware of	1	2	3	4
42.	I lose my temper	1	2	3	4
43.	If someone annoys me, I'm apt to tell him or her how I feel	1	2	3	4
44.	I control my angry feelings	1	2	3	4

ID #: _____

PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to the word. Indicate to what extent you feel this way RIGHT NOW.

1	2	3	4	5
slightly or not at all	a little	moderately	quite a bit	extreme

_____ interested
_____ distressed
_____ excited
_____ upset
_____ strong
_____ guilty
_____ scared
_____ hostile
_____ enthusiastic
_____ proud

_____ irritable
_____ alert
_____ ashamed
_____ inspired
_____ nervous
_____ determined
_____ attentive
_____ jittery
_____ active
_____ afraid

Acceptance and Action Questionnaire
(Hayes, 2000)

Below you will find a list of statements. Please rate the truth of each statement as it applies to you.

Use the following scale to make your choices.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

_____ 1. I am able to take actions on a problem even if I am uncertain what is the right thing to do.

_____ 2. I often catch myself daydreaming about things I've done and what I would do differently next time.

_____ 3. When I feel depressed or anxious, I am unable to take care of my responsibilities.

_____ 4. I rarely worry about getting my anxieties, worries, and feelings under control.

_____ 5. I'm not afraid of my feelings.

_____ 6. When I evaluate something negatively, I usually recognize that this is just a reaction, not an objective fact.

_____ 7. When I compare myself to other people, it seems that most of them are handling their lives better than I do.

_____ 8. Anxiety is bad.

_____ 9. If I could magically remove all the painful experiences I've had in my life, I would do so.

Angry Memory Identification Instructions

Please identify a memory for an event in your life that made you feel very angry. This memory should not just be of an event that made you angry at the time it happened, but it should also be one that still makes you feel very angry as you currently think about it. For example, an angry memory might be of a fight with a parent, close friend, significant other, or roommate. The important thing is that you think of the memory that makes you the angriest.

In the space below, please write down a few words that summarize the memory you have identified. If necessary, the experimenter will use these words to remind you of the memory you have identified in this and following sessions.

Emotionally Neutral Memory Identification Instructions

Please identify two memories for events that were not associated with any particular emotional experience. These memories should not just be of emotionally neutral events that did not produce any strong feelings at the time they happened, but they should also be ones that still do not make you have any particular strong feelings as you currently think about them. For example, an emotionally neutral memory might be what you had for breakfast yesterday or what clothes you decided to wear to class today. The important thing is that you think of two memories that did not evoke any particularly strong feelings at the time they happened or as you currently think about them.

In the space below, please write down a few words that summarize the first emotionally neutral memory you have identified. If necessary, the experimenter will use these words to remind you of the memory you have identified in this and following sessions.

In the space below, please write down a few words that summarize the second emotionally neutral memory you have identified. If necessary, the experimenter will use these words to remind you of the memory you have identified in this and following sessions.

Emotionally Expressive Writing Instructions

I want you to write about the angry memory that you previously identified. In your writing, it is important to not just write about what happened, but also to include your deepest thoughts and feelings related to this memory. Ideally, whatever you write about should address aspects of the event or experience that you have not talked about with other people in detail. The only rules we have about your writing is that you limit your writing topic to the memory that you identified as being your angriest experience and that you write continuously for 20 minutes. If you run out of things to say, you can just repeat what you have already written. In your writing, DO NOT worry about grammar, spelling, or sentence structure. Just write! Your writing is completely anonymous and confidential. Everything is coded strictly by number. The research assistant is available to answer any questions you may have. You do not need to monitor the time. The research assistant will tell you when to stop writing.

If you are having any difficulty remembering which angry memory you previously identified, you may ask the research assistant to provide you with the reminder words you listed when you first identified your angriest memory.

Emotionally Neutral Writing Instructions (Version A)

I want you to write about the first emotionally neutral memory that you have identified. In your writing it is important for you to be as objective as possible. We DO NOT want you to write about your emotions or your opinions. We want you to be completely objective; however, feel free to be as detailed in your description as you can possibly be. The only rules we have about your writing is that you limit your writing topic to the first memory that you identified as being an emotionally neutral experience and that you write continuously for 20 minutes. If you run out of things to say, you can just repeat what you have already written. In your writing, DO NOT worry about grammar, spelling, or sentence structure. Just write! Your writing is completely anonymous and confidential. Everything is coded strictly by number. The research assistant is available to answer any questions you may have. You do not need to monitor the time. The research assistant will tell you when to stop writing.

If you are having any difficulty remembering which emotionally neutral memory you previously identified, you may ask the research assistant to provide you with the reminder words you listed when you first identified your emotionally neutral memory.

Emotionally Neutral Writing Instructions (Version B)

I want you to write about the second emotionally neutral memory that you have identified. DO NOT write about the emotionally neutral memory that you have already written about. In your writing it is important for you to be as objective as possible. We DO NOT want you to write about your emotions or your opinions. We want you to be completely objective; however, feel free to be as detailed in your description as you can possibly be. The only rules we have about your writing is that you limit your writing topic to the second memory that you identified as being an emotionally neutral experience and that you write continuously for 20 minutes. If you run out of things to say, you can just repeat what you have already written. In your writing, DO NOT worry about grammar, spelling, or sentence structure. Just write! Your writing is completely anonymous and confidential. Everything is coded strictly by number. The research assistant is available to answer any questions you may have. You do not need to monitor the time. The research assistant will tell you when to stop writing.

If you are having any difficulty remembering which emotionally neutral memory you previously identified, you may ask the research assistant to provide you with the reminder words you listed when you first identified your emotionally neutral memory.

Decision Making Game Instructions and Scenario

Game Instructions

You are going to play a decision making game. You will make a series of decisions that will determine how many hypothetical gold coins you and another person each receive. The research assistant will read the scenario below to you and based upon this scenario you are to make your decisions. Please DO NOT state your decisions out loud. You have been given a Blue Paddle and a Red Paddle. When you choose to cooperate raise the Blue Paddle. When you choose to compete raise the Red Paddle. The research assistant will record your decisions and the number of coins you each receive. After each trial the research assistant will announce to you both what each of you decided, the number of coins you each receive for that trial, and the total number of coins you each have at that point. The research assistant will refer to you as Player 1 and Player 2. Player 1 will be the person on the research assistant's left and Player 2 will be the person on the research assistant's right. If you look on the wall in front of you, you will see a sign to remind you of which player you are. You have been given a form that you are to use to track your progress in the game. You will have 10 seconds per trial to make your decision. The game will continue until the research assistant tells you that the game is complete.

Game Scenario

A fiendish millionaire has locked you and another person into a competitive game. You do not know the other person and cannot see them. You only know the other person's decision after you've made your decision and you do not know when the game will end. On each trial, you and the other person will each have to decide whether to cooperate or compete with one another. These decisions will determine the number of solid gold coins you each receive. If you both choose to cooperate you each receive 3 gold coins. If one of you chooses to cooperate and the other chooses to compete, the competitor will receive 5 gold coins and the cooperator will receive 0 gold coins. If you both decide to be competitive you will each receive 1 gold coin. The four possible scenarios are listed below:

Your Decision	Your Game Partner's Decision	Outcome of Trial
Cooperate	Cooperate	You receive 3 gold coins Your game partner receives 3 gold coins
Cooperate	Compete	You receive 0 gold coins Your game partner receives 5 gold coins
Compete	Cooperate	You receive 5 gold coins Your game partner receives 0 gold coins
Compete	Compete	You receive 1 gold coin Your game partner receives 1 gold coin

ID #: _____

Participant Game Recording Form

Use this form to monitor your progress in the game. Use additional pages as needed.

Trial Number	Total Number of Decision	Number of Coins for Trial	Coins

Research Assistant Script for Prisoner's Dilemma Trials

Prior to the First Trial

Game Instructions (Read Verbatim)
"You are going to play a decision making game. You will make a series of decisions that will determine how many hypothetical gold coins you and another person each receive. I will read the scenario below to you and based upon this scenario you are to make your decisions. Please DO NOT state your decisions out loud. You have been given a Blue Paddle and a Red Paddle. When you choose to cooperate raise the Blue Paddle. When you choose to compete raise the Red Paddle. I will record your decisions and the number of coins you each receive. After each trial I will then announce to you both what each of you decided, the number of coins you each receive for that trial, and the total number of coins you each have at that point. I will refer to you as Player 1 and Player 2. Player 1 will be the person on my left and Player 2 will be the person on my right. If you look on the wall in front of you, you will see a sign to remind you of which player you are. You have been given a form that you are to use to track your progress in the game. You will have 10 seconds per trial to make your decision. The game will continue until I tell you that the game is complete."

Game Scenario
"A fiendish millionaire has locked you and another person into a competitive game. You do not know the other person and cannot see them. You only know the other person's decision after you've made your decision and you do not know when the game will end. On each trial, you and the other person will each have to decide whether to cooperate or compete with one another. These decisions will determine the number of solid gold coins you each receive. If you both choose to cooperate you each receive 3 gold coins. If one of you chooses to cooperate and the other chooses to compete, the competitor will receive 5 gold coins and the cooperator will receive 0 gold coins. If your both decide to be competitive you will each receive 1 gold coin. The four possible scenarios as follows:

If you decide to cooperate and your partner decides to cooperate, you will receive 3 gold coins and your game partner will receive 3 gold coins.

If you decide to cooperate and your partner decides to compete, you will receive 0 gold coins and your game partner will receive 5 gold coins.

If you decide to compete and your partner decides to cooperate, you will receive 5 gold coins and your game partner will receive 0 gold coins.

If you decide to compete and your partner decides to compete, you will receive 1 gold coin and your game partner will receive 1 gold coin.

Please use the Participant Game Recording Form located in the study binder to record each trial number and your decision. After both of you have used the paddles to indicate

your decision on each trial, I will inform you of the number of gold coins you have earned on the trial and the total number of gold coins you have earned up to that point.

If you have any questions, please raise your hand and wait for me to come to your side.

We are now ready for the first trial. Please consider the Game Scenario as I have described it and make your first decision to either cooperate or compete. If you chose to cooperate raise your Blue Paddle. If you choose to compete raise your Red Paddle. You have 10 seconds to make your decision."

To be read at the completion of each trial

"You have just completed trial number *X (state the trial number that was just completed)* and may now lower your Paddle. Player 1 you chose to (*cooperate/compete*) you receive *X* (*number of coins based on participant's decision*) gold coins. Player 2 you chose to (*cooperate/compete*) you receive *X* (*number of coins based on participant's decision*) gold coins. Player 1 now has a total of *X* gold coins. Player 2 now has a total of *X* gold coins. You will have 10 seconds to make your next decision. Remember to raise the appropriate paddle after making your decision. Please make your next decision."

Note to Research Assistant: Remember to alternate which participant's decision and outcome you report first so that there is not the appearance of any bias or reason for you start with.

To be read at the completion of the final trial

"You have just completed the final trial of the game and may now lower your Paddle. Player 1 you chose to (*cooperate/compete*) you receive *X* (*number of coins based on participant's decision*) gold coins. Player 2 you chose to (*cooperate/compete*) you receive *X* (*number of coins based on participant's decision*) gold coins. Player 1 has a final total of *X* gold coins. Player 2 has a final total of *X* gold coins. Please continue on in the binder and complete the next set of questionnaires."

Research Assistant Game Recording Form

Player = ID# _____. Player/RA Confederate = _____. RA Game Director = _____.

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Player Decision					
Outcome on Current Trial					
Running Total					
Player/Confed. Decision					
Outcome on Current Trial					
Running Total					

	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
Player Decision					
Outcome on Current Trial					
Running Total					
Player/Confed. Decision					
Outcome on Current Trial					
Running Total					

	Trial 11	Trial 12	Trial 13	Trial 14	Trial 15
Player Decision					
Outcome on Current Trial					
Running Total					
Player/Confed. Decision					
Outcome on Current Trial					
Running Total					

Player = ID# _____. Player/RA Confederate = _____. RA Game Director = _____.

	Trial 16	Trial 17	Trial 18	Trial 19	Trial 20
Player Decision					
Outcome on Current Trial					
Running Total					
Player/Confed. Decision					
Outcome on Current Trial					
Running Total					

	Trial 21	Trial 22	Trial 23	Trial 24	Trial 25
Player Decision					
Outcome on Current Trial					
Running Total					
Player/Confed. Decision					
Outcome on Current Trial					
Running Total					

	Trial 26	Trial 27	Trial 28	Trial 29	Trial 30
Player Decision					
Outcome on Current Trial					
Running Total					
Player/Confed. Decision					
Outcome on Current Trial					
Running Total					

Prisoner's Dilemma Game

RA Confederate Instructions and Strategy

Trial 1 = <u>Cooperate</u>

Trials 2 – 5 = <u>Tit for Tat</u>

- Your response is determined by the participant's response on the previous trial.
- If on the previous trial the participant Cooperated you will Cooperate on the current trial. If on the previous trial the participant Competed you will Compete on the current trial.
- You are basically mimicking the participant's responses.

Trial 6 = <u>Compete</u>

Trial 7 = <u>Compete</u>

Trials 8 – 30 = return to **<u>Tit for Tat</u>**

Use your copy of the Research Assistant Game Recording Form to track what happens in the game. This will provide a duplicate record of the game. It will also help you stay in character and focus on the game. It is important that you follow the strategy outlined above and that you participate in the entire game. Your participation in the entire game and your fellow research assistant treating you as a participant will help keep the conditions of the game consistent and naturalistic. We do not want the conditions of the game to vary or the participant suspecting that you are not a genuine opponent.

Cory James Patrick

Professional Positions Held

Post-Doctoral Resident in Primary Care Behavioral Health
South Texas Veterans Health Care System, starting August, 2013
Clinical Psychology Intern
VA Western New York Healthcare System (July 2012 – July 2013)
Adjunct Professor of Psychology
Carthage College, Kenosha WI. (July 2010 – May 2012)
Associate Lecturer, Psychology
University of Wisconsin – Milwaukee (August 2009 – May 2011)

Education

VA Western New York Healthcare System: Buffalo, NY.
Pre-Doctoral Clinical Psychology Internship
Track: General
Rotations: Behavioral Health; Post-traumatic Stress Disorder; Psychosocial Recovery and Rehabilitation; Primary Care
Intern Project: LGBTQ Support and Outreach
Completion Date: July 12th, 2013
Training Director: Karl Frohm, Ph.D.

University of Wisconsin-Milwaukee: Milwaukee, WI.
Ph.D. Dissertation Title: *The Therapeutic Expression of Anger: Emotionally Expressive Writing and Exposure*
Program: Clinical Psychology, APA accredited
Minor: Neuroscience
Dissertation Defense: June 17th, 2013
Degree Expected: August, 24th 2013
Research Mentor: Shawn P. Cahill, Ph.D.

M.S. Thesis Title: *The Influence of Reading Ability and Visual Field in the Word Letter Phenomenon*
Program: Clinical Psychology, APA accredited
Minor: Neuroscience
Degree Awarded: May, 2007
Research Mentor: David C. Osmon, Ph.D., ABPP-CN

Northern Michigan University: Marquette, MI.
B.S. Senior Directed Study Project: *Hooper Visual Organizational Test Performance in Alzheimer's disease and Alcohol Related Dementia: A Comparative Study*
Major 1: Psychology: Graduate School Preparation Track
Major 2: Criminal Justice
Degree Awarded: May, 2003
Psychology Advisor(s): Charles Leith, Ph.D. and Yves Turgeon, Ph.D.
Crim. Justice Advisor: Gregory Warchol, Ph.D.

Professional Affiliations

2009 – Present	Association for Behavioral and Cognitive Therapies	Student Affiliate
2009 – Present	American Psychological Association	Student Affiliate

2007 – Present	Wisconsin Psychological Association	Student Member
2007 – 20010	International Neuropsychological Society	Associate Member
2008 – 2009	Midwest Neuropsychology Group	Student Member

Awards and Honors

2011 – 2012	Advanced Opportunity Program (AOP) Fellowship
2010	Wisconsin Psychology Foundation, Scientific Research Poster Award 1st place Grad/Post Doc Category Poster Title: *Expressive Writing and Emotional Reactivity*
2004 – 2005	Chancellor's Graduate Student Award: University of Wisconsin – Milwaukee
2003	Graduated Summa Cum Laude: Northern Michigan University
2003	Nominated Outstanding Graduating Senior: Department of Psychology Northern Michigan University
2001	Membership in Psi Chi, The National Honor Society in Psychology: Chapter Historian (Northern Michigan University): 2001-2002 Chapter Membership Chair (Northern Michigan University): 2002-2003
2001	Membership in Golden Key National Honor Society
2001	Membership in Alpha Phi Sigma, the National Criminal Justice Honor Society
2000	Certificate of Achievement: Northern Michigan University, Student Support Services, for tutoring conducted during the 1999-2000 academic year
1999 – 2001	Board of Control Scholarship: Northern Michigan University

Clinical Experience

7/2012 – 7/13 Pre-Doctoral Clinical Internship

VA Western New York Healthcare System

Internship Project – Supervisor: Erica Sargent Ph.D. The development of services for LGBTQ veterans. We have established a weekly support group for LGBTQ veterans. We have also been in contact with community based organizations to help advertise services and provide veterans with information regarding community organizations, support, advocacy, and rights. The development of a brief questionnaire to track group benefits and satisfaction, as well as to explore other desired services and concerns within the LGBTQ veteran population.

Rotations:

Behavioral Health – Supervisor: Erica Sargent Ph.D. A general outpatient therapy rotation in which I maintained a diverse caseload of individual psychotherapy patients. Patients were generally seen on a weekly basis. Diagnoses and problems seen included depression, bipolar disorder, relationship/attachment concerns, Post-traumatic Stress Disorder, combat trauma, Military Sexual Trauma, Schizoaffective Disorder, alcohol abuse, grief and loss, Panic Disorder, Social Phobia, and eating disorder. Group psychotherapy experiences have included support for combat PTSD, and LGBTQ support.

Psychosocial Recovery and Rehabilitation – Supervisor : Clifford Mahler, Ph.D. A rehabilitation center for chronic and severe mental illness where my primary clinical responsibilities included leading group therapy sessions, intake assessment, creating individual recovery plans, individual therapy, and milieu therapy. Types of group therapy included anger management, support for combat based PTSD, cognitive behavior therapy, supportive therapy and process groups, dual recovery for addiction and mental illness, and men's

health. My responsibilities also included serving as an advisor to the executive board of the veteran community government.

Primary Care – Supervisor: Shelia Donovan, Ph.D. My primary responsibilities are providing assessment, consultation, treatment planning, and short term psychotherapy as part of an integrated primary care team. These clinical responsibilities include providing care on an open access, walk in, basis, and responding to mental health crises.

Residential PTSD Center (Batavia, NY) – Supervisors: Amy Rodrigues, Ph.D. & Katie Chipman, Ph.D. A residential center serving male and female veterans for the treatment of PTSD. My clinical responsibilities include individual therapy using Prolonged Exposure and Cognitive Processing Therapy, group psychotherapy, and comprehensive intake assessments. Group psychotherapy protocols include trauma processing, sleep hygiene, relaxation training, relationship skills, anger management, and Acceptance and Commitment Therapy.

2006 – 2012 Therapy Practicum
University of Wisconsin – Milwaukee, Psychology Clinic
Supervisors: Shawn P. Cahill, Ph.D.; Robyn Ridley, Ph.D.; Gwynne Kohl, Ph.D.
Activities: Providing individual psychotherapy with clients presenting with a range of Axis I and Axis II disorders. Providing couples therapy. Completion of intake procedures and regular assessment to monitor treatment progress.
Therapy protocols used: Cognitive Behavior Therapy; Exposure and Response Prevention; Exposure and Cognitive Restructuring; Integrative Behavioral Couples Therapy; Behavioral Activation; Acceptance and Commitment Therapy; Functional Analytic Psychotherapy

2009 – 2010 Peer Supervisor: Assessment Practicum
University of Wisconsin – Milwaukee, Psychology Clinic
Supervisors: Bonnie Klein-Tasman, Ph.D.; & David C. Osmon, Ph.D., ABPP-CN
Activities: Providing live supervision of junior graduate students during the completion of adult and child psycho-diagnostic and psycho-educational assessments. Providing constructive feedback regarding test administration and general clinical skills. Didactic instruction of clinical interviewing, test administration, test scoring, test interpretation, report writing, and general clinical skills.

2008 – 2009 Practicum in Clinical Supervision
University of Wisconsin – Milwaukee, Psychology Clinic
Supervisor: Robyn Ridley, Ph.D.
Activities: Providing peer supervision of junior practicum students on a clinic practicum team during the completion of both psychotherapy and psycho-diagnostic assessment training. Providing performance based feedback and assistance to junior graduate students. Assisting with case conceptualization. Coordinating and leading group supervision meetings

2008 – 2009 Community Placement
Zablocki VA Medical Center (Milwaukee, WI.), Acute Mental Health Division
Supervisors: Bertrand Berger, Ph.D.; Kathleen Kos, Ph.D.; Jill Klayman, Ph.D.
Group Psychotherapy: As part of a psycho-education and rehabilitation program for veterans with severe and persistent mental illness, I co-led several groups teaching communication skills and medication management skills. I led a cognitive processing and restructuring group in a harm reduction program for veterans recovering from substance abuse and

dependence. I led/co-led a morning self-reflection group, and led an afternoon relaxation group on the locked inpatient unit.
Individual Psychotherapy: I saw two veterans for individual psychotherapy. One case focused on supportive psychotherapy and the enhancement of daily living skills. The other case focused on behavioral activation and cognitive restructuring.
Assessment: I completed psycho-diagnostic assessments and reports focused on Axis I and Axis II differential diagnosis on the locked inpatient unit. I completed pre-surgical psychological evaluations and reports for pain management to determine eligibility for spinal cord stimulator implant surgery.

7/2007 – 12/2007 Community Placement
Medical College of Wisconsin/Froedtert Memorial Hospital, Neurosciences Clinic (Milwaukee, WI.)
Supervisor: Sara Swanson, Ph.D.
Activities: Neuropsychological testing of adults presenting with a wide array of neurological and behavioral concerns including memory problems, motor/coordination problems, dementia onset, head injury, stroke, learning /performance difficulties, and epilepsy.

2005 – 2006 Clinical Assessment Practicum
University of Wisconsin – Milwaukee, Psychology Clinic
Supervisors: Bonnie Klein-Tasman, Ph.D. & David C. Osmon, Ph.D., ABPP-CN
Activities: The completion of referral based adult and child clinical assessments. Types of assessments and cases seen included psycho-educational evaluation, learning disability, neuropsychological testing; structured interviewing, personality assessment, and differential diagnosis of Axis I and Axis II psychopathology.

1/2005 – 6/2005 First Year Clinical Practicum
University of Wisconsin – Milwaukee, Psychology Clinic
Supervisor: Nicole Roberts, Ph.D.
Activities: Learning clinical interviewing skills and techniques, including structured interviewing with student volunteers. The completion of intelligence test administration with student volunteers.

Professional Development & Service

Seeking Safety – training completed at the Buffalo VA Medical Center on 05/23/2013.
Workshop – Treating our wounded warriors: Prolonged exposure therapy for combat related PTSD.
42nd annual convention of the Association for Behavioral and Cognitive Therapies
Conducted By: Alan Peterson, University of Texas Health Science Center at San Antonio
David S. Riggs, Uniformed Services University of Health Sciences
Jeffery A. Cigrang, San Antonio Military Medical Center
Invited talk: Post-traumatic Stress Disorder
Veterans Day Recognition 2011: *"Fostering a Connected Campus Community"*
University of Wisconsin – Milwaukee

Research

Research Interests:
My research interests are within the broad categories Psychopathology, Emotional Expression, Anxiety, and Treatment Development/Outcome.

Peer Reviewed Publications

Mano, Q. R., **Patrick, C. J.,** Andresen, E. A., Capizzi, K., Biagioli, R., & Osmon, D. C. (2010). Re-examining format distortion and orthographic neighborhood size effects in the left, central and right visual fields. *Journal of Research in Reading. 33 (4),* 356 - 373

Manuscripts in Revision/Preparation

Patrick, C. J., Cahill, S. P., & Duncan, E. (in preparation) The Ability of Expressive Writing to Reduce Anger and Negative Affect: Potential Therapeutic Implications.

Anderson, R. E., **Patrick, C. J**., & Cahill, S. P. (in preparation). Recognition of Sexual Assault Threat in ADRP: An Empirical Review.

Patrick, C. J., Osmon, D. C., & Andresen, E. A. (in revision). Separate Orthographic and Phonological Aspects of the Word-Letter Phenomenon.

Book Chapters

Osmon, D.C., **Patrick, C.J.,** & Andresen, E.A. (2008). Learning Disabilities. In A.M. Horton, Jr. & D. Wedding (Eds.), *Neuropsychological Handbook, 3rd Edition*.

Symposia Presentations

Riemann, B., Conelea, C., Manos, R. C., & **Patrick, C.** (2010, November). Treatment of OCD at Rogers Memorial Hospital: Description of the Programs and Patient Characteristics at Admission. In C. Wetterneck (Chair), *OCD Research Collaborative Association (ORCA): Evaluating the Effectiveness of Residential and Intensive Outpatient Treatment Programs in Adolescents and Adults*. Symposium presented the annual meeting of the Association for Behavioral and Cognitive Therapies (ABCT). San Francisco, CA.

Simpson, H. B., Wetterneck, C., Cahill, S., **Patrick, C.,** & Riemann, B. (2010, November). Comorbid OCD & Eating Disorders: Results from a Specialty Residential Program. In C. Wetterneck (Chair), *OCD Research Collaborative Association (ORCA): Evaluating the Effectiveness of Residential and Intensive Outpatient Treatment Programs in Adolescents and Adults*. Symposium presented the annual meeting of the Association for Behavioral and Cognitive Therapies (ABCT). San Francisco, CA.

Patrick, C. J. (2010, April). *The Therapeutic Expression of Anger: Emotionally Expressive Writing & Exposure.* Presentation given at the 2010 annual Association of Graduate Students in Psychology Research Symposium. Milwaukee, WI.

Riemann, B., Conelea, C., Manos, R. C., & **Patrick, C.** (2010, March). Treatment of OCD at Rogers Memorial Hospital: Description of the Programs and Patient Characteristics at Admission. In B. Riemann (Chair) & S. P. Cahill (Co-Chair), *OCD Research Collaborative Association (ORCA): Evaluating the Effectiveness of Residential and Intensive Outpatient Treatment Programs in Adolescents and Adults*. Symposium presented at the annual meeting of the Anxiety Disorders Association of America, Baltimore, Maryland.

Wetterneck, C., Simpson, H. B., **Patrick, C.,** & Riemann, B. (2010, March). Comorbid OCD & Eating Disorders: Results from a Specialty Residential Program. In B. Riemann (Chair) & S. P. Cahill (Co-Chair), *OCD Research Collaborative Association (ORCA): Evaluating the Effectiveness of Residential and Intensive Outpatient Treatment Programs in Adolescents and Adults*. Symposium presented at the annual meeting of the Anxiety Disorders Association of America, Baltimore, Maryland.

Patrick, C. Bass, H. Bretyl, B. Blanton, J. Burns, S. Gegory, A. Greising, J. Hudson, D. Kelly, E. Leith, C. Mashinini, D. Pascoe, N. Seablom, K. Vanlanen, K. (2002, April). *Transfer of Mental Rotation Training to Novel but Unsurprising Test Angles.* Paper presented at the meeting of Celebration of Student Research and Creative Works (Northern Michigan University), Marquette, MI.

Poster Presentations

Patrick, C. J., Grout, K. M., Bayne, A. M., & Cahill, S. P. (2012). *Emotional Reactivity and Competitive Behavior: Does an iterative economic Prisoner's Dilemma task respond to changes in state anger?* Poster session presented at the 2012 Spring Convention of the Wisconsin Psychological Association (WPA). Middleton, WI.

Duncan, E., **Patrick, C. J.,** & Cahill, S. P. (2011). *Severity of Life Events vs. Amplification of Reactions to Life Events in Understanding Trait Anger*. Poster session presented at the 2011 UWM Undergraduate Research Symposium. Milwaukee, WI.

Key, M., Ran, D., Klossner, S., Boisen, N., **Patrick, C. J.,** & Cahill, S. P. (2011). *Emotionally Expressive Writing Manipulation Check.* Poster session presented at the 11th Annual UW System Symposium for Undergraduate Research and Creative Activity. University of Wisconsin – Parkside, Kenosha, WI.

Boisen, N., Klossner, S., Duncan, E., Key, M., **Patrick, C. J.,** & Cahill, S. P. (2011). *Trait Anger Moderates Activation and Habituation of State Anger Following Expressive Writing.* Poster session presented at the 2011 Spring Convention of the Wisconsin Psychological Association (WPA). Middleton, WI.

Patrick, C. J., Holcomb, B., Salasek, R., Orvis, A., Duncan, E., Cahill, S. P. (2010, November). *The Ability of Expressive Writing to Reduce Anger and Negative Affect: Potential Therapeutic Implications.* Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies (ABCT). San Francisco, CA.

Patrick, C. J., Salasek, R., Holcomb, B., Orvis, A., Duncan, E., Cahill, S. P. (2010, March). *Expressive Writing and Emotional Reactivity.* Poster session presented at the 2010 Spring Convention of the Wisconsin Psychological Association (WPA). Middleton, WI.

Bowe, W., Busch, A., **Patrick, C.,** Andresen, E., Kanter, J. W. (2009, November) *The Effect of Depression Severity on Sensitivities to Positive Reinforcement and Punishment*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies (ABCT). New York, NY.

Ross, A., Conelea, C. A., Manos, R. C., **Patrick, C. J.,** Cahill, S. P., & Riemann, B. C. (2009, November). *Trichotillomania treatment outcome in an intensive outpatient and residential sample.* Poster presented at the Special Interest Group Poster Exposition at the annual meeting of the Association for Behavioral and Cognitive Therapies. New York, NY.

Patrick, C. J., Andresen, E. N., Busch, A., Weeks, C., & Kanter, J. (2008, May). *The relationship between the Wisconsin Card Sorting Test (WCST) and Reward Responsivity.* Poster session presented at the 2008 Midwest Neuropsychology Group conference (MNG). Chicago, IL.

Andresen, E. N., **Patrick, C. J**., Busch, A., Weeks, C., & Kanter, J. (2008, May). *The impact of trait and state characteristics on executive functioning.* Poster session presented at the 2008 Midwest Neuropsychology Group conference (MNG). Chicago, IL.

Flynn, J., **Patrick, C**., & Osmon, D. (2008, April). *The Word Letter Phenomenon (WLP): Family Sinstrality as a Possible Moderator Variable.* Poster session presented at the 2008 Spring Convention of the Wisconsin Psychological Association (WPA). Middleton, WI.

Patrick, C. J., Flynn, J., Osmon, D. C., (2008, February). *Reading Ability Moderates the Word Letter Phenomenon (WLP): Support for a Dual Route Model.* Poster session presented at the 36th Annual meeting of the International Neuropsychological Society (INS). Kona, HI.

Patrick, C. J., Flynn, J., Osmon, D. C., (2008, February). *Reading Ability Moderates Removal of the Word Letter Phenomenon (WLP) in Lateralized Stimulus Displays: Elucidating the role of the Right Hemisphere.* Poster session presented at the 36th Annual meeting of the International Neuropsychological Society (INS). Kona, HI.

Patrick, C., Flynn, J. Nass, M., & Osmon, D. (2007, April). *The Word Letter Phenomenon (WLP): Implications for bi-hemispheric processing in word recognition*. Poster session presented at the 2007 Spring Convention of the Wisconsin Psychological Association (WPA). Middleton, WI.

Patrick, C. J., Osmon, D. C., & McCarren, M. (2007, February). *The Influence of Visual Field in the Word Letter Phenomenon (WLP): Does the perceptual advantage for words depend upon bi-hemispheric processing?* Poster session presented at the 35th Annual meeting of the International Neuropsychological Society (INS). Portland, OR.

Patrick, C. Greising, J. Turgeon, Y. Stanczak, S. (2003, June). *Hooper Visual Organizational Test Performance in Alzheimer's Disease and Alcohol Related Dementia: A Comparative Study.* Poster session presented at the XIV Annual meeting of Theoretical and Experimental Neuropsychology (TENNET). Montreal, Canada.

Research Experience

2008 – 2013 Fear, Exposure, and Anxiety Research Center

Supervisor: Shawn P. Cahill, Ph.D.; University of Wisconsin Milwaukee

Doctoral Dissertation Research: Dissertation Proposal Passed on September, 28th, 2011
Defense Passed on June, 27th, 2013

The Therapeutic Expression of Anger: Emotionally Expressive Writing and Exposure

The focus of the project is the therapeutic benefits of emotionally expressive writing in reducing anger. The project is investigating the roles of emotional expression, writing, and problem solving in the experience of anger and the treatment of anger, as well as the reduction of aggressive behavior.

Prior to the completion of my dissertation proposal, I completed data collection for a pair of preliminary studies testing the implementation of expressive writing procedures to reduce the experience of state anger and the feasibility of using a competitive game as a dependent measure of anger and aggression. The results of these studies have generated several completed presentations and a manuscript that is in preparation.

Other laboratory research projects and interests to which I have contributed

- Factors that contribute to and reduce the risk of victimization in sexual assault.
- Outcome data analysis of residential and outpatient treatment programs for Obsessive Compulsive Disorder at Rogers Memorial Hospital
- The construct validity of self-efficacy

2007 – 2009 Depression Treatment and Research Center

Supervisor: Jonathan Kanter, Ph.D.; University of Wisconsin Milwaukee

Schedule Sensitivity in Depression

Role: Co-investigator and Study Assessor

The focus of the study was to examine sensitivity to shifting contingencies of reinforcement in a community sample of depressed and control participants. Neuropsychological measures of executive functioning, such as the Wisconsin Card Sorting Test, were administered and constructs such as cognitive flexibility were related to the influence of contingency schedules upon behavior in depressed individuals. The project produced multiple presentations.

2004 – 2008 Adult Neuropsychology Research Laboratory

Supervisor: David C. Osmon, Ph.D., ABPP-CN; University of Wisconsin Milwaukee

Effort Testing in Learning Disabilities:

I generated a literature review and preliminary design for a study to examine methods for detecting inadequate effort in the assessment of adult learning disabilities. However, due to a shift in focus and career goals from neuropsychology to cognitive behavioral theories and treatment of psychopathology, I did not carry out the intended study.

Masters Thesis Research : *The Influence of Reading Ability and Visual Field in the Word Letter Phenomenon (WLP)*

Research focused on the use of a cognitive perceptual paradigm in word recognition known as the Word Letter Phenomenon (WLP) to investigate bi-hemispheric aspects of automated word recognition and how such abilities may relate to fluent reading ability and reading disability.

Other laboratory research projects focused on topics such as language, reading ability, learning disabilities, attention, ADHD, neuropsychological testing, and the measurement of effort in neuropsychological assessment.

2003 - 2004 Advanced Physiological Psychology (advanced research course)

Supervisor: John Renfrew, Ph.D.; Northern Michigan University

Co-Principle Investigator: *Electric Stimulation of the Brain in the Rat and Aggressive Behavior Toward Inanimate Objects: Effects of aspartame*

Responsibilities: Research design, literature review, data collection, data analysis, a written research report and presentation

2003 – 2004 Cognition and Aging Research Team

Supervisor: Yves Turgeon, Ph.D.; Northern Michigan University

Research Assistant:

Responsibilities: Literature review, data collection, and data analysis.

2002 – 2003 Directed Study: Fundamentals of Neuropsychology and Aging

Supervisor: Yves Turgeon, Ph.D.; Northern Michigan University

Co-Principle Investigator: *Hooper Visual Organizational Test Performance in Alzheimer's disease and Alcohol Related Dementia: A Comparative Study*

Responsibilities: Research design, literature review, data collection, data analysis, written research report, abstract and poster for the XIV Annual meeting of Theoretical and Experimental Neuropsychology (TENNET)

2001 – 2002 Research Assistant

Supervisors: Charles Leith, Ph.D. & Shelia Burns, Ph.D.; Northern Michigan University

Transfer of Mental Rotation Training to Novel but Unsurprising Test Angles

Responsibilities: Literature review, data collection, data analysis, and preparing a paper presentation for the Michigan Academy of Science, Arts & Letters. Presented the background, design, and results of the study at the annual Celebration of Student Research and Creative Works, Northern Michigan University, Marquette, MI.

Teaching Experience

2010 – 2012 Carthage College Adjunct Professor of Psychology

Courses Taught	Number of Times
Abnormal Psychology	2
Social Psychology	4

2009 – 2011 University of Wisconsin-Milwaukee Associate Lecturer, Psychology

Courses Taught	Number of Times
Personality	4
Social Psychology	1

Guest & Substitute Lectures Given

Theories of Intelligence & Intelligence Testing; Existentialism; Carl Jung's personality theory; Henry Murray & Personology; Humanistic Psychology; Carl Rogers' personality

theory; Abraham Maslow's personality theory; Karen Horney's personality theory; Sigmund Freud's personality theory

1/2011 – 5/2001 University of Wisconsin – Milwaukee Teaching Assistant

Research Methods Laboratory Instructor

Responsibilities: Instructing students in the completion of laboratory experiments; reviewing relevant reading with students; teaching APA style; grading laboratory reports.

2004 – 2011 University of Wisconsin – Milwaukee Teaching Assistant

Courses: Personality Theory (advanced level course); Personality (introductory level course); Introductory Psychology

Responsibilities: Teaching 5 weekly discussion groups, preparing materials and topic for discussion, preparing and administering quizzes, writing exam questions, preparing and administering exams, providing individual assistance to students, and recording keeping.

2002 – 2003 Northern Michigan University Teaching Apprenticeship

Courses: Psychological Statistics; Abnormal Psychology; Psychology of Personality

Responsibilities: Two office hours per week to assist students with course material, grading exams and quizzes, attending class occasionally to assist the professor with lecture, proctoring exams, and individual tutoring for students as needed.

Summer 2002 Northern Michigan University Laboratory Teaching Assistant

Introduction to Psychology as a Natural Science

Responsibilities: Advanced preparation for lab topic, setting up necessary lab equipment, attending lab sessions to assist students with their lab projects, assisting in the grading of lab reports & quizzes, and record keeping.

1999 – 2000 Northern Michigan University Specialized Tutor

Student Support Services

Responsibilities: Met with students as frequently as necessary (a minimum of two hours per week), instructed students in the areas of basic study skills and strategies, and covered course material recently introduced in class for the purpose of presenting the material in a manner better suited for the student to understand.

Other Experience

2000 – 2004 Substitute Child Care Counselor

Marquette County Youth Home: A non-secured, community based, juvenile correctional facility

Marquette County Probate Court and Juvenile Court Services (Marquette, MI.):

Responsibilities: Supervision of the residents inside the facility, during activity outings, and while conducting community service work. Correcting and reinforcing behavior pursuant with the behavioral program guidelines of the facility. Youth guidance through informal conversation, and providing a positive role model for behavior. Administration of residents' daily medication. Transportation to and from school, employment, medical appointments, and mental health care appointments. Secured transport of referents to a secured regional juvenile detention center. Completing required paper work for intake, release, and incident reporting.

2002 – 2003 Volunteer Work

D.J. Jacobetti Home for Veterans (Marquette, MI.)

Department of Military and Veteran Affairs, State of Michigan

Responsibilities: Regularly visiting with an elderly resident for the purpose of engaging the resident in conversation and activities. Volunteer work was in conjunction with the Directed Studies Course: Fundamentals of Neuropsychology and Aging to gain experience interacting with the residents and medical staff of a long term care facility.

References:

Can be provided upon request