Trauma Memory: The Role of Alexithymia and Emotion Regulation

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ABSTRACT

TRAUMA MEMORY: THE ROLE OF ALEXITHYMIA AND EMOTION REGULATION

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Alexithymia is a clinical term used to describe individuals who struggle to connect to their emotional experiences. Alexithymia is observed among individuals with a variety of mental health problems and may characterize more severe clinical presentations. In addition, alexithymia seems to be related to adverse treatment outcomes. This study adds to the current literature by examining the effect of alexithymia and emotion regulation (i.e., emotion suppression, emotion acceptance) on variables associated with trauma memory (i.e., narrativity, cohesiveness, connectivity, and use of emotion words). Prescreening was used to identify individuals who had a history of trauma exposure. The study randomly assigned participants to an emotion regulation condition (i.e., emotion suppression, emotion acceptance) and asked participants to write a narrative of their trauma memory while using the emotion regulation strategy assigned to them. In this way, this study examined the impact of alexithymia and emotion regulation on aspects of the written trauma memory. Two significant results emerged from the data collected in this study. First, alexithymia was significantly associated with cohesiveness, such that greater alexithymia was associated with less cohesive trauma narratives. Second, emotion suppression significantly moderated the relationship between alexithymia and
narrativity. For individuals with higher alexithymia, emotion suppression negatively impacted the narrativity of their written trauma accounts. All other hypothesized effects were nonsignificant. Interpretation of the nonsignificant findings are explored using the framework provided by Cronbach and Meehl.
TRAJMA MEMORY: THE ROLE OF ALEXITHYMIA AND EMOTION REGULATION

BY

JENNIFER MILLIKEN
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A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL
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FOR THE DEGREE
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Doctoral Director:
Michelle M. Lilly
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CHAPTER 1
INTRODUCTION

The term alexithymia was originally coined by Sifneos in 1972, meaning “absence of words for emotion.” Contemporary research describes alexithymia as a multifaceted construct involving (a) difficulty identifying feelings and discriminating between feelings and bodily sensations of emotional arousal; (b) difficulty describing feelings to others; (c) restricted imagination; and (d) a cognitive style that is literal, utilitarian, and externally oriented (Taylor & Bagby, 2000). While most researchers agree on the definition of alexithymia, not much else is agreed upon in regard to this clinical phenomenon. Debated within the literature are issues surrounding the stability of alexithymia, the dimensional or categorical nature of alexithymia, the etiology of alexithymia, and the distinction of alexithymia from other clinical conditions (e.g., emotional intelligence, depression). Of note, the terms feeling(s) and emotion(s) are used interchangeably throughout the literature and will be used interchangeably throughout this document in reviewing the past literature.

As the literature currently stands, alexithymia may be best understood as a distinct, dimensional trait that remains relatively stable over time (Mikolajczak & Luminet, 2006; Parker, Bagby, & Taylor, 1991; Parker, Keefer, Taylor, & Bagby, 2008; Parker, Taylor, & Bagby, 2001). Genetics play a role in the development of alexithymia, perhaps making certain individuals more susceptible to its development, but the largest contributors to the development of alexithymia appear to be environmental factors (Jørgensen, Zachariae, Skytthe, & Kyvik, 2007). Consistent
with a diathesis-stress model, certain individuals may have a predisposed genetic vulnerability to develop alexithymia. Yet, a significant stressor may be enough to lead to the development of alexithymia in those without this genetic predisposition (Badura, 2003; Frewen, Dozois, Neufeld, Lanius, 2008; Hyer, Woods, Summers, Boudewyns, & Harrison, 1990; Krystal, 1988; Söndergaard & Theorell, 2004; Zlotnick, Mattia, & Zimmerman, 2001).

Alexithymia was initially observed among individuals with psychosomatic diseases (Nemiah, Freyberger, & Sifneos, 1976) and has since been observed among individuals with a variety of mental health problems (e.g., substance use disorders, posttraumatic stress disorder, panic disorder, somatoform disorders, eating disorders; Taylor, 2000; Taylor, Bagby, & Parker, 1997). Over the past few decades, a growing number of studies have found a positive association between PTSD and alexithymia (e.g., Badura, 2003; Hyer et al., 1990; Söndergaard & Theorell, 2004; Zlotnick et al., 2001). In a meta-analysis evaluating the size of this effect, Frewen and colleagues (2008) found large effects when PTSD samples were compared to study sample control groups ($d_{SAMP} = .80, SE = 0.10, 95\% CI = .60–1.00$) and when PTSD was compared to normative values for nonpsychiatric populations ($d_{POP} = 1.20, SE = 0.04, 95\% CI = 1.10–1.30$). Additionally, Frewen and colleagues (2008) found that alexithymia distinguished levels of symptom severity within individuals with PTSD, suggesting that a) not all individuals with PTSD have alexithymia and b) individuals with PTSD and alexithymia may experience increasingly adverse outcomes and may be particularly resistant to treatment.

Indeed, several studies have documented adverse treatment outcomes in individuals with alexithymia. In a clinical trial conducted by Kosten, Krystal, Giller, Frank, and Dan (1992), individuals with PTSD were randomly assigned to either a psychotherapy alone condition or a psychotherapy combined with pharmacotherapy condition. Alexithymia was assessed before and
after treatment. Results indicated that higher levels of alexithymia prior to treatment predicted poorer treatment response in the psychotherapy alone group. Alexithymia did not predict treatment response in the psychotherapy combined with pharmacotherapy condition (Kosten et al., 1992). Furthermore, alexithymia differentially impacted the symptoms of PTSD, such that avoidance symptoms in individuals with alexithymia were particularly resistant to treatment (Kosten et al., 1992). In a review article by Ogrodniczuk, Piper, and Joyce (2011), treatment follow-up studies found that alexithymia predicted residual symptoms of depression even after taking into account the type of therapy received, use of antidepressant medication, and baseline levels of depression and anxiety. Furthermore, individuals with alexithymia were often perceived by psychologists as dull, boring, frustrating, and lacking in positive emotion, which may partially account for the relationship between alexithymia and poorer treatment outcomes (Ogrodniczuk et al., 2011).

Most psychotherapies rely heavily on client report of experience. That is, individuals work with a psychologist to process experiences that have happened in the past and learn strategies to behave or approach situations differently in the future. Inherent in this process is the individual’s ability to remember their experiences. Notably, research has found associations between alexithymia and deficits in semantic memory (Meltzer, & Nielson, 2010; Nielson, & Meltzer, 2009). For example, Meltzer and Nielson (2010) investigated memory biases for emotion words in high and low alexithymia using an explicit retention test. In the study, participants were asked to rate the valence, arousal, and dominance of words from the Affective Norms for English Words database (Bradley & Lang, 1999). Recall was then unexpectedly tested after a 45-minute interim, when participants completed various surveys, including a measure of alexithymia (e.g., the 20-Item Toronto Alexithymia Scale; Meltzer & Nielson, 2010). Results of
the study demonstrate that individuals with high levels of alexithymia recalled fewer negative emotion words than did low-alexithymia individuals, $F (1, 83) = 3.93, p = .05$ (Meltzer & Nielson, 2010). Unfortunately, little to no research has investigated deficits in episodic memory, yet, the results of this study seem to suggest that individuals with alexithymia avoid arousing stimuli (i.e., negative emotion words), which may ultimately contribute to deficits in memory for arousing stimuli. Overall, memory deficits may contribute significantly to the difficulty in treating alexithymia. However, it remains unknown why individuals with alexithymia experience memory deficits.

Many psychotherapies also involve the processing of emotional experiences. For example, in prolonged exposure therapy for PTSD, individuals recount the memory of a traumatic experience and process the emotional aspects of the memory (Foa, Hembree, & Rothbaum, 2007). Emotional processing may be particularly difficult in individuals with alexithymia for a number of reasons. One of these reasons may be the tendency of individuals with alexithymia to avoid emotional experiences through the use of emotion suppression (e.g., Laloyaux, Fantini, Lemaire, Luminet, & Laroi, 2015; Swart, Kortekaas, & Aleman, 2009). The tendency of individuals with alexithymia to rely on emotion suppression may account for their memory deficits. Indeed, several studies have documented the effect of suppression on memory and have found evidence linking the use of emotion suppression and decrements in memory (e.g., Hayes et al., 2010; Richards & Gross, 1999; Richards & Gross, 2000, 2006).

Difficulties with emotion regulation and memory deficits are highly relevant experiences for individuals who have a history of trauma exposure. Further, these experiences may be tied to alexithymia in ways that interfere with current treatments. As such, the primary goal of this study was to examine the role of emotion regulation and alexithymia on specific aspects of memory for
traumatic events. This study is, to my knowledge, the first to test these relationships experimentally.

**Literature Review**

This document will begin with a review of the alexithymia literature, particularly in regard to the stability of alexithymia, the dimensional or categorical nature of alexithymia, the etiology of alexithymia, the distinction of alexithymia from other clinical conditions (e.g., emotional intelligence, depression), and the treatment implications associated with alexithymia. Next, the document will examine the literature surrounding the intersection between alexithymia and emotion regulation. Lastly, the document will review the literature surrounding trauma memory, and the potential role of alexithymia.

**Stability.** Although there is debate regarding the stability of alexithymia over time, most research supports a conceptualization of alexithymia as a relatively stable trait. Still, some researchers conceptualize alexithymia as a more state-dependent phenomenon arising from personal distress. Unfortunately, there is a limited number of studies investigating the levels of alexithymia prior to the onset of psychological distress (Mikolajczak & Luminet, 2006), making it difficult to determine the state or trait nature of alexithymia. Martínez-Sánchez and colleagues (1998; 2003) investigated the stability of alexithymia over the course of academic semesters and thus varying levels of stress. In their first study, 36 undergraduate students completed measures of alexithymia (i.e., the 20-Item Toronto Alexithymia Scale; TAS-20), anxiety, and depression following midterm exams and again before final exams (Martínez-Sánchez et al., 1998). As such, this study measured alexithymia following a reduction in stress (after midterms) and then right before the induction of stress (finals). Results from this study suggest that alexithymia levels remain stable despite variations in stress, $t(204)=1.115, p >.05$ (Martínez-Sánchez et al., 1998).
In a similar vein, Martínez-Sánchez and colleagues (2003) investigated levels of alexithymia among 20 undergraduate students but manipulated when data collection occurred. The first ten students were assigned to the A-B sequence, which replicated the design of the previous study (stress reduction followed by stress induction, evaluated at weeks 10 and 26 of the academic year). The other ten students were assigned to the B-A sequence, that is, stress induction followed by stress reduction, evaluated at weeks 5 and 14 of the academic year. Results of this study suggest that alexithymia is not impacted by the state effects of academic stress, as alexithymia scores remained largely unchanged over time (Martínez-Sánchez, Ato-García, & Ortiz-Soria, 2003). Means of alexithymia in the A-B sequence ranged from 50.57 (SD = 12.07) to 51.90 (SD = 10.71), and means in the B-A sequence ranged from 49.34 (SD = 9.56) to 52.04 (SD = 10.92; Martínez-Sánchez et al., 2003). Note the TAS-20 uses cut-off scoring with scores equal to or less than 51 being labeled as nonalexithymia, equal to or greater than 61 labeled as alexithymia. Scores of 52 to 60 are labeled as possible alexithymia. As such, the sample used in this study would not meet the cut-off criteria for even possible alexithymia.

Although the prospective designs from the Martínez-Sánchez and colleagues’ (1998; 2003) studies demonstrate stability of alexithymia, despite variations in stress levels, both studies suffer from small sample sizes and low levels of alexithymia. To combat the small sample size, Mikolajczak and Luminet (2006) investigated alexithymia over time in a sample of 100 students. Data were collected at the beginning of the semester and again twelve weeks later during exams. Results of the study suggest that alexithymia, as measured by the TAS-20, is fairly stable over time, demonstrating high mean-level stability (i.e., the mean of the group remains stable across time; mean change score = -1.06, t(70) = -1.11, p > .25) and relative stability (i.e., relative differences between individual scores remain the same across time), with alexithymia at baseline
accounting for the most variance in alexithymia at follow-up ($F$ change [1, 65] = 62.96, $p \leq .001$; Mikolajczak & Luminet, 2006). Still, the mean level of alexithymia observed in this study was below the cut-off criterion for possible alexithymia, with the mean alexithymia score at baseline being 48.45 ($SD = 11.25$) and the mean alexithymia score at follow-up being 49.51 ($SD = 10.85$; Mikolajczak & Luminet, 2006).

Although these studies provide evidence supporting the conceptualization of alexithymia as a stable trait (Martínez-Sánchez et al., 1998; 2003; Mikolajczak & Luminet, 2006), one may argue that academic stress is not a significant enough stressor to induce changes in alexithymia, particularly in students who are in college and likely well versed in the challenges and stresses of academia. Thus, it remains unclear how alexithymia functions in the face of significant distress (e.g., trauma). It may be that alexithymia serves as a risk factor for the development of psychopathology following a significant stressor or that alexithymia functions as a coping mechanism against the emotional distress associated with the stressor.

Unfortunately, research examining the stability of alexithymia is not particularly useful in clarifying the onset and trajectory of alexithymia. The majority of other studies investigate the stability of alexithymia in samples of psychiatric outpatients (Haviland, Shaw, Cummings, & MacMurray, 1988; Honkalampi, Hintikka, Saarinen, Lehtonen, & Viinamaki, 2000; Pinard, Negrete, Annable, & Audet, 1996; Saarijärvi, Salminen, & Toikka, 2001; Salminen, Saarijärvi, Aärelä, & Tamminen, 1994). Thus, the onset and cause of alexithymia remains largely unknown (the etiology of alexithymia will be discussed in further detail below). Still, there is evidence supporting the stability of alexithymia.

Pinard and colleagues (1996) examined levels of alexithymia in 48 individuals diagnosed with substance abuse undergoing treatment. Results of the study suggest that alexithymia, as
measured by the TAS-20, remained stable over the course of treatment for substance abuse, despite significant changes in depression. For subjects who completed detoxification, the mean initial alexithymia score was 54.6 ($SD = 13.5$) and the mean final alexithymia score was 57.2 ($SD = 13.3$). The change from the initial alexithymia measurement to the final alexithymia measurement was not significant (mean change score = 2.6, $t[48] = .97, p > .34$; Pinard, Negrete, Annable, & Audet, 1996).

Similarly, Saarijärvi, Salminen, and Toikka (2001) measured alexithymia, using the TAS-20, among 120 individuals who completed outpatient treatment (i.e., antidepressant medication, $n = 106$; intensive supportive therapy, $n = 40$) for clinically significant levels of depression. Data were collected at baseline and at a one-year follow up. Results of the study found that despite significant decreases in depressive and psychological distress symptoms, alexithymia remained stable across study time points. Mean level of alexithymia at baseline was 57.1 ($SD = 13.8$) and mean level of alexithymia at follow-up was 55.1 ($SD = 13.2$; Saarijärvi et al., 2001).

While the relationship between alexithymia and depression is complex (the distinction between alexithymia and depression will be discussed in further detail below), there is some evidence suggesting that depression impacts the stability of alexithymia. Honkalampi and colleagues (2000) examined the relationship between alexithymia, as measured by the TAS-20, and depression among 169 individuals undergoing outpatient treatment for depression. Follow-up data were collected six months after baseline data collection. Results of this study suggest that individuals who reported heightened levels of alexithymia are more likely to experience moderate to severe levels of depression compared to individuals with low levels of reported alexithymia ($\chi^2 = 27.8, p < .001$). Additionally, the trajectory of alexithymia from baseline to follow-up resulted in the demarcation of specific groups. For 54% of the sample, alexithymia...
was not observed at baseline or at follow-up (nonalexithymic group). For 17% of the sample, alexithymia remained stable from baseline to follow-up (stable alexithymia group). Alexithymia was significantly reduced from baseline to follow-up in 23% of the sample (alexithymia reduction group). Finally, the onset of alexithymia from baseline to follow-up was observed in 6% of the sample (alexithymia onset group). These results suggest that alexithymia is connected with both the severity and stability of depression (Honkalampi et al., 2000). The authors also suggest that nonrecovery from depression might influence the onset of alexithymia (Honkalampi et al., 2000). However, more work is needed to determine if alexithymia predisposes individuals to the development of depression or if depression predisposes individuals to the development of alexithymia.

Given the limited longitudinal and prospective data on alexithymia, it is difficult to determine the state or trait nature of alexithymia. It may be that alexithymia develops as a result of personal distress, and may even persist when stress has eased, or that alexithymia promotes the development of psychopathology. Despite the need for more research to clarify these relationships, the existing literature supports a conceptualization of alexithymia as a relatively stable trait.

**Dimensional vs. categorical.** Of further debate is whether alexithymia represents a categorical syndrome or whether alexithymia represents a dimensional trait. Notably, only two studies have investigated the dimensional versus categorical nature of alexithymia using the taxometric method developed by Meehl and colleagues (Grove & Meehl, 1993; Meehl, 1995; Meehl & Yonce, 1994, 1996; Waller & Meehl, 1998). The taxometric method is a data analytic strategy used to determine whether a construct is dimensional or categorical. Parker and colleagues (2008) investigated the latent structure of alexithymia using a taxometric data analytic
strategy in a sample of over 4,000 individuals drawn from community, university, and outpatient populations. All structural plots obtained from the taxometric procedures were rated as dimensional rather than categorical across the samples. As such, this study supports the dominant theoretical model of alexithymia as a dimensional personality characteristic, as opposed to a distinct categorical syndrome (Parker et al., 2008).

Mattila and colleagues (2010) also conducted a taxometric investigation of the alexithymia construct. A sample of over 5,000 individuals from the Finnish population returned a completed measure of alexithymia as part of an epidemiological study conducted in 2000-2001. Ten percent of the total sample endorsed high levels of alexithymia (i.e., TAS-20 total score > 61). Like the study conducted by Parker and colleagues (2008), this study supported the dimensional latent structure of alexithymia (Mattila et al., 2010).

Measurement. Alexithymia has typically been conceptualized as a dimensional construct, which is reflected in both the development and use of instruments designed to measure alexithymia. Historically, research on the alexithymia construct has primarily been conducted by two groups of researchers; the Toronto group and the Amsterdam group (Preece, Becerra, Allen, Robinson, & Dandy, 2017). These two groups have proposed disparate definitions of alexithymia, which has ultimately influenced the development of measures used to assess alexithymia (Preece et al., 2017). As a result, researchers must select between these definitions when choosing measures for their work (Preece et al., 2017).

The most widely used measure of alexithymia within the literature was developed by the Toronto group (Preece et al., 2017; Watters, Taylor, Quilty, & Bagby, 2016). The Toronto model of alexithymia retains the multidimensional structure of the alexithymia construct originally proposed by Nemiah and Sifneos in 1970, which includes four interrelated components:
difficulty identifying feelings and discriminating between feelings and bodily sensations of emotional arousal, difficulty describing feelings to others, an externally orientated thinking style whereby one tends to focus excessively on the details of the external world rather than focusing attention on their internal states, and constricted imaginal processes.

The 20-Item Toronto Alexithymia Scale (TAS-20) was developed by the Toronto group with the underlying assumption that alexithymia is a dimensional construct (Bagby, Parker, & Taylor, 1994; Bagby, Taylor, & Parker, 1994; Parker, Taylor, & Bagby, 2003; ; Preece et al., 2017; Taylor, Bagby, Parker, 2003). Thus, the TAS-20 was developed as a continuous measure of alexithymia. However, research has also identified cut-off scores that are used to identify high (alexithymic) and low (non-alexithymic) categories of alexithymia (Taylor et al., 1988). It is not uncommon for researchers to analyze their data by a) using the TAS-20 as a continuous variable and b) creating high and low alexithymia groups based on cut-off scores (Parker et al., 2008).

While the TAS-20 is the most commonly used self-report measure of alexithymia in the literature, the Bermond Vorst Alexithymia Questionnaire (BVAQ) is a close second. The Amsterdam group builds on the components of alexithymia delineated by the Toronto model and adds a fifth component: reduced emotional reactivity or reduced ability to become emotionally aroused (Vorst & Bermond, 2001). The addition of the fifth component is debated within the literature (Bagby, Taylor, Quilty & Parker, 2007), as some researchers suggest that this component describes differences in physiological arousal rather than differences in awareness of feelings (Bagby et al., 2009). Nevertheless, the BVAQ was developed by the Amsterdam group to reflect the addition of this fifth component (Vorst & Bermond, 2001). The Amsterdam group also organizes the five components of alexithymia according to a higher order structure, in which there are two broader, orthogonal components: cognitive alexithymia and affective alexithymia.
(Vorst & Bermond, 2001). Cognitive alexithymia is composed of difficulty identifying feelings, difficulty describing feelings to others, and an externally orientated thinking style (Vorst & Bermond, 2001), whereas affective alexithymia is composed of constricted imaginal processes and reduced emotional reactivity or difficulty emotionalizing (Vorst & Bermond, 2001).

While the TAS-20 and BVAQ have several strengths, the TAS-20 seems to reflect the most widely accepted model of alexithymia among researchers. Research investigating alexithymia may benefit from using the TAS-20 for several reasons. For one, the TAS-20 is the most commonly used measure of alexithymia in the current literature, likely due to the debatable addition of the emotionalizing factor within the BVAQ (Bagby et al., 2007; 2009). As such, results from this study may be more easily compared to the previous literature. In addition, the TAS-20 consists of 20 items while the BVAQ consists of forty items. Using a shorter measure of alexithymia within a research project may reduce participant fatigue. For these reasons, this study used the TAS-20 to assess for alexithymia. The psychometric properties of the TAS-20 will be reviewed in the measures section below.

**Etiology.** The etiology of alexithymia may be the most debated topic among researchers, yet, the cause(s) of alexithymia remain largely unexplored. According to Jørgensen and colleagues (2007), only two studies have explored the contributions of genetic and environmental factors in alexithymia, and both of these studies had small sample sizes. Heiberg and Heiberg (1978) investigated the heritability of alexithymia in a sample of 15 monozygotic and 18 dizygotic same-sex twins using a nonvalidated interview of alexithymia. Results of this study point to a possible genetic influence in alexithymia (Heiberg & Heiberg, 1978). However, the veracity of these results is questionable given the small sample size and presence of significant skewness and kurtosis in the sample distribution (Heiberg & Heiberg, 1978). Valera
and Berenbaum (2001) examined the relative contributions of genetic and environmental factors in alexithymia with a sample of 45 monozygotic and 32 dizygotic same-sex twins using the TAS-20. Results of this study support a strong familial contribution in the development of alexithymia (Valera & Berenbaum, 2001). However, due to the small sample, the study was unable to confidently disentangle the contributions of genetic and shared family environment (Valera & Berenbaum, 2001). Still, the authors cautiously suggest that difficulty identifying feelings and difficulty describing feelings are more strongly influenced by nongenetic, shared environmental factors than genetic factors (Valera & Berenbaum, 2001). In contrast, externally oriented thinking style seems to be more strongly influenced by genetic rather than shared environmental factors (Valera & Berenbaum, 2001).

While the results from these two studies suggest a possible genetic influence in the development of alexithymia, both studies suffer from small sample sizes and the researchers stress that the results should be interpreted cautiously. In response to the paucity of research in this area, Jørgensen and colleagues (2007) investigated the heritability of alexithymia in a sample of over 8,000 twin pairs using a Danish translation of the TAS-20. The authors found heritability estimates between 30 and 33%, meaning that genetic factors explained about a third of the variance in the alexithymia phenotype while shared environment accounted for 15-20% of the variation, and unique environment accounted for 47-55% of the variance (Jørgensen et al., 2007).

Although (to my knowledge) no prospective studies have been conducted to determine the etiological factors associated with alexithymia, several authors point to the early onset of trauma as a contributing factor. Krystal (1988) was among the first to suggest that alexithymia stems from early life “psychic trauma,” which interferes with both the neuroanatomical and psychological aspects of affect development. Krystal (1988) also proposed that alexithymia may
be a consequence of catastrophic trauma in adult life. Indeed, several studies have found a significant association between alexithymia and posttraumatic stress disorder (PTSD) across a variety of trauma-exposed populations (e.g., combat exposure, motor vehicle accidents, sexual assault, e.g., Badura, 2003; Frewen et al., 2008; Hyer et al., 1990; Söndergaard & Theorell, 2004; Zlotnick et al., 2001). Still, it remains unknown whether alexithymia is a risk factor for the development of PTSD and/or depression in individuals who have experienced trauma or if trauma exposure is a risk factor for the development of alexithymia.

**Distinct or overlapping construct(s).** Researchers have also debated whether alexithymia represents a distinct clinical phenomenon or a repackaging of already understood clinical phenomena. For example, in a study investigating the relationship between emotional intelligence and alexithymia, researchers found evidence to suggest that alexithymia is independent from emotional intelligence ($\chi^2$ difference = 47.09 [df = 1], $p < .0001$) but strongly and inversely associated with emotional intelligence ($r[734] = -.72, p < .01$; Parker et al., 2001). Alexithymia has also been highly associated with depression. As such, Parker, Bagby, and Taylor (1991) investigated the overlap and distinction between alexithymia and depression in both a nonclinical ($N = 406$) and clinical sample ($N = 164$) using the Beck Depression Inventory (BDI) and Toronto Alexithymia Scale (TAS). The authors found significant moderate correlations between the measure of alexithymia and depression across samples; for the student sample the correlation between the BDI and TAS was $r = 0.28 (p < .01)$ and for the clinical sample the correlation was $r = 0.47 (p < .01$; Parker et al., 1991).

In the same study, a factor analysis was performed with the BDI and TAS for both subsamples. In the student sample, the principal components analysis with iterations and squared multiple correlations in the diagonal revealed a four-factor solution that accounted for 27.3% of
the total variance, which is a moderate amount. Factor 1 accounted for 14.4% of the variance and was comprised entirely of BDI items. The three remaining factors were comprised of items from the TAS. Factor 2 accounted for 5% of the variance and was comprised of items assessing the ability to identify and distinguish between feelings and body sensations. Factor 3 accounted for 4.8% of the variance with items assessing day-dreaming and other imaginal activity. Finally, Factor 4 accounted for 3.1% of the variance, with items assessing an externally oriented thinking style. In the clinical sample, the principal components analysis with iterations and squared multiple correlations in the diagonal revealed a four-factor solution that accounted for 34.9% of the total variance. Similar to the student sample, Factor 1 accounted for 21% of the variance and was comprised almost entirely of BDI items, but none of the TAS items loaded on this factor. The only item from the BDI that did not load on Factor 1 assessed degree of worry about physical health, which instead loaded on Factor 4. All other factors replicated the factor structure found within the student sample. The four-factor solution across the student and clinical samples, with Factor 1 comprising entirely BDI items, suggests that depression is a separate and distinct construct from alexithymia (Parker et al., 1991). These results also suggest that the factors associated with alexithymia are separate and distinct. Thus, although alexithymia seems to be highly related to existing clinical conditions, there is evidence to suggest that alexithymia represents a distinct clinical phenomenon.

As the literature stands, alexithymia may be best understood as a dimensional personality trait that remains relatively stable over time. Genetics play a role in the development of alexithymia, perhaps making certain individuals more susceptible to developing alexithymia, but the largest contributors to the development of alexithymia appear to be environmental factors. Consistent with a diathesis-stress model, certain individuals may have a genetic vulnerability to
develop alexithymia. However, a significant stressor may be enough to lead to the development of alexithymia in those without this genetic predisposition.

**Clinical Implications of Alexithymia**

With this conceptualization of alexithymia in mind, it is important to understand that alexithymia is a term used frequently by psychologists to describe the emotional functioning of individuals. To this day, the descriptions and definitions of alexithymia are based primarily on clinical observations, and there is relatively little empirical validation of the construct (Papciak, Feuerstein, & Spiegel, 1985). This is unfortunate given the comorbidity among alexithymia and other clinical conditions, as well as the impact alexithymia has on treatment efficacy.

**Comorbidity.** Alexithymia was initially observed among individuals with psychosomatic diseases (Nemiah, Freyberger, & Sifneos, 1976) and has since been observed among individuals with a variety of mental health disorders (e.g., substance use disorders, posttraumatic stress disorder, panic disorder, somatoform disorders, and eating disorders; Taylor, 2000; Taylor et al., 1997). As stated previously, a number of studies have found a positive association between PTSD and alexithymia (e.g., Badura, 2003; Hyer et al., 1990; Söndergaard & Theorell, 2004; Zlotnick et al., 2001). A positive association has also been demonstrated between depression and alexithymia (Li, Zhang, Guo, & Zhang, 2015). In a meta-analysis with a sample of over 3,000 individuals with depression, a medium positive correlation was found between alexithymia, as measured by the TAS-20, and depression severity ($r = .428$, 95% CI .376-.478; Li et al., 2015). Interestingly, the TAS-20 subscales measuring difficulty identifying feelings ($r = .417$, 95% CI .310-.513) and difficulty describing feelings ($r = .342$, 95% CI .244-.435) were more strongly associated with depression than the subscale measuring externally oriented thinking ($r = .104$, 95% CI .033-.175; Li et al., 2015).
Treatment efficacy. Relatively few studies have empirically investigated the role of alexithymia in predicting psychotherapy outcomes (Rufer et al., 2010), and there appear to be mixed results across studies. Some studies have documented adverse treatment outcomes in individuals with alexithymia. As discussed previously, the clinical trial conducted by Kosten and colleagues (1992) found that higher levels of alexithymia prior to treatment predicted poorer treatment response in a psychotherapy alone group. Yet, alexithymia did not predict treatment response in the psychotherapy combined with pharmacotherapy condition (Kosten et al., 1992). These results suggest that medication may be particularly useful in treating individuals with alexithymia. Further, the review article by Ogrodniczuk and colleagues (2011) demonstrated that alexithymia predicted residual symptoms of depression even after taking into account the type of therapy received (i.e., interpretive and supportive forms of individual and group psychotherapy), use of antidepressant medication, and baseline levels of depression and anxiety.

Bach and Bach (1995) also document the role of alexithymia on treatment outcomes in 30 individuals diagnosed with somatoform and anxiety disorders. All participants in this study received inpatient cognitive behavioral therapy (CBT), which included behavior therapy, cognitive group therapy, exposure, assertiveness training, and progressive muscle relaxation. All participants were interviewed twice, once at baseline and again two years after completing treatment. High alexithymia scores at baseline emerged as a significant predictor of persistent somatization following treatment ($\chi^2 = 4.51, p = .03$). This effect was independent of other measures of psychopathology, socio-demographic variables, and measures of illness severity.

While the studies above have documented adverse treatment outcomes in individuals with alexithymia, other research suggests that alexithymia has no impact on treatment outcomes. Spek, Nyklíček, Cuijpers, and Pop (2008) examined the relationship between alexithymia and
treatment outcomes in individuals with subthreshold depression symptoms. CBT was the modality of treatment used in the study, and outcomes were assessed at a one-year follow-up. Alexithymia at baseline did not predict treatment outcomes at posttreatment ($r = .03, p = .73$) or at one year follow up ($r = .04, p = .69$; Spek et al., 2008). Additionally, Rufer and colleagues (2010) conducted a prospective study of short-term cognitive behavioral group therapy (CBGT) for panic disorder and evaluated the predictive impact of alexithymia for treatment outcomes. The results showed no significant effect of alexithymia on posttreatment outcomes following CBGT.

Summarizing the findings across these studies, there seems to be evidence to support the view that individuals with alexithymia respond poorly to insight-oriented, supportive, and psychodynamic treatment modalities. In contrast, alexithymia seems to have little impact on outcomes following CBT. Some authors speculate that CBT’s behavioral experiments, or exposures, lead individuals with alexithymia to have new emotional experiences, which challenge dysfunctional beliefs and attitudes surrounding emotional experiencing and expression (Rufer et al., 2010; Spek et al., 2008). Still, it remains unclear exactly how or why alexithymia impacts treatment.

Clarifying the processes involved in alexithymia may improve our understanding of what alexithymia actually is and help advance treatment for individuals with alexithymia. As such, the primary goal of this study was to advance our understanding of processes involved in alexithymia. To this end, this study took a closer look at the relationships between alexithymia, emotion regulation, and memory, which are particularly relevant in the context of traumatic stressors.
Emotion Regulation

Richards and Gross (1999, 2000, 2006) define emotion regulation as any strategy, cognitive or behavioral, aimed at influencing the type of emotion an individual has, when the individual experiences the emotion, how that emotion is experienced by the individual, and how the emotion is expressed by the individual. Conceptually, emotion regulatory efforts can be evoked at different points along the emotion generative process. Antecedent-focused emotion regulation occurs early in the emotion generative process (e.g., cognitive reappraisal), whereas response-focused emotion regulation occurs when emotional response tendencies have already been triggered (e.g., expressive suppression; Richards & Gross, 1999, 2000, 2006).

It is important to distinguish between the experience of emotion and the expression of emotion. Expression refers to the outward manifestation of emotion (e.g., facial expressions). Experience refers to the internal sensations of emotion (e.g., heartbeat, breathing rate, muscle tension, cognitive appraisal). Thus, expressive suppression is a response-focused emotion regulation strategy aimed at inhibiting the outward expression of emotion (Richards & Gross, 1999, 2000, 2006), whereas experiential avoidance is an antecedent-focused emotion regulation strategy aimed at inhibiting the internal experience of emotion (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Notably, alexithymia appears to be highly related to both expressive suppression and experiential avoidance (Connelly & Denney, 2007; Laloyaux et al., 2015; Panayiotou et al., 2015; Swart et al., 2009; Venta, Hart, & Sharp, 2013).

Laloyaux and colleagues (2015) collected data across two samples and explored the relationship between alexithymia, as measured by the BVAQ, and emotion regulation strategies, as measured by the Emotion Regulation Questionnaire (Gross & John, 2003). The first sample was a convenience sample of 255 college students and the second was a community
sample of 1,107 individuals. Across both samples, expressive suppression was significantly related to alexithymia, $r = .40, p < .0001$ and $r = .49, p < .001$, respectively.

Swart, Kortekaas, and Aleman (2009) have also documented a significant relationship between alexithymia and expressive suppression. In their study, high and low alexithymia groups were selected for participation by generating upper and lower quartiles based on the sample’s scores on the BVAQ. The high alexithymia group consisted of 16 individuals, and the low group consisted of 18 individuals. Both groups completed questionnaires of emotion regulation and performed several emotion processing tasks (e.g., micro-expression recognition, emotion recognition in spoken sentences). Results revealed that the high alexithymia group self-reported less use of reappraisal ($F(1,32) = 6.85, p = 0.013$) and more use of expressive suppression ($F(1,32) = 33.42, p < 0.001$), compared to the low alexithymia group (Swart et al., 2009). As such, expressive suppression appears to be a common emotion regulation strategy among people with alexithymia.

The literature also documents a strong association between alexithymia and experiential avoidance. Panayiotou and colleagues (2015) investigated experiential avoidance as a mechanism to help explain the relationship between alexithymia and psychological symptoms. Two studies were conducted that included student ($n = 205$) and clinical ($n = 163$) samples. In the student sample, study variables were investigated cross-sectionally using the TAS-20 and the Acceptance and Action Questionnaire II (AAQ-II), which is a measure of experiential avoidance (Bond et al., 2011). Experiential avoidance completely mediated the relationship between alexithymia and somatic symptoms, $B = .32, SE = .06, \beta = .25, p < .001, CI [.21, .45]$, with a large effect size ($\chi^2 = .22, BCa CI [.14, .30]$). In the clinical sample, study variables were investigated longitudinally. Participants completed an intensive outpatient CBT program. At
Time 1 (intake), experiential avoidance completely mediated the relationship between alexithymia and depressive symptoms, $B = .23$, $SE = .06$, $\beta = .19$, $p < .001$, BCa CI [.13, .36], with a medium to large effect size ($\kappa^2 = .18$, BCa CI [.11, .27]). At Time 2 (posttreatment), experiential avoidance partially mediated the relationship between alexithymia and depressive symptoms as measured at Time 2, $B = .20$, $SE = .07$, $\beta = .20$, $p < .01$, BCa CI [.09, .38], with a moderate to large effect size ($\kappa^2 = .20$, BCa CI [.10, .33]). The longitudinal course of this mediational relationship was also examined based on change scores in alexithymia, experiential avoidance, and depression from Time 1 to Time 2. Experiential avoidance partially mediated the relationship between alexithymia and depressive symptoms, $B = .23$, $SE = .10$, $\beta = .16$, $p < .05$, BCa CI [.08, .48], with a medium to large effect size ($\kappa^2 = .17$, BCa CI [.06, .32]). In sum, these results suggest that reduction in experiential avoidance mediates the effect of alexithymia improvement on depression symptom reduction.

Further, in a cross-sectional study conducted by Venta, Hart, and Sharp (2013) in which participants retrospectively reported on their experiences, experiential avoidance partially mediated the relationship between alexithymia prior to treatment and difficulties in emotion regulation posttreatment. The study investigated these relationships in a sample of 64 adolescents undergoing inpatient treatment, suggesting that 1) difficulties in emotion regulation arise relatively early in life and 2) experiential avoidance partially accounts for these difficulties. However, due to the cross-sectional design, the temporal or causal relations between these constructs remain unclear.

It is important to note that, although expressive suppression changes the outward manifestation of emotion, research has shown that expressive suppression does little to change the internal experience of emotion and actually increases sympathetic activation (Goldin,
McRae, Ramel, & Gross, 2008; John & Gross, 2004; Richards & Gross, 1999, 2000, 2006). In contrast, experiential avoidance does seem to change the internal experience of emotion. Sloan (2004) investigated the emotional reactivity of high experiential avoiders and low experiential avoiders using positive and negative emotion-inducing film clips. The study found a complicated pattern of results, such that in response to negative emotion-inducing film clips, high experiential avoiders reported greater subjective experience of negative emotion compared to low experiential avoiders. However, high experiential avoiders evidenced attenuated heart rate in response to the negative emotion-inducing film clips compared to low experiential avoiders. These results suggest that experiential avoidance alters the internal, physiological experience of emotion. As such, expressive suppression is an emotion regulation strategy aimed at altering the outward appearance of emotion, while experiential avoidance is an emotion regulation strategy aimed at altering the internal, physiological experience of emotion.

Notably, it is unlikely that expressive suppression and experiential avoidance are used exclusively in isolation of one another. It is more likely that expressive suppression and experiential avoidance are strategies used in tandem and interact to predict the experience of emotion. Further, some researchers speculate that the suppression of emotion becomes an effortless, automatic process overtime (Sloan, 2004). Ultimately, the automatic suppression of emotion may be a core process involved in alexithymia. Although existing literature does not directly support the idea of a suppression process involved in alexithymia, the literature surrounding emotion suppression and memory may provide indirect evidence to support this perspective.
Richards and Gross (1999, 2000) describe emotion suppression as a cognitively costly form of emotion regulation, requiring sustained expenditure of resources aimed at the down-regulation of emotion expressive on experiential behavior. The demanding nature of emotion suppression requires continuous diversion of resources away from ongoing events in the environment to events going on internally (Richards & Gross, 1999, 2000, 2006). As a result, the fidelity of memory for events going on in the environment is compromised (Richards & Gross, 1999; 2000; 2006).

In fact, the relationship between emotion suppression and memory decrements is documented across several studies (Dunn, Billotti, Murphy, & Dalgleish, 2009; Hayes et al., 2010; John & Gross, 2004; Richards & Gross, 1999; 2000; 2006). For example, Richards and Gross (2000) tested the relationship between emotion regulation strategy and memory across three studies. In the first study, participants viewed an emotion-eliciting film pulling for the experience of negative emotion. Participants were randomly assigned to a watch condition or an expressive suppression condition. Results indicate that participants who engaged in expressive suppression during the film had objectively worse memory for the details of the film as compared to participants who simply watched the film, $F(1, 51) = 8.98, p = .004$. Further, participants in the expressive suppression condition reported less confidence in their memory for the details of the film as compared to participants in the watch condition, $F(1, 51) = 14.58, p < .001$. In a second study, participants viewed slides intended to evoke high and low levels of negative emotion (i.e., photographs depicting males who had been badly injured). Participants were randomly assigned to one of three conditions: expressive suppression, reappraisal, or watch-control. Expressive suppression led to worse performance on a cued-recall memory test,
but reappraisal did not, \( t(59) = 2.47, p < .05 \). Finally, in a third study, participants completed a packet of measures including a measure of expressive suppression and reappraisal. Participants kept a two-week diary of one situation per day wherein they attempted to regulate their emotions. One week following the last diary entry, participants completed a free-recall test of their memory for the experiences recorded in their diaries. Consistent with the results obtained in the previous studies, participants who were high in expressive suppression had worse self-reported memory, \( r(76) = -.27, p < .05 \), and worse performance on an objective memory test of their own emotional experiences, \( r(76) = -.23, p < .05 \), as compared to individuals low in expressive suppression.

Notably, alexithymia has also been linked to deficits in memory (Lane et al., 1996; Luminet, Vermeulen, Demaret, Taylor, & Bagby, 2006; Lundh, Johnsson, Sundqvist, & Olsson, 2002; Meltzer & Nielson, 2010; Nielson & Meltzer, 2009; Parker et al., 1993). However, the majority of these studies have investigated the relationship between alexithymia and deficits in semantic memory. Little to no research has investigated the impact of alexithymia on episodic memory. For example, studies have documented impairment in the ability to recall word-lists consisting of nouns (Nielson & Meltzer, 2009) and emotion words (Luminet et al., 2006; Meltzer & Nielson, 2010) in individuals with greater alexithymia. Nielson and Meltzer (2009) investigated the role of physiological arousal on memory in individuals who evidenced high and low levels of alexithymia. Keep in mind, research suggests that the physiological response to emotionally provocative stimuli is intact in individuals with alexithymia, but the subjective interpretation of physiological arousal is impaired (Stone & Nielsen, 2001). Thus, Nielson and Meltzer (2009) exposed participants with high and low levels of alexithymia to a list of 30 nouns and then quasi-randomly exposed participants to either a neutral film condition (i.e., tooth brushing) or an arousing film condition (i.e., oral surgery). Results indicate that alexithymia
interfered with immediate recall of the word list, such that individuals with high levels of alexithymia recalled fewer words (mean = 33.9%, SEM = 1.8) than individuals with low levels of alexithymia (mean = 39.4%, SEM = 1.8), irrespective of arousal condition $F(1, 56) = 4.80, p = .033, \eta^2 = .079$. Consistent with findings from Richards and Gross (1999, 2000, 2006), it may be that individuals with high levels of alexithymia divert resources away from events going on in their environment and toward efforts to suppress their emotion expression and experiencing, thus impacting the fidelity of their immediate memory. Notably, long-term recognition memory (i.e., 24-hour delayed recognition) was not impacted by alexithymia, $F(1, 56) = .714, p = .402, \eta^2 = .013$. That is, within each arousal condition, high and low alexithymia groups recognized a similar number of words after a 24-hour delay. Unfortunately, it is unclear how long-term recall memory may have been affected by the 24-hour delay. It may be that individuals with alexithymia evidence intact long-term recognition, but that long-term recall is impaired. In general, recognition is considered an easier form of memory retrieval than recall. During recall, there are fewer cues available to aid in the retrieval of memory. Thus, the recognition test employed in the Nielson and Meltzer (2009) study may have not been sufficient to differentiate between memory processes occurring in individuals with high and low levels of alexithymia.

Luminet and colleagues (2006) investigated the recall of emotional material in individuals with high and low levels of alexithymia. In this study, 82 students with high and low levels of alexithymia were asked to view 18 words, 12 emotional (6 positive, 6 negative) and 6 neutral, under one of two conditions: shallow processing (e.g., how large or small the font of the word was) or deep processing (e.g., estimate the correctness of the definition for the word). After processing the words in the assigned condition, a surprise word recall task was administered. Participants were asked to list the words they could recall and for each word indicate a) if they
had a specific memory of the word appearing on the screen (remember), b) know the word was part of the list, but without specific retrieval of more details (know), or c) had some uncertainty about whether the word was part of the list or not (guess). Results indicate that alexithymia had no effect on the overall number of words correctly recalled. However, when participants were asked to consider the fidelity of their memory for the words, results suggest that individuals with low levels of alexithymia “remembered” more words than individuals with high levels of alexithymia, $F(1, 78)= 9.32, p < .005$. In other words, individuals with low levels of alexithymia reported having more specific memories associated with the recalled word than individuals with high levels of alexithymia.

The only study (to my knowledge) addressing episodic memory was conducted by Lundh, Johnsson, Sundqvist, and Olsson (2002). The researchers investigated the role of alexithymia on retrieval of autobiographical memory. In the study, 88 individuals from both student and community populations completed measures of alexithymia, depression, anxiety, and social desirability. Participants then completed an autobiographical memory test (AMT, originally designed by Williams and Broadbent in 1986). During the AMT task, participants were presented, successively, with ten emotions words (5 positive and 5 negative) and then asked to report the first memory of a situation in which the emotion was experienced. The dependent variable in the AMT was latency of memory retrieval. Results of the study indicated that alexithymia was not associated with latency to retrieve autobiographical memories on the AMT ($r = .08$). Unfortunately, this methodology falls short of assessing the quality and quantity of memories retrieved. It may be that individuals with alexithymia are only able to retrieve overly general memories (i.e., the tendency to recall categories of events when asked to provide specific instances from one's life) or have fewer memories to recall overall.
To summarize so far, research demonstrates strong associations between alexithymia and emotion suppression (i.e., expressive suppression and experiential avoidance; Connelly & Denney, 2007; Laloyaux et al., 2015; Panayiotou et al., 2015; Swart et al., 2009; Venta et al., 2013). Emotion suppression is a cognitively costly form of emotion regulation, requiring sustained expenditure of resources aimed at the down-regulation of emotion (Richards & Gross, 1999; 2000). The demanding nature of emotion suppression requires continuous diversion of resources away from events going on in the environment, resulting in compromised memory for these events (Richards & Gross, 1999, 2000, 2006).

In fact, the relationship between emotion suppression and memory decrements is well documented across several studies (Dunn et al., 2009; Hayes et al., 2010; John & Gross, 2004; Richards & Gross, 1999, 2000, 2006;). Alexithymia has also been linked to memory deficits (Lane et al., 1996; Luminet et al., 2006; Lundh et al., 2002; Meltzer & Nielson, 2010; Nielson & Meltzer, 2009; Parker et al., 1993). However, the majority of these studies focus on deficits in semantic memory. Only one study (to my knowledge) has examined the impact of alexithymia on episodic memory, and no existing studies have assessed the quality of these memories. It may be that individuals with alexithymia are only able to retrieve overly general memories, have fewer memories to recall overall, or recall memories that are very fragmented or disjointed, lacking strong narrative cohesion.

This study adds to the current literature by investigating the impact of emotion regulation and alexithymia on a very specific type of episodic memory. Alexithymia, emotion suppression, and memory have all been linked to PTSD, making these relationships particularly relevant for traumatic memory. As such, this study examined the impact of alexithymia and emotion regulation on traumatic memory.
Associations with Trauma and PTSD

Disturbances in emotion experiencing and expression are often observed in individuals with PTSD. Indeed, work by Roemer and colleagues (2001) suggests that individuals with PTSD suppress emotions more frequently and more intensely than individuals without PTSD. Unfortunately, emotion suppression seems to exacerbate symptoms rather than mitigate them. In a study conducted by Moore, Zoellner, and Mollenholt (2008), use of expressive suppression was associated with greater self-reported PTSD severity ($r = .34, p < .05$) while the use of reappraisal was not ($r = -.03, p > .05$).

Additionally, in a study conducted by Tull and colleagues (2007), posttraumatic symptom severity (PTSS) was associated with lack of acceptance of emotional experiences ($r = .49, p < .01$), lack of clarity of emotional responses ($r = .36, p < .01$), limited access to emotion regulation strategies ($r = .61, p < .01$), difficulties engaging in goal-directed behavior ($r = .42, p < .01$) and refraining from impulsive behavior while upset ($r = .59, p < .01$; Tull, Barrett, McMillan, & Roemer, 2007). Acceptance of emotional experiences, in particular, is seen as a vital aspect of emotion regulation, as nonacceptance may result in the persistence of emotional distress by adding negative secondary emotions to the primary negative emotion (e.g., feeling angry about having the experience of sadness; Gratz & Roemer, 2004; Greenberg & Safran, 1989; Tull et al., 2007).

A similar pattern of emotion regulation difficulty was found in a study conducted by Ehring and Quack (2010). In the study, PTSD was associated with reduced levels of emotion clarity ($r = .38, p < .001$), emotion awareness ($r = .34, p < .001$), lack of acceptance of negative emotions ($r = .48, p < .001$), higher levels of experiential avoidance ($r = .49, p < .001$) and emotion suppression ($r = .36, p < .001$), difficulties engaging in goal-directed behavior when
Some researchers suggest that PTSD extends beyond deficits in an individual’s ability to extinguish learned fear responding, common among other anxiety-based disorders (i.e., social anxiety, panic disorder, specific phobia), and is, at least partly, a disorder of emotion regulation deficits (Etkin & Wager, 2007; Rauch, Shin, & Phelps, 2006). In fact, neuroimaging studies have documented disparities in brain activation/deactivation between PTSD and other anxiety-based disorders. Specifically, Etkin and Wager (2007) found evidence of hypoactivation in the rostral anterior cingulate cortex and ventromedial prefrontal cortex in individuals with PTSD, which are areas associated with emotional coping (Etkin, Egner, Peraza, Kandel & Hirsch, 2006). This pattern of hypoactivation may reflect a deficit in the recruitment of emotion regulation processes and lead to symptoms of emotion dysregulation, namely hypervigilance, hyperarousal, dissociation, emotional numbing, and re-experiencing, consistent with symptoms of PTSD (Etkin & Wager, 2007).

It is possible that alexithymia accounts for chronic dysfunctional emotion regulation observed in individuals with PTSD. In the meta-analysis performed by Frewen and colleagues (2008), alexithymia was most strongly correlated with emotional numbing symptoms \( r = .43, p < .001 \); Frewen et al, 2008), which are the least well understood symptoms in PTSD (Litz, Litz, & Gray, 2002). It is unknown if emotional numbing results directly from traumatization, premorbid characteristic(s), or posttrauma problems (Litz et al., 2002). It may be that alexithymia serves as a risk factor for the development of emotional numbing symptoms and then maintains difficulties with emotional experiencing and expression posttrauma.
Developing our understanding of these relationships is especially important given the large experiential components of the current “gold standard” treatments for PTSD, including Prolonged Exposure Therapy and Cognitive Processing Therapy (Foa et al., 2007; Resick, Monson, & Chard, 2016). In Prolonged Exposure Therapy, imaginal exposures to the traumatic memory are used to process the experience and stop avoidance (Foa et al., 2007). In Cognitive Processing Therapy, progressive worksheets are used to identify how the trauma occurred and how the trauma affects the individual’s current beliefs about themselves, others, and the world (Resick et al., 2016). In a promising new treatment for PTSD, Written Exposure Therapy (WET; Sloan, Marx, Lee, Resick, 2018), writing about the trauma is used to process the experience, reduce fear, and allow new learning to occur.

Notably, WET may be a more palatable treatment for individuals experiencing PTSD, with fewer required sessions (i.e., WET involves five sessions) and no between-session assignments. In a randomized noninferiority clinical trial (i.e., a test used to determine whether or not a new experimental treatment is less effective than an active treatment already in use), WET was compared to CPT in a sample of 126 adults seeking treatment for PTSD (Sloan et al., 2018). WET demonstrated significantly fewer treatment dropouts as compared to the CPT condition, $\chi^2 = 12.84, p < .001$. Additionally, within-condition effects sizes were large (ranging from $d = .38$ for CPT at Week 6 to $d = 1.38$ for CPT at Week 24; $d = .51$ for WET at Week 6 to $d = 1.08$ for WET at Week 36) for both WET and CPT conditions, indicating that PTSD severity scores for participants in the WET condition were noninferior (i.e., not less effective) to the PTSD severity scores of participants in the CPT condition (Sloan et al., 2018).

According to emotional processing theory, the development of dysfunctional beliefs following trauma underlies the onset and maintenance of PTSD (Rauch & Foa, 2006).
Specifically, individuals believe a) the world is completely dangerous (e.g., “it is dangerous to be alone”) and/or b) they are totally incompetent (e.g., “if I remember the trauma I will completely lose control”, “my PTSD symptoms mean I am going crazy”; Rauch & Foa, 2006). These beliefs lead individuals to systematically avoid trauma-related thoughts, feelings, and activities, leaving them with limited opportunities to incorporate disconfirming information. Additionally, emotion processing theory posits that pathological fear is represented in memory as a network of associated stimuli, responses, and meaning elements that are excessive and resistant to modification (Rauch & Foa, 2006). For example, a rape survivor who was assaulted in a park may feel that all parks are dangerous and completely avoid parks. A combat veteran may believe that all crowded areas are dangerous and only go to the grocery store late at night when most people are sleeping or at home.

According to emotional processing theory, effective treatment involves systematic and repeated exposure to the traumatic memory and avoided trauma-related situations (Rauch & Foa, 2006). These exposures provide individuals with a) opportunities to learn new information that is inconsistent with the pathological elements of the fear structure and b) information disconfirming individuals’ beliefs about their incompetence and the dangerousness of the world (Rauch & Foa, 2006). According to emotional processing theory, the fear structure needs to be sufficiently activated during exposure for these modifications to occur (Rauch & Foa, 2006). That is, emotional experiencing is necessary for treatment to be successful. Indeed, research has demonstrated that higher use of negative and positive emotion words during recounting of the traumatic experience is associated with lower PTSD symptom severity (Jaeger, Lindblom, Parker-Guilbert, & Zoellner, 2014).
The activation and experience of emotion during exposure poses a distinct problem for individuals who experience alexithymia. For one, individuals who experience alexithymia may have limited access to emotion expression and experience. Second, individuals who have alexithymia may experience difficulty recalling traumatic memories with the level of specificity required for new learning to occur.

In fact, several researchers suggest that trauma memories are inherently disorganized, incoherent, and fragmented (e.g., Foa & Riggs, 1993; Kilpatrick, Resnick & Freedy, 1992; Van der Kolk & Fisler, 1995), making it very difficult for individuals to process and learn from their experience. Indeed, information processing theories of PTSD suggest that the failure to process trauma-related information underlies the development and maintenance of PTSD (Amir, Stafford, Freshman, & Foa, 1998). Thus, another aim of exposure therapy is to produce a more coherent, organized memory of the traumatic event (Foa & Meadows, 1997), and research has demonstrated that reduction in narrative fragmentation (Foa, Molnar, & Cashman, 1995) and increase in degree of narrative articulation (Amir et al., 1998) aid recovery after trauma.

**Written Trauma Account**

The act of organizing personal experience into a narrative format is a natural human process that allows individuals to make sense of and create meaning from the events they experience (Pennebaker & Seagal, 1999). Organizing and remembering events in a coherent manner, while integrating thoughts and feelings, seems to give individuals a sense of predictability and controllability over their lives (Pennebaker & Seagal, 1999). The act of constructing a story facilitates a sense of resolution and alleviates painful emotion, making the experience more manageable (Pennebaker & Seagal, 1999).
Indeed, prior research demonstrates that writing or talking about an emotional experience is associated with a number of health benefits (e.g., better immune functioning, reduced distress, improvements in grades; Pennebaker, 1997). Writing about emotional experiences in particular demonstrates moderate effect sizes for overall psychological well-being ($d = .661, r = .206, p < .0001$) and overall physiological functioning ($d = .681, r = .322, p < .0001$; Smyth, 1998).

Consistent with emotional processing theory and information processing theories, the act of writing about a traumatic experience involves converting emotions and images into words, which may change the way a person organizes and thinks about the traumatic event. Once a coherent narrative of the traumatic memory is constructed, the event can be summarized and stored in memory (Pennebaker & Seagal, 1999).

Furthermore, the dynamic view of memory suggests that each retrieval and reactivation of a lasting, stable memory reverts the memory back into a labile, vulnerable state, a process known as reconsolidation (Alberini & LeDoux, 2013; Lane, Ryan, Nadel, & Greenberg, 2015; Lee, Nader, & Schiller, 2017). During the reconsolidation process, retrieved memory becomes susceptible to change, allowing the individual to incorporate newly learned information into the memory (Alberini & LeDoux, 2013; Lane et al., 2015; Lee et al., 2017). Consistent with multiple trace theory (MTT; Moscovitch & Nadel, 1999; Nadel & Moscovitch, 1997), each time an episodic memory is retrieved, a new encoding process occurs, allowing new information to be incorporated into the memory while also making the details of the event more accessible and more likely to be retrieved in the future (Lane et al., 2015). Thus, according to MTT, repeated retrievals both alter and strengthen the memory (Lane et al., 2015).

Some researchers have proposed that traumatic memory is special, arguing that traumatic memory is permanent and unchangeable, a perspective known as the static view of traumatic
memory (e.g., Hermann, 1992; Van der Kolk & Fisler, 1995). However, more recent investigations have demonstrated that traumatic memory, like ordinary, everyday memory, is susceptible to change, a perspective known as the dynamic view of traumatic memory (Baddeley, 1990). For example, Dekel and Bonanno (2013) investigated the changes in traumatic memory content over time. Using both a standardized trauma memory questionnaire and a free-recall narrative obtained at both 7 and 18 months after the 9/11 terrorist attacks, the researchers found that only one-third of the trauma narrative content remained the same over time (percentage of consistent units: $M = 34.45$, $SD = 13.3$), meaning that the majority (two-thirds) of the trauma narrative content changed over the course of approximately one year (Dekel & Bonanno, 2013).

Further, Foa, Molner, and Cashman (1995) examined changes in rape narratives over the course of an exposure-based treatment for PTSD, which involves repeated retrieval and retelling of traumatic memory. Results of the study provide evidence in support of the dynamic view of traumatic memory; that is, the structure and content of traumatic memory change over time. Comparing the first and last narrative generated during treatment, the last narrative contained significantly more organized thought ($M = 9.02$) than the first narrative ($M = 5.72$; $t(13) = 2.50$, $p < .03$), and the last narrative contained significantly more expressions of thoughts and feelings ($M = 22.03$) than the first narrative ($M = 16.80$; $t(13) = 2.19$, $p < .05$; Foa et al., 1995). Notably, decreases in fragmentation of the traumatic memory were positively correlated with reductions in trauma-related anxiety ($r(13) = .73$, $p < .002$; Foa et al., 1995). These findings have since been replicated in a study by Van Minnen, Wessel, Dijkstra, and Roelofs (2002). All participants in the study demonstrated a significant decrease in disorganized thoughts, $t(19) = 2.36$, $p < .05$, and a significant increase in expressions of thoughts and feelings, $t(19) = -2.32$, $p < .05$, from pre- to
posttreatment. Improved participants (i.e., participants showing at least a 50% decline in PTSD symptoms as well as reductions in depression and anxiety) demonstrated greater decrease in disorganized thoughts during therapy than nonimproved participants, \( t(18) = -1.73, p = .05 \); Van Minnen et al., 2002). Results of these studies suggest that the memory updating process during reconsolidation is pivotal to trauma recovery.

The reactivation of traumatic memory may pose a distinct challenge for individuals with alexithymia. For one, individuals with alexithymia may be particularly hesitant to engage in, or avoid, traumatic memory retrieval due to the strong emotional nature of traumatic memory. Second, the retrieval of traumatic memory may trigger the emotion suppression tendency in individuals with alexithymia, thereby further establishing that the traumatic memory is to be avoided during reconsolidation and that the individual is incapable of regulating the emotions associated with the traumatic memory. However, these ideas have not (to my knowledge) been examined empirically.

As such, participants in this study were asked to write about a traumatic experience while using an emotion regulation skill taught to them: emotion suppression or emotion acceptance. In this way, this study examined a) the influence of emotion regulation on trauma memory during a written trauma account, b) the influence of alexithymia on trauma memory during a written trauma account, and c) the interaction between alexithymia and emotion regulation on trauma memory.

**Indicators of Trauma Memory**

Research suggests that critical differences exist between the way people experience traumatic memory and memory of other significant events. According to Van der Kolk and Fisler (1995), traumatic memory is inherently dissociated and initially stored as sensory fragments
without a coherent semantic component. It follows that a necessary part of treatment is to construct a more coherent, organized memory of the traumatic event (Foa & Meadows, 1997). As such, this study investigated trauma narrative cohesion and organization across three indicators: narrativity (i.e., the text tells a story with characters, events, places, and things), cohesiveness (i.e., the degree to which the text contains causal and intentional connectives when there are causal and logical relationships within the text), and connectivity (i.e., the degree to which the text contains cohesive links between ideas and clauses that provide clues about text organization).

Research has found a positive association between increases in degree of narrative articulation and recovery after trauma (Amir et al., 1998). Specifically, in a study of 12 female sexual assault survivors, severity of PTSD symptoms three-months posttrauma was associated with narrative reading level, such that lower narrative reading level was associated with more severe PTSD symptoms ($r = -.63$, $p < .05$). The authors interpreted this result to mean that survivors who have less articulated trauma memory experience greater difficulty processing the traumatic memory and thus have greater trauma-related disturbances (Amir et al., 1998).

Research indicates that the use of positive and negative emotion words in trauma narrative processing is associated with lower PTSD re-experiencing symptoms ($\beta = -.42$, $p < .05$) for both positive and negative emotion words (Jaeger et al., 2014). Consistent with emotional processing theory, the use of emotion words may be evidence of emotional engagement during the written trauma account. Research suggests that both emotional engagement and habituation are necessary conditions in effective exposure therapy (Jaycox, Foa, & Morral, 1998). As such, individuals who are able to actively express their experience of emotion may have processed the trauma memory more successfully than individuals who are not able to express their emotional
experiences. This study investigated emotional engagement during the trauma narrative by examining participants’ use of emotion words within the written trauma account and by assessing pre- and postnarrative state affect assessed by a widely used measure of positive and negative affect (i.e., the Positive and Negative Affect Schedule [PANAS]).

This Study

Using emotional processing theory and information processing theories of PTSD as theoretical grounding, this study aimed to examine the effect(s) of alexithymia and emotion regulation (i.e., emotion suppression, emotion acceptance) on variables associated with trauma memory (i.e., narrativity, cohesiveness, connectivity, use of emotion words). Individuals who experience alexithymia may struggle to engage emotionally during trauma-focused treatment, tending to suppress emotional experiences rather than accept emotional experiences. As such, individuals with alexithymia may benefit from additional emotion-focused intervention prior to trauma-focused interventions.

Study Hypotheses

1. Emotion regulation strategy will have a significant impact on indices of traumatic memory. It was hypothesized that individuals randomly assigned to the emotion suppression group would have lower index trauma memory scores across narrativity, cohesiveness, connectivity, and use of emotion words, whereas individuals in the acceptance group would have higher index trauma memory scores. Note, each index (i.e., narrativity, cohesiveness, connectivity and use of emotion words) was analyzed separately.

2. Alexithymia will have a significant impact on indices of traumatic memory. It was hypothesized that alexithymia would be negatively associated with index trauma memory
scores across narrativity, cohesiveness, connectivity, and use of emotion words. Each index was analyzed separately.

3. The negative association between alexithymia and trauma memory index scores will be heightened for individuals randomly assigned to the emotion suppression condition. That is, it was hypothesized that the use of emotion suppression among individuals with higher levels of alexithymia would be associated with more severe decrements in index trauma memory scores, whereas the use of emotion acceptance would attenuate this effect. Indices were analyzed separately.
CHAPTER 2

METHOD

Participants

Prescreening was used to identify participants with exposure to at least one previous traumatic event. Current experience of posttraumatic stress symptoms was not required for participation in the study, nor did it preclude participation in the study. Overall, 123 individuals participated in this study. Thirty-five participants were excluded due to failed emotion regulation practice attempts, and 18 participants were excluded due to “nontraumatic” written narratives, which will be discussed in greater detail in the discussion section. The remaining sample consisted of 70 undergraduates from an introductory psychology course at Northern Illinois University. Over half of the sample identified as the female sex (57.1%), and 42.9% of the sample identified as the male sex. The average age of the sample was 19.80 (SD = 3.5). With respect to race, 65.7% (n = 46) identified as White, 20% (n = 14) identified as African American, 5.7% (n = 4) identified as Asian, and 2.9% (n = 2) identified as American Indian or Alaskan Native; racial categories were not mutually exclusive. In terms of ethnicity, 22.9% (n = 16) identified as Hispanic or Latino. The majority of the sample had no prior experience with mental health treatment (71.4%; n = 50). Of those who had received mental health treatment (28.5%; n = 20), the predominant presenting problems were depression (n = 7) or comorbid depression and anxiety (n = 6). Treatment experiences included psychiatry, inpatient hospitalization, and outpatient treatment. Only one participant identified Cognitive Behavioral Therapy as the mode of treatment.
Measures

Socio-demographics. Participants answered several questions about their socio-demographic characteristics (e.g., age, race, ethnicity, mental health treatment history).

Alexithymia. The TAS-20 (Bagby, Parker, & Taylor, 1994; Bagby, Taylor, & Parker, 1994) was used to measure alexithymia. The TAS-20 is a 20-item self-report measure of alexithymia. Items are scored on a 5-point Likert scale from 1 = strongly disagree to 5 = strongly agree. Items assess three dimensions of alexithymia, including difficulty identifying feelings (e.g., “I am often confused about what emotion I am feeling”), difficulty describing feelings (e.g., “It is difficult for me to find the right words for my feelings”), and externally oriented thinking (e.g., “I prefer talking to people about their daily activities rather than their feelings”). There are five items that are reversed scored (Items 4, 5, 10, 18 and 19). A higher total score on the measure is indicative of greater alexithymia (Taylor et al., 1988; Taylor, Babgy, & Parker, 1997).

In previous research, the TAS-20 has demonstrated good internal consistency (Cronbach’s alpha = .81) and test-retest reliability over a three-week period ($r = .77$, $p < .01$; Bagby, Taylror, & Parker, 1994). Validity analyses of the TAS-20 demonstrated adequate levels of convergent, discriminant, and concurrent validity (Bagby, Taylor, & Parker, 1994). Convergent validity was demonstrated in relation to measures of need for cognition ($r = -.55$, $p < .01$), openness to experience ($r = -.49$, $p < .01$), and positive emotionality ($r = -.36$, $p < .01$). For the current sample, the TAS-20 demonstrated good internal consistency (Cronbach’s alpha = .862). The TAS-20 uses cut-off scoring, with scores equal to or less than 51 being labeled as non-alexithymia, equal to or greater than 61 labeled as alexithymia. Scores of 52 to 60 are labeled as possible alexithymia. For the current sample, 31.6% had scores at or above the
possibly alexithymic range, 18.6% had scores in the alexithymic range, and 67.1% had scores in the non-alexithymic range.

**Memory.** Written trauma narratives were analyzed in the software program Coh-Metrix Version 3.0, and a subset (25% or 20 narratives) was initially coded by a team of research assistants in an effort to establish consistency. As consistency was not established between Coh-Metrix and the research team, all narratives were coded by the team of research assistants and comparative analyses were performed. That is, all hypotheses were run with a) the Coh-Metrix-analyzed narratives, b) the research-assistant-analyzed narratives, and then c) compared for similarities/differences.

Coh-Metrix is a computational tool developed to analyze multiple levels of linguistic and discourse processing depicted in written language (Graesser, McNamara, & Kulikowich, 2011). Coh-metrix provides indices for text characteristics across multiple levels of analysis, including word characteristics, sentence characteristics, and the discourse relationships between ideas in text (McNamara & Graesser, 2012). Coh-Metrix is capable of producing over 100 indices of text cohesion, language, and readability (Graesser, McNamara, Louwerse & Cai, 2004).

In this study, the written trauma accounts produced by participants were entered into Coh-Metrix and analyzed for narrativity (i.e., the text tells a story with characters, events, places, and things), cohesiveness (i.e., the degree to which the text contains causal and intentional connectives when there are causal and logical relationships within the text), and connectivity (i.e., the degree to which the text contains cohesive links between ideas and clauses that provide clues about text organization).

Written trauma narratives were also coded by a team of three research assistants. The coding scheme is outlined in Appendix N. The foundation of the coding scheme was based on
published works from the developers of the Coh-Metrix software (e.g., Graesser, McNamara, & Kulikowich, 2011; Graesser, McNamara, Louwerse, & Cai, 2004; McNamara, Louwerse, McCarthy, & Graesser, 2010) and from the index descriptions provided on the Coh-Metrix website (www.cohmetrix.com). From this foundation, scoring anchors were extrapolated by the research team. All narratives were coded independently by each of the three research assistants. Research assistants were blind to study conditions. Discrepancies between coders were then examined and discussed in weekly team meetings and coded by consensus. For the current sample, each of the coding indices demonstrated good interrater reliability ($\kappa_{\text{narrativity}} = .832; \kappa_{\text{cohesiveness}} = .770; \kappa_{\text{connectivity}} = .832; \kappa_{\text{use of emotion words}} = 1$).

**State affect.** The Positive and Negative Affect Schedule (PANAS; Watson, Clark & Tellegen, 1988) was used to measure state affect a) prior to the written trauma account and b) following the written trauma account. The instructions asked participants to rate their affect in the present moment. The PANAS consists of 20 positive and negative affect words (10 positive; 10 negative), which are rated on a 5-point Likert scale with $1 = \text{very slightly or not at all}$ and $5 = \text{extremely}$. In previous research, the PANAS has demonstrated good internal consistency for both the positive affect scale (Cronbach’s alpha = .88) and negative affect scale (Cronbach’s alpha = .87; Watson et al., 1988). Validity analyses demonstrated convergent and discriminant validity for both the positive affect scale and negative affect scale (Watson et al., 1988). Convergent validity of the negative affect scale was demonstrated in relation to the Hopkins Symptoms Checklist ($r = .74$), Beck Depression Inventory ($r = .58$), and the A state of the State Trait Anxiety Inventory ($r = .51$). The positive affect scale was negatively correlated with these measures (Hopkins Symptoms Checklist, $r = -.19$; Beck Depression Inventory, $r = -.36$; A state of the State Trait Anxiety Inventory, $r = -.35$; Watson et al., 1988).
For this sample, the positive affect scale demonstrated good internal consistency at the first administration (Cronbach’s alpha = .901) and the second administration (Cronbach’s alpha = .910). The negative affect scale also demonstrated good internal consistency at the first administration (Cronbach’s alpha = .874) and the second administration (Cronbach’s alpha = .882).

**Trauma history and posttraumatic stress disorder.** The Life Events Checklist for DSM-5 (LEC-5) was used in prescreening to assess for previous trauma exposure and was re-assessed during the experiment to account for any changes in trauma exposure. The PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013) was used to measure symptoms of PTSD. As discussed above, previous research has demonstrated strong associations between symptoms of PTSD, alexithymia, emotion regulation strategies, and trauma memory. The PCL-5 is a 20-item self-report measure of PTSD symptoms over the past month (e.g., “In the past month, how much were you bothered by: Repeated, disturbing, and unwanted memories of the stressful experience?”). Items are scored on a 5-point Likert scale with 0 = not at all, 1 = a little bit, 2 = moderately, 3 = quite a bit, 4 = extremely. A total symptom severity score, ranging from 0-80, is obtained by summing the scores across the 20 items.

In previous research, the PCL-5 has demonstrated good internal consistency (Cronbach’s alpha = .95) and test-retest reliability ($r = .82$, 95% CI [.71, .89]; Blevins, Weathers, Davis, Witte, & Domino, 2015). Validity analyses demonstrated concurrent, convergent, and discriminant validity (Weathers et al., 2013). Concurrent validity was demonstrated in relation to a measure assessing PTSD and other trauma-related phenomena (DAPS; $r = .84$, $p < .01$). Convergent validity was demonstrated in relation to several clinical scales within the Personality Assessment Inventory (PAI; i.e., anxiety, traumatic stress, depression, paranoia, schizophrenia,
borderline personality features, somatic complaints, alcohol problems, and drug problems), with \( r \) scores ranging from .39 to .74 \((p < .05)\). Discriminant validity was demonstrated in relation to the mania \((r = .39, p < .01)\) and antisocial personality features \((r = .31, p < .01)\) clinical scales of the PAI. In the current sample, the PCL-5 demonstrated good internal consistency (Cronbach’s alpha = .935). Based on current research, a cut-point score of 33 is indicative of clinically significant symptoms of PTSD (Weathers et al., 2013). In the current sample, 54.3\% endorsed PTSD symptoms above this threshold.

**Depression.** The Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977) was used in this study to assess current symptoms of depression. The CES-D is a 20-item self-report measure of depression symptoms over the past week (e.g., “During the past week, I felt that I could not shake off the blues, even with help from my family or friends”). Items are scored on a 4-point Likert scale with 0 = *Rarely or none of the time (less than 1 day)* and 4 = *Most or all of the time (5-7 days)*. The possible range of scores is 0-60, with higher scores indicating more depressive symptomatology.

In previous research, the CES-D has demonstrated good internal consistency (Cronbach’s alpha = .85) and moderate test-retest reliability \((r = .57; \text{Radloff}, 1977)\). Validity analyses demonstrated concurrent, convergent, and discriminant validity (Radloff, 1977). Concurrent validity was demonstrated in relation to the Hamilton Clinician’s Rating Scale and the Raskin Rating Scale, \( r = .44 \) and \( r = .54 \), respectively (Radloff, 1977). Convergent validity was demonstrated in relation to the Bradburn Negative Affect Scale, with \( r \) scores ranging from .55 to .63. Discriminant validity was demonstrated in relation to the Bradburn Positive Affect Scale (range of \( r = -.21 \) to -.55) and Marlowe Crown Social Desirability Scale (range of \( r = -.18 \) to -.20; Radloff, 1977). For the current sample, the CES-D demonstrated good internal consistency.
Based on available research, a score of 16 on the CES-D is recommended as an indicator of subthreshold depression (Radloff, 1977). For the current sample, 38.2% had scores above this threshold.

**Emotion suppression.** As stated previously, it is unlikely that expressive suppression and experiential avoidance are used in isolation of one another. As such, this study intended to use two measures, one assessing expressive suppression and another assessing experiential avoidance. In this way, the study hoped to measure overall emotion suppression (i.e., suppression of external expression and internal experience). Unfortunately, items assessing emotion expression were not administered by mistake. As such, this study was only able to capture experiential avoidance.

Due to the experimental nature of this study, participants could be assigned to an emotion regulation strategy that is uncharacteristic of them. For example, a person who has a high tendency to use emotion suppression may have been assigned to the emotion acceptance condition. This person may have had great difficulty using the emotion regulation strategy taught to them and resorted to a strategy that is more practiced and well learned during the written trauma narrative. As such, each participant’s characteristic use of experiential avoidance was examined post hoc and used as a potential moderator of study effects.

The Action and Acceptance Questionnaire-II (AAQ-II; Bond et al., 2011) is a 10-item scale used to measure experiential avoidance (e.g., “I am afraid of my feelings”). All 10 items of the AAQ-II were used in this study. In previous research, the AAQ-II has demonstrated good internal consistency (Cronbach’s alpha = .80; Bond et al., 2011). Validity analyses demonstrated concurrent, predictive, discriminant, and convergent validity (Bond et al., 2011). Concurrent validity was demonstrated in relation to measures of emotional distress (e.g., depression, anxiety,
stress), and predictive validity was demonstrated in relation to an indicator of poorer life functioning (e.g., work absence). Higher experiential avoidance, as measured by the AAQ-II, was concurrently associated with greater depressive symptoms (BDI-II; \( r = .71, p < .001 \)), anxiety-related symptoms (BAI; \( r = .61, p < .001 \)), and stress symptoms (DASS; \( r = .57, p < .001 \)) and predicted more occasions of full-day work absences in the following year \( (r = .25, p < .05; \) Bond et al., 2011). Convergent validity was demonstrated in relation to a measure of thought suppression (WBSI; \( r = .63, p < .001; \) Bond et al., 2011). Discriminant validity was demonstrated in relation to a measure of social desirability \( (r = -.09, p > .01; \) Bond et al., 2011).

For the current sample, the AAQ-II demonstrated good internal consistency (Cronbach’s alpha = .873). Based on available research, a score above the range of 24-28 on the AAQ-II seems to be an indicator of clinically significant distress (Bond et al., 2011). For the current sample, 32.9% had scores at or above 24 on the measure, indicating that about a third of the sample endorsed frequently using experiential avoidance to cope with tough emotions.

**Brief Emotion Regulation Intervention**

Participants were randomly assigned to one of two brief emotion regulation interventions: emotion suppression or emotion acceptance. The instructions were modeled after the instructions used in a study by Dunn, Billotti, Murphy, and Dalgleish (2009) comparing the use of emotion suppression and emotion acceptance. Instructions for the brief emotion suppression intervention were as follows:

*For the purpose of this experiment, it is important that you try to suppress any emotional responses you may be having. What I mean by this is that you should try to adopt a detached and unemotional attitude. Try to think objectively in such a way that you don’t feel anything at all. Further, if you have any feelings, try not to let these show and keep a “straight face.”*
words, try to behave in such a way that a person watching would not know that you were feeling anything. For example, when you feel anxious, but you know you have to do something, you can push the feelings away in order to accomplish the task. That's what I am going to encourage you to do today. Try not to feel anything, try not to think emotional thoughts, try to just get through the task with as little emotion and discomfort as possible.

Instructions for the brief emotion acceptance intervention were as follows:

For the purpose of this experiment, it is important that you try to accept any emotional responses you may be having. What I mean by this is that you should try to adopt an attitude of willingness to experience emotions, even if they are painful. Try to engage with your emotional experience in such a way that you are present with your emotional experience, able to visualize the feeling, or able to experience the feeling in the body. Further, if you have any feelings at all, try to let these show and don’t hold anything back. Willingness to experience your thoughts and feelings, good and bad, can free you up to focus on what really matters in your life. If you are willing to feel happy, sad, anxious, unsure, joyful and any other emotions that come up for you, you can choose the activities that you want to participate in, so that you ultimately choose your directions in life, instead of letting your fear of anxious thoughts and feelings make those choices for you.

Following instructions for the brief emotion regulation intervention, participants had the opportunity to practice the assigned emotion regulation strategy during a picture viewing task. The International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1997) is a widely used and empirically validated set of pictures used to evoke differing intensities of emotional reactions (Sheppes et al., 2014). Each picture contains a normative rating for arousal (1 = low, 9 = high) and valence (1 = very unpleasant, 9 = highly pleasant). For the purpose of this study, a
set of 15 moderate-intensity pictures (mean arousal = 5.57, mean valence = 2.70) was selected and presented to participants. Participants viewed each picture for 5,000 milliseconds, with the following instructions:

You will now have the opportunity to practice the emotion regulation strategy you just learned. In this task, you will be presented with a series of pictures. I want you to view each picture and practice the emotion regulation strategy taught to you.

Once participants finished viewing the set of pictures, they were be asked to respond to two statements assessing their understanding of the emotion regulation instructions. For participants assigned to the emotion suppression intervention the following statements were used: 1) While viewing the pictures, I was able to hide my emotional reactions so that others would not be able to tell what I was feeling and 2) While viewing the pictures, I was able to push my feelings away and not feel anything at all. For participants assigned to the emotion acceptance intervention the following statements were used: 1) While viewing the pictures, I was able to show my emotional reactions so that others would be able to see what I was feeling and 2) While viewing the pictures, I was willing to experience my feelings, even the negative ones.

Participants rated the extent to which they agreed with each of the statements on a 6-point scale ranging from 0 (not at all) to 5 (very much). Participants who provided answers less than or equal to 4 on one or both of the items were prompted to complete the practice emotion regulation task again using a different set of pictures with approximately the same arousal and valence ratings as the first set. Participants who were unable to successfully practice the assigned emotion regulation strategy within three practice attempts did not complete the remainder of the study. These participants were thanked for their time and participation, debriefed by the research assistant, and granted course credit. Participants who were successful in practicing the assigned
emotion regulation strategy completed the remainder of the study (i.e., the written trauma account).

**Procedure**

Introductory psychology students with a history of trauma exposure were invited, via email, to read the study description and sign up for the study through an online sign-up system (i.e., SONA Systems). Qualified and interested participants signed up for a time to come into the laboratory and complete the study in a private area within the research laboratory. All study measures were completed on a computer via a secure, online survey platform (i.e., Qualtrics).

Upon arrival to the laboratory, participants were greeted by a research assistant who remained in the laboratory for the duration of the study. Participants were seated at a computer in a private area and presented with a hard copy of the informed consent form. The research assistant reviewed this form with the participant, including information about the study, confidentiality, potential risks and benefits of participating, estimated time for completion, format for data presentation in future manuscripts or presentations, and the contact information for the researchers and the NIU Office of Research Compliance, Integrity, and Safety.

After completing the informed consent, the research assistant helped participants access the online survey platform on the lab computer. After completing the socio-demographics questionnaire, participants completed the TAS-20, ERQ, AAQ-II, LEC-5, PCL-5, CES-D, and PANAS. Upon completion of these measures, participants were randomly assigned to undergo one of two brief emotion regulation interventions: an emotion suppression intervention or an emotion acceptance intervention (see instructions above).
Following the brief emotion regulation intervention, participants completed a written trauma account. Instructions for the written trauma account were modeled after instructions in the Written Exposure Treatment protocol and were as follows (Sloan & Marx, 2015):

“Using the emotion regulation strategy you just learned, I would like for you to look back on the most traumatic event you have experienced and write about it. Don’t worry about spelling or grammar. I would like you to write about the details of the trauma as you remember it now. For example, how the trauma happened, who was involved, and what you were thinking and feeling at the time of the trauma. Try to be as specific as possible in writing about the details of the trauma, the thoughts you had at the time of the trauma, and the feelings you experienced. For example, you might write about what you saw, what you heard, or what you smelled. You should also write about your thoughts during the trauma as you remember it now. For example, people often have thoughts like ‘I am going to die,’ ‘this can’t be happening to me,’ or ‘I’m going to be raped.’ Remember, the trauma is not actually happening again, you are simply looking back on it and writing about it. Again, it is very important that you practice the emotion regulation strategy you learned while you are writing about the trauma you experienced. This task will last twenty minutes.”

Following the writing period, participants completed a second PANAS to assess their state affectivity from the written trauma account. A positive mood induction procedure was used to mitigate negative affect stemming from the written trauma account. In a meta-analysis of mood induction procedures, Film/Story mood induction procedures with explicit instructions were the most potent manipulator of positive mood states, with a large effect size of $r_m = .73$ (Westermann, Spies, Stahl, & Hesse, 1996). This study used a positive mood induction modeled after Valdez’s (2015) dissertation. Valdez used a true story from NBC news describing how a
76-year-old grandmother received an associate degree after 42 years of delaying her education to raise a family (see Appendix M). This story was selected from five other stories and rated as the most positive among a group of five graduate students when piloted by Valdez (2015).

A master’s-level clinical psychologist was available for participants who experienced any adverse reactions related to their participation in this study. No participants reported having adverse reactions as a result of their participation. Participants were then debriefed by the research assistant and given a debriefing form that provides local and national mental health resources.

**Data Analysis Plan**

**Power analysis.** A power analysis was performed using G*Power. Previous research has demonstrated a significant association between PTSD and alexithymia (Frewen et al., 2008). In a meta-analysis evaluating the size of this effect, Frewen and colleagues (2008) found large effects when PTSD samples were compared to study sample control groups ($d_{SAMP} = .80, SE = 0.10, 95\% CI = .60– 1.00$) and when PTSD was compared to normative values for nonpsychiatric populations ($d_{POP} = 1.20, SE = 0.04, 95\% CI = 1.10– 1.30$). Further, the effect size for the difference between two correlations found in the study by Laloyaux and colleagues (2015); (i.e., the correlation between alexithymia and reappraisal, $r = -.17$, and the correlation between alexithymia and suppression, $r = .49$) is considered a large effect (Cohen’s $q = .708$). Based on these data, a medium to large effect size was anticipated. Using $f^2 = .30$ for an anticipated effect size, the power analysis revealed that sufficient power to detect effects in linear multiple regression (as outlined in Hypothesis 3) could be achieved with 55 participants divided evenly across the two emotion regulation conditions. However, to account for experimenter error and/or
unforeseen issues, a sample of 70 valid participants was collected and split evenly across the emotion regulation conditions (i.e., 35 participants in each condition).
CHAPTER 3

RESULTS

Narrative Characteristics

The narratives collected in this study ranged from 171 words to 1,314 words. On average, participants wrote 543.97 words (SD = 188.95). Notably, number of written words varied by study condition. Participants in the emotion suppression condition wrote more words on average (M = 607.14, SD = 194.74) than participants in the emotion acceptance condition (M = 470.14, SD = 168.10); this difference (137, 95% CI [50.4, 223.5]) was statistically significant, t(68) = 3.16, p = .002. To account for variance in total number of written words, the use of emotion words variable was transformed to a percentage.

The instructions used in this study asked participants to “look back on the most traumatic event you have experienced and write about it.” Upon further investigation of the types of trauma written about in this study, it was discovered that 43.19% (n = 38) of the 88 narratives collected for this study were written about events that are not captured in the DSM-5 Criterion A definition of trauma. As PTSD was not a primary outcome of this study, a broader definition of trauma was adopted. The broader conceptualization of “what counts” as trauma led to the inclusion of narratives written about the unexpected, nonaccidental, nonviolent death of a loved one, which is supported in the literature (e.g., Breslau, 1998). Narratives written about break-ups with romantic partners, verbal arguments, suicide ideation, loss of possessions, and witnessing a parent under the influence of drugs or alcohol were excluded. Based on this exclusion criteria, 70 narratives were retained for data analysis. Of the remaining 70 narratives, 28.57% (n = 20) were written
about an unexpected, nonaccidental, nonviolent death of a loved one. The majority of narratives collected in this study (71.43%; n = 50) were written about DSM-5 Criterion A events (see Table 1).

Data Cleaning

Data were cleaned and prepared for analyses following procedures outlined by Tabachnick and Fidell (2007). These procedures included checking for missing data, checking for skewness and kurtosis of variables, and examining whether any assumptions for statistical analyses had been violated. Data were screened for linear outliers using descriptive statistics, histograms, and box plots. There were no missing data.

The Kolmogorov-Smirnov test was used to determine normality of the sampling distribution. The scores on alexithymia \([D(70) = .085, p > .200]\), narrativity \([D(70) = .054, p > .200]\), cohesiveness \([D(70) = .044, p > .200]\), and connectivity \([D(70) = .054, p > .200]\) did not deviate significantly from normal. Use of emotion words \([D(70) = .141, p = .001]\) did deviate significantly from normal. Notably, in large samples (above 30 participants) the Kolmogorov-Smirnov test can be significant even when scores are only slightly different from a normal distribution (Field, 2013). As such, normality of the use of emotion words variable was further investigated with histograms, P-P and Q-Q plots, and the values of skew and kurtosis.

The use of emotion words demonstrated significant skewness and kurtosis (skewness = 1.428, standard error = .287; kurtosis = 2.301, standard error = .566). Inspection of histograms and P-P and Q-Q plots provided evidence of nonnormality in the distribution. Four cases were deemed significant outliers based on boxplot inspection. These cases were replaced using a value \(x = 2.08\) two standard deviations from the mean \((M = .78, SD = .65; Field, 2013)\).
Table 1. Narrative Trauma Types

<table>
<thead>
<tr>
<th>Event</th>
<th>Happened to me</th>
<th>Witnessed it</th>
<th>Learned about it</th>
<th>Part of my job</th>
<th>TRAUMA TYPE TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural disaster (for example, flood, hurricane, tornado, earthquake)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire or explosion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation accident (for example, car accident, boat accident, train wreck, plane crash)</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Serious accident at work, home, or during recreational activity</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Exposure to toxic substance (for example, dangerous chemicals, radiation)</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm)</td>
<td>12</td>
<td>1</td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Other unwanted or uncomfortable sexual experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combat or exposure to war-zone (in the military or as a civilian)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Life-threatening illness or injury</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Severe human suffering</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Sudden violent death (for example, homicide, suicide)</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Sudden accidental death</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Serious injury harm of death you caused to someone else</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any other very stressful event or experience:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unexpected, non-accidental, non-violent death of a loved one</td>
<td>11</td>
<td>9</td>
<td></td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>
Normality of the outlier corrected sampling distribution was investigated. The Kolmogorov-Smirnov test remained significant following replacement of outliers \[D(70) = .138, p = .002\]. Normality was further investigated with histograms, P–P and Q–Q plots, and the values of skew and kurtosis. Skewness and kurtosis were no longer demonstrated (skewness = .902, standard error = .287; kurtosis = .001, standard error = .556), and inspection of histograms and P-P and Q-Q plots provided evidence of normality in the distribution. As such, the outlier-corrected use of emotion words variables was used for data analysis.

**Pre-Experiment Group Differences**

In order to assess whether the random assignment procedure worked as intended, the emotion acceptance and emotion suppression groups were compared on demographic characteristics. Participants randomly assigned to the emotion suppression condition did not differ from participants randomly assigned to the emotion acceptance condition with regard to age \((t(68) = -.477, p = .635)\), sex \(\chi^2(1, N = 70) = .000, p = 1.000\), ethnicity \(\chi^2(1, N = 70) = 2.917, p = .088\), marital status \(\chi^2(1, N = 70) = 1.609, p = .205\), habitual use of experiential avoidance \((t(68) = 1.902, p = .061)\), alexithymia \((t(68) = .594, p = .555)\), PTSD symptoms \((t(68) = .556, p = .580)\), depression symptoms \((t(68) = .739, p = 463)\), baseline (prewriting) negative affect \((t(68) = 1.004, p = .319)\), baseline (prewriting) positive affect \((t(68) = .886, p = .379)\), postwriting negative affect \((t(68) = -.838, p = .405)\), postwriting positive affect \((t(68) = .886, p = .379)\), or previous mental health treatment \(\chi^2(1, N = 70) = 2.520, p = .112\).

**Coh-Metrix vs. Research Team Coding**

Consistency between Coh-Metrix and the research team was not established, as all correlations between outcome variables were nonsignificant (Table 2). As such, all data were analyzed with a) the Coh-Metrix-analyzed narratives, b) the research-assistant-coded narratives,
and then c) compared for similarities/differences. Finally, given the unexpected group
differences in word count between conditions, a regression-based approach to data analysis was
investigated.

**Coh-Metrix**

**Hypothesis 1.** It was hypothesized that individuals randomized to the emotion
suppression group would have lower index trauma memory scores across narrativity, cohesiveness, connectivity, and use of emotion words, whereas individuals in the acceptance group would have higher index trauma memory scores. To examine this hypothesis, a *t* test was conducted to assess if mean differences exist on each of narrativity, cohesiveness, connectivity, and use of emotion words between the two emotion regulation strategies: emotion suppression and emotion acceptance.

**Narrativity.** Participants who engaged in emotion suppression had slightly higher scores on narrativity (*M* = 2.24, *SE* = .081) than participants engaged in emotion acceptance (*M* = 2.17, *SE* = .087). However, this difference, .07, 95% CI [-.164, .313], was not statistically significant, *t*(68) = .623, *p* = .535.

**Cohesiveness.** Participants who engaged in emotion suppression had slightly lower scores on cohesiveness (*M* = -2.30, *SE* = .190) than participants engaged in emotion acceptance (*M* = -2.38, *SE* = .181). However, this difference, .08, 95% CI [-.446, .605], was not statistically significant, *t*(68) = .301, *p* = .764.

**Connectivity.** Participants who engaged in emotion suppression had slightly lower scores on connectivity (*M* = .798, *SE* = .119) than participants engaged in emotion acceptance (*M* = .969, *SE* = .138). However, this difference, .171, 95% CI [-.535, .192], was not statistically significant, *t*(68) = -.94, *p* = .351.
Table 2. *Correlations Between Coh-Metrix and Hand-Coded Outcome Variables (N = 70)*

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Coh-Metrix Narrativity</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Coh-Metrix Cohesion</td>
<td>.638**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Coh-Metrix Connectivity</td>
<td>-.065</td>
<td>-.121</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Coded Narrativity</td>
<td>.179</td>
<td>-.097</td>
<td>.163</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Coded Cohesion</td>
<td>-.168</td>
<td>-.228</td>
<td>-.090</td>
<td>.143</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Coded Connectivity</td>
<td>.023</td>
<td>-.031</td>
<td>-.20</td>
<td>.195</td>
<td>.125</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7. Use of Emotion Words</td>
<td>.042</td>
<td>.163</td>
<td>.010</td>
<td>.079</td>
<td>-.080</td>
<td>.039</td>
<td>1</td>
</tr>
</tbody>
</table>

** Correlation is significant at the *p < .01* level (2-tailed).
Use of emotion words. Participants who engaged in emotion suppression had slightly lower scores on use of emotion words ($M = .643, SE = .097$) than participants engaged in emotion acceptance ($M = .857, SE = .095$). However, this difference, $-.214, 95\% \text{ CI} [-.485, .057]$, was not statistically significant, $t(68) = -1.576, p = .120$.

Hypothesis 2. It was hypothesized that greater alexithymia would be associated with lower index trauma memory scores across each of narrativity, cohesiveness, connectivity, and use of emotion words, whereas lower alexithymia would be associated with higher index trauma memory scores. A correlation was used to determine if significant negative associations were present between alexithymia and each of narrativity, cohesiveness, connectivity, and use of emotion words (Table 3).

Narrativity. Alexithymia was not significantly correlated with narrativity, $r(70) = .112, p = .357$.

Cohesiveness. Alexithymia was not significantly correlated with cohesiveness, $r(70) = .028, p = .818$.

Connectivity. Alexithymia was not significantly correlated with connectivity, $r(70) = -.087, p = .472$.

Use of emotion words. Alexithymia was not significantly correlated with use of emotion words, $r(70) = -.071, p = .561$.

Hypothesis 3. It was hypothesized that the negative association between alexithymia and trauma memory index scores would be heightened for individuals assigned to the emotion suppression condition. That is, the use of emotion suppression among individuals with higher levels of alexithymia would be associated with more severe decrements in index trauma memory
Table 3. Correlations and Descriptive Statistics for Study Variables and Coh-Metrix (N = 70)

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alexithymia</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. PTSD Symptoms</td>
<td>.233</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Depression Symptoms</td>
<td>.562**</td>
<td>.468**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Experiential Avoidance</td>
<td>.618**</td>
<td>.509**</td>
<td>.646**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Coh-Metrix Narrativity</td>
<td>.112</td>
<td>.119</td>
<td>-.062</td>
<td>.115</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Coh-Metrix Cohesion</td>
<td>.028</td>
<td>-.071</td>
<td>-.120</td>
<td>.046</td>
<td>.638**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Coh-Metrix Connectivity</td>
<td>-.087</td>
<td>-.070</td>
<td>-.057</td>
<td>-.162</td>
<td>-.065</td>
<td>-.121</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8. Use of Emotion Words</td>
<td>-.071</td>
<td>-.436**</td>
<td>-.392**</td>
<td>-.296*</td>
<td>.105</td>
<td>.298*</td>
<td>-.196</td>
<td>1</td>
</tr>
</tbody>
</table>

|M| 47.46 | 38.96 | 16.77 | 21.61 | 2.20  | .88   | -2.34 | .75   |
|SD| 12.03 | 16.04 | 11.05 | 7.87  | .50   | .76   | 1.09  | .57   |

** Correlation is significant at the *p* < .01 level (2-tailed).
* Correlation is significant at the *p* < .05 level (2-tailed).
scores, whereas the use of emotion acceptance would attenuate this effect. To analyze this hypothesis, a moderation analysis was conducted using model 1 of the PROCESS macro (Hayes, 2013). Significance of the interaction term was indicated by a significant $\Delta R^2$ (i.e., $p < .05$) and estimated by confidence intervals. Confidence intervals for the interaction term that fail to include zero indicate a significant interaction. As none of the interactions were significant, simple slopes were not investigated.

**Narrativity.** Emotion regulation did not moderate the relationship between alexithymia and narrativity, 95% CI [-.0057, .0344].

**Cohesiveness.** Emotion regulation did not moderate the relationship between alexithymia and cohesiveness, 95% CI [-.0164, .0455].

**Connectivity.** Emotion regulation did not moderate the relationship between alexithymia and connectivity, 95% CI [-.0288, .0606].

**Use of emotion words.** Emotion regulation did not moderate the relationship between alexithymia and use of emotion words, 95% CI [-.0113, .0348].

**Research Team Coding**

**Hypothesis 1.** It was hypothesized that individuals randomized to the emotion suppression group would have lower index trauma memory scores across narrativity, cohesiveness, connectivity, and use of emotion words, whereas individuals in the acceptance group would have higher index trauma memory scores. To examine this hypothesis, a $t$ test was conducted to assess if mean differences exist on each of narrativity, cohesiveness, connectivity, and use of emotion words between the two emotion regulation strategies: emotion suppression and emotion acceptance.
Narrativity. For narrativity, no mean differences were observed across participants engaged in suppression ($M = 3.59$, $SE = .101$) versus acceptance ($M = 3.59$, $SE = .082$). As such, the $t$ test was not significant, $t(68) = .000$, $p = 1.000$.

Cohesiveness. Participants who engaged in emotion suppression had slightly higher scores on cohesiveness ($M = 2.38$, $SE = .152$) than participants engaged in emotion acceptance ($M = 2.01$, $SE = .153$). However, this difference, $.37$, 95% CI $[-.061, .803]$, was not significant, $t(68) = 1.713$, $p = .091$.

Connectivity. Participants who engaged in emotion suppression had lower scores on connectivity ($M = 2.29$, $SE = .137$) than participants engaged in emotion acceptance ($M = 2.41$, $SE = .152$). However, this difference, $.12$, 95% CI $[-.533, .285]$, was not significant, $t(68) = -.604$, $p = .548$.

Use of emotion words. Participants who engaged in emotion suppression had slightly lower scores on use of emotion words ($M = .643$, $SE = .097$) than participants engaged in emotion acceptance ($M = .857$, $SE = .095$). However, this difference, $-.214$, 95% CI $[-.485, .057]$, was not statistically significant, $t(68) = -1.576$, $p = .120$.

Hypothesis 2. It was hypothesized that greater alexithymia would be associated with lower index trauma memory scores across each of narrativity, cohesiveness, connectivity, and use of emotion words, whereas lower alexithymia would be associated with higher index trauma memory scores. A correlation was used to determine if significant negative associations were present between alexithymia and each of narrativity, cohesiveness, connectivity, and use of emotion words (Table 4).
Table 4. Correlations and Descriptive Statistics for Study Variables and Coding (N = 70)

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alexithymia</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. PTSD Symptoms</td>
<td>.233</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Depression Symptoms</td>
<td>.562**</td>
<td>.468**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Experiential Avoidance</td>
<td>.618**</td>
<td>.509**</td>
<td>.646**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Coded Narrativity</td>
<td>-.178</td>
<td>-.053</td>
<td>-.113</td>
<td>-.099</td>
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<td></td>
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</tr>
<tr>
<td>6. Coded Cohesion</td>
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<td>-.226</td>
<td>-.142</td>
<td>.143</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Coded Connectivity</td>
<td>-.209</td>
<td>-.186</td>
<td>-.239*</td>
<td>-.205</td>
<td>.195</td>
<td>.125</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8. Use of Emotion Words</td>
<td>-.071</td>
<td>-.436**</td>
<td>-.392**</td>
<td>-.296*</td>
<td>.024</td>
<td>-.230</td>
<td>.015</td>
<td>1</td>
</tr>
</tbody>
</table>

| M                         | 47.46 | 38.96 | 16.77 | 21.61 | 2.20  | .88   | -2.34 | .75   |
| SD                        | 12.03 | 16.04 | 11.05 | 7.87  | .50   | .76   | 1.09  | .57   |

* Correlation is significant at the p < .05 level (2-tailed).
** Correlation is significant at the p < .01 level (2-tailed)
**Narrativity.** Alexithymia was not significantly correlated with narrativity, $r(70) = -0.178$, $p = 0.139$.

**Cohesiveness.** Alexithymia was significantly correlated with cohesiveness, $r(70) = -0.270$, $p = 0.024$, such that greater alexithymia was associated with less cohesive trauma narratives. Alexithymia accounted for 7.29% of the variance in cohesiveness.

**Connectivity.** Alexithymia was not significantly correlated with connectivity, $r(70) = -0.209$, $p = 0.082$.

**Use of emotion words.** Alexithymia was not significantly correlated with use of emotion words, $r(70) = -0.071$, $p = 0.561$.

**Hypothesis 3.** It was hypothesized that the negative association between alexithymia and trauma memory index scores would be heightened for individuals assigned to the emotion suppression condition. That is, the use of emotion suppression among individuals with higher levels of alexithymia would be associated with more severe decrements in index trauma memory scores, whereas the use of emotion acceptance would attenuate this effect. To analyze this hypothesis, a moderation analysis was conducted using Model 1 of the PROCESS macro (Hayes, 2013). Significance of the interaction term was indicated by a significant $\Delta R^2$ (i.e., $p < 0.05$) and a confidence interval that did not span zero. Simple slopes were plotted and used to determine the nature of the interaction.

**Narrativity.** Emotion regulation moderated the relationship between alexithymia and narrativity, 95% CI [-0.020, 0.045]. A significant effect was observed for suppression, 95% CI [-0.0326, -0.0043], but not acceptance, 95% CI [-0.0110, 0.0206] (Figure 1). This suggests that for individuals with alexithymia, emotion suppression negatively impacts the narrativity of their written trauma narratives.
**Figure 1.** Interaction between alexithymia and emotion suppression for narrativity.

- **Cohesiveness.** Emotion regulation did not moderate the relationship between alexithymia and cohesiveness, 95% CI [-.0431, .0278].
- **Connectivity.** Emotion regulation did not moderate the relationship between alexithymia and connectivity, 95% CI [-.0106, .0572].
**Use of emotion words.** Emotion regulation did not moderate the relationship between alexithymia and use of emotion words, 95% CI [-.0113, .0348].

**Similarities and Differences**

No significant effects were observed for narratives analyzed by Coh-Metrix. However, the research-team-coded narratives yielded two significant results. First, alexithymia was significantly correlated with cohesiveness, $r(70) = -.270$, $p = .024$, such that greater alexithymia was associated with less cohesive trauma narratives. Second, emotion regulation significantly moderated the relationship between alexithymia and narrativity, 95% CI [.0020, 0445], but only for the suppression condition 95% CI [-.0326, -.0043], not the acceptance condition, 95% CI [-.0110, .0206].

**Post Hoc Analyses**

Each participant’s characteristic use of experiential avoidance was examined post hoc and analyzed as a potential moderator of study effects. Experiential avoidance among individuals with higher levels of alexithymia may be associated with more severe decrements in index trauma memory scores. To examine this possibility, a three-way moderation analysis was conducted with the full sample using Model 3 of the PROCESS macro (Hayes, 2013). Significance of the three-way interaction term was indicated by a significant $\Delta R^2$ (i.e., $p < .05$) and a confidence interval that did not span zero. As none of the interactions were significant, simple slopes were not investigated.

**Coh-Metrix**

**Narrativity.** The interaction between experiential avoidance and condition did not moderate the relationship between alexithymia and narrativity, 95% CI [-.0027, 0026].
Cohesiveness. The interaction between experiential avoidance and condition did not moderate the relationship between alexithymia and cohesiveness, 95% CI [-.0040, .0042].

Connectivity. The interaction between experiential avoidance and condition did not moderate the relationship between alexithymia and connectivity, 95% CI [-.0084, .0033].

Use of emotion words. The interaction between experiential avoidance and condition did not moderate the relationship between alexithymia and use of emotion words, 95% CI [-.0053, .0003].

Research Team Coding

Narrativity. The interaction between experiential avoidance and condition did not moderate the relationship between alexithymia and narrativity, 95% CI [-.0007, .0049].

Cohesiveness. The interaction between experiential avoidance and condition did not moderate the relationship between alexithymia and cohesiveness, 95% CI [-.0017, .0106].

Connectivity. The interaction between experiential avoidance and condition did not moderate the relationship between alexithymia and connectivity, 95% CI [-.0001, .0086].

Use of emotion words. The interaction between experiential avoidance and condition did not moderate the relationship between alexithymia and use of emotion words, 95% CI [-.0053, .0003].

Controlling for Word Count

Word count emerged as an unexpected significant difference across the experimental conditions in this study. As such, the all hypothesis were re-examined controlling for word count.
Coh-Metrix

**Hypothesis 1.** It was hypothesized that individuals randomized to the emotion suppression group would have lower index trauma memory scores across narrativity, cohesiveness, connectivity, and use of emotion words, whereas individuals in the acceptance group would have higher index trauma memory scores. To examine this hypothesis, a hierarchical regression was performed with trauma memory index scores as the dependent variables. Word count was entered at stage one of the regression and condition was entered at stage two.

**Narrativity.** The hierarchical regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = .014, p = .905$. At stage two, the introduction of the condition variable also did not contribute significantly to the regression model, $F(2, 67) = .258, p = .773$.

**Cohesiveness.** The hierarchical regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = 2.334, p = .131$. At stage two, the introduction of the condition variable also did not contribute significantly to the regression model, $F(2, 67) = 1.245, p = .294$.

**Connectivity.** The hierarchical multiple regression revealed that at stage one, word count contributed significantly to the regression model, $F(1, 68) = 4.641, p = .035$), and accounted for 6.4% of the variation in connectivity. Introducing condition to the model explained an additional 0.3% of variation in connectivity, but this change in $R^2$ was not significant, $F(1, 67) = .240, p = .626$.

**Use of emotion words.** The hierarchical regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = 1.758, p = .189$). At stage two, the introduction of the condition variable also did not contribute significantly to the regression model, $F(2, 67) = 1.309, p = .277$. 
Hypothesis 2. It was hypothesized that greater alexithymia would be associated with lower index trauma memory scores across each of narrativity, cohesiveness, connectivity, and use of emotion words, whereas lower alexithymia would be associated with higher index trauma memory scores. A hierarchical regression was performed with the trauma memory index scores as the dependent variables. Word count was entered at stage one of the regression and alexithymia was entered at stage two.

Narrativity. The hierarchical regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = .014, p = .905$. At stage two, the introduction of the alexithymia variable also did not contribute significantly to the regression model, $F(2, 67) = .450, p = .639$.

Cohesiveness. The hierarchical regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = 2.334, p = .131$. At stage two, the introduction of the alexithymia variable did not contribute significantly to the regression model, $F(2, 67) = 1.207, p = .305$.

Connectivity. The hierarchical regression revealed that at stage one, word count contributed significantly to the regression model, $F(1, 68) = 4.641, p = .035$, and accounted for 6.4% of the variation in connectivity. At stage two, the introduction of the alexithymia variable did not contribute significantly to the regression model, $F(1, 67) = .001, p = .975$.

Use of emotion words. The hierarchical regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = 1.758, p = .189$. At stage two, the introduction of the alexithymia variable did not contribute significantly to the regression model, $F(2, 67) = 1.596, p = .210$. 
**Hypothesis 3.** It was hypothesized that the negative association between alexithymia and trauma memory index scores would be heightened for individuals assigned to the emotion suppression condition. That is, the use of emotion suppression among individuals with higher levels of alexithymia would be associated with more severe decrements in index trauma memory scores, whereas the use of emotion acceptance would attenuate this effect. To analyze this hypothesis, a moderation analysis was conducted using Model 3 of the PROCESS macro (Hayes, 2013). Significance of the interaction term was indicated by a significant $\Delta R^2$ (i.e., $p < .05$) and estimated by confidence intervals. Confidence intervals for the interaction term that fail to include zero indicate a significant interaction. As none of the interactions were significant, simple slopes were not investigated.

**Narrativity.** The interaction between word count and emotion regulation did not moderate the relationship between alexithymia and narrativity, 95% CI [-.0001, .0001].

**Cohesiveness.** The interaction between word count and emotion regulation did not moderate the relationship between alexithymia and cohesiveness, 95% CI [-.0002, .0002].

**Connectivity.** The interaction between word count and emotion regulation did not moderate the relationship between alexithymia and connectivity, 95% CI [-.0001, .0004].

**Use of Emotion Words.** The interaction between word count and emotion regulation did not moderate the relationship between alexithymia and use of emotion words, 95% CI [-.0001, .0003].

**Research Team Coding**

**Hypothesis 1.** It was hypothesized that individuals randomized to the emotion suppression group would have lower index trauma memory scores across narrativity, cohesiveness, connectivity, and use of emotion words, whereas individuals in the acceptance
group would have higher index trauma memory scores. To examine this hypothesis, a hierarchical regression was performed with trauma memory index scores as the dependent variables. Word count was entered at stage one of the regression and condition was entered at stage two.

**Narrativity.** The hierarchical regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = 2.654, p = .108$. At stage two, the introduction of the alexithymia variable also did not contribute significantly to the regression model, $F(2, 67) = 1.508, p = .229$.

**Cohesiveness.** The hierarchical multiple regression revealed that at stage one, word count contributed significantly to the regression model, $F(1, 68) = 6.348, p = .014$,) and accounted for 8.5% of the variation in cohesiveness. Introducing condition to the model explained an additional 11% of the variation in cohesiveness, but this change in $R^2$ was not significant, $F(1, 67) = .832, p = .365$.

**Connectivity.** The hierarchical multiple regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = .307, p = .581$). At stage two, the introduction of the alexithymia variable also did not contribute significantly to the regression model, $F(2, 67) = .520, p = .597$.

**Use of emotion words.** The hierarchical regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = 1.758, p = .189$). At stage two, the introduction of the condition variable also did not contribute significantly to the regression model, $F(2, 67) = 1.309, p = .277$.

**Hypothesis 2.** It was hypothesized that greater alexithymia would be associated with lower index trauma memory scores across each of narrativity, cohesiveness, connectivity, and
use of emotion words, whereas lower alexithymia would be associated with higher index trauma memory scores. A hierarchical regression was performed with the trauma memory index scores as the dependent variables. Word count was entered at stage one of the regression and alexithymia was entered at stage two.

**Narrativity.** The hierarchical regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = 2.654, p = .108$). At stage two, the introduction of the alexithymia variable also did not contribute significantly to the regression model, $F(2, 67) = 1.807, p = .172$.

**Cohesiveness.** The hierarchical multiple regression revealed that at stage one, word count contributed significantly to the regression model, $F(1, 68) = 6.348, p = .014$), and accounted for 8.5% of the variation in connectivity. Introducing alexithymia to the model explained an additional 3.1% of the variation in cohesiveness, but this change in $R^2$ was not significant, $F(1, 67) = 2.372, p = .128$.

**Connectivity.** The hierarchical multiple regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = .307, p = .581$). At stage two, the introduction of the alexithymia variable also did not contribute significantly to the regression model, $F(2, 67) = 1.533, p = .223$.

**Use of emotion words.** The hierarchical regression revealed that at stage one, word count did not contribute significantly to the regression model, $F(1, 68) = 1.758, p = .189$). At stage two, the introduction of the condition variable also did not contribute significantly to the regression model, $F(2, 67) = 1.309, p = .277$.

**Hypothesis 3.** Taking into account word count, it was hypothesized that the negative association between alexithymia and trauma memory index scores would be heightened for
individuals assigned to the emotion suppression condition. That is, the use of emotion suppression among individuals with higher levels of alexithymia would be associated with more severe decrements in index trauma memory scores, whereas the use of emotion acceptance would attenuate this effect. To analyze this hypothesis, a moderation analysis was conducted using Model 3 of the PROCESS macro (Hayes, 2013). Significance of the interaction term was indicated by a significant ΔR² (i.e., p < .05) and a confidence interval that did not span zero. Simple slopes were plotted and used to determine the nature of the interaction.

**Narrativity.** The interaction between word count and emotion regulation did not moderate the relationship between alexithymia and narrativity, 95% CI [-.0002, .0000].

**Cohesiveness.** The interaction between word count and emotion regulation did not moderate the relationship between alexithymia and cohesiveness, 95% CI [-.0004, .0000].

**Connectivity.** The interaction between word count and emotion regulation did not moderate the relationship between alexithymia and connectivity, 95% CI [-.0002, .0002].

**Use of emotion words.** The interaction between word count and emotion regulation did not moderate the relationship between alexithymia and use of emotion words, 95% CI [-.0001, .0003].
CHAPTER 4
DISCUSSION

This study examined the impact of alexithymia and emotion regulation on indicators of traumatic memory. Using emotional processing theory and information processing theories of PTSD as theoretical grounding, this study aimed to advance the literature by investigating how alexithymia and emotion regulation strategy might affect variables associated with traumatic memory (i.e., narrativity, cohesiveness, connectivity, use of emotion words). The study selected for individuals with at least one previous traumatic experience. These individuals were then asked to complete measures of alexithymia, PTSD symptoms, depression symptoms, emotion regulation strategies, and state affectivity. Participants were asked to learn an emotion regulation strategy (i.e., emotion suppression or emotion acceptance) and employ the strategy while writing about a traumatic event. In this way, the study examined how alexithymia and emotion regulation impacted participants’ retelling of a past traumatic event.

Using the originally proposed data analysis strategy, two significant results emerged from the data collected in this study. First, alexithymia was significantly associated with cohesiveness, such that greater alexithymia was associated with less cohesive trauma narratives. In this study, cohesiveness served as an indicator of the degree to which the narrative told a logical and complete story. As such, the study found that individuals with higher levels of alexithymia tended to produce narratives that were less logical and more incomplete. Second, emotion suppression significantly moderated the relationship between alexithymia and narrativity. Recall that narrativity served as an indicator that the written trauma narrative told a story involving
characters, events, places, and things. In this way, individuals with higher levels of alexithymia and greater use of emotion suppression produced trauma narratives with fewer characters, events, places, and things.

These results were further evaluated when word count, or length of the trauma narrative, emerged as an unexpected but significant difference across conditions. Based on analyses that controlled for word count, it was discovered that alexithymia and emotion regulation no longer emerged as significant predictors of the trauma narrative indices. As such, the significant results in this study appear to be driven by how much the participant actually wrote.

The significance of narrative length may be particularly relevant for treatments, such as Written Exposure Therapy (WET; Sloan, Marx, Lee, & Resick, 2018), where patients are instructed to “look back on a traumatic event and write about it.” It may be that the more an individual writes, the more the trauma memory is reprocessed. Results of this study suggest emotion suppression may enable the individual to write more. Existing research suggests traumatic memory is initially encoded as sensory fragments without a coherent semantic component (Brewin et al., 1996; Van der Kolk & Fisler, 1995), leading to memory that is inherently disorganized and incoherent (e.g., Foa & Riggs, 1993; Kilpatrick, Resnick & Freedy, 1992; Van der Kolk & Fisler, 1995). Further, information processing theory emphasizes the importance of integration between trauma memory and the wider autobiographical memory system. Accordingly, the conflicting information produced by trauma must be consciously accommodated by searching for meaning and making appraisals of cause and blame (Brewin et al., 1996; Brewin & Holmes, 2003).

The impact of word count, or narrative length, observed in this study may support the idea that the more one writes, the more one is able to make meaning from trauma and draw
causal conclusions. The distancing perspective in social psychology posits that self-distancing during expressive writing allows the individual to reconstrue distressing events versus recount distressing events (Kross & Ayduk, 2008), and that greater self-distancing reduces physical symptoms (Park, Ayduk, & Kross, 2016). In this way, the emotion suppression condition in this study may have allowed participants to emotionally distance themselves from the trauma narrative, which in turn facilitated greater reprocessing.

Given the theory-driven nature of the hypotheses in this study, the number of nonsignificant findings need to be considered along several dimensions. As outlined in Cronbach and Meehl (1955), there are three important interpretations of nonsignificant findings: “(a) the test does not measure the construct variable; (b) the theoretical network which generated the hypothesis is incorrect; or (c) the experimental design failed to test the hypothesis properly” (p. 295). These ideas will be explored below. Limitations of this study and ideas for future directions are incorporated throughout.

Although there were several benefits of using the TAS-20 to measure alexithymia in this study (i.e., widely used, comparability, length, sound psychometric properties), the measure may not have adequately captured the construct of alexithymia. As discussed above, the Toronto group and Amsterdam group have proposed distinct definitions of alexithymia (Preece et al., 2017), such that the Amsterdam group adds an additional component to the construct of alexithymia not captured on the TAS-20 that reflects reduced emotional reactivity or reduced ability to become emotionally aroused (Vorst & Bermond, 2001). The Amsterdam group further argues that there are distinct subtypes of alexithymia, namely cognitive alexithymia and affective alexithymia (Vorst & Bermond, 2001). Perhaps the TAS-20 captures more of the processes involved in the presentation of cognitive alexithymia but misses important processes involved in
affective alexithymia. Cognitive alexithymia includes difficulty identifying feelings, difficulty describing feelings to others, and an externally orientated thinking style, whereas affective alexithymia includes constricted imaginal processes and reduced emotional reactivity or difficulty emotionalizing (Vorst & Bermond, 2001).

Importantly, it may be that cognitive and affective alexithymia differ in habitual strategies of emotion regulation. Though research suggests that higher scores on both the TAS-20 ($r = .40, p = .0001$) and BVAQ ($r = .49, p = .001$) are strongly and positively related to reliance on the emotion suppression strategy (Laloyaux et al., 2015), the reduced emotional reactivity and reduced ability to become emotionally aroused described in affective alexithymia seems conceptually similar to dissociation (e.g., an involuntary removal from orientations that would otherwise allow for emotional experience; Stovall-McClough & Cloitre, 2006). It may be that individuals with cognitive alexithymia rely less heavily on emotion suppression than individuals with affective alexithymia. Further, individuals with affective alexithymia may rely more heavily on extreme forms of emotion suppression, namely, dissociation. To my knowledge, this idea has not been investigated in existing research.

Another factor that may have led to null results is the overall low level of alexithymia reported by the sample. The majority of the sample collected in this study did not meet the cutoff for alexithymia (67.1% of the sample had scores in the nonalexithymic range). As such, the sample may have been more flexible in their use of emotion regulation strategies, despite being instructed to use the emotion regulation strategy assigned to them (i.e., emotion suppression, emotion acceptance). The sample may have had better awareness of their emotions, and been better able to effectively regulate them.
Relatedly, participants in this study may have experienced difficulty adopting the emotion regulation strategy assigned to them. Of the 123 total participants in this study, 28.5% (n = 35) were unsuccessful in practicing the assigned emotion regulation strategy with the IAPS. Notably, of those unsuccessful with practicing, 71.4% (n = 25) were randomly assigned to the emotion acceptance regulation strategy. This finding suggests that emotion acceptance is a more difficult emotion regulation skill to master. This conclusion was further supported by examination of data collected on number of practice attempts. Individuals assigned to the emotion suppression condition required on average 1.44 (SD = 0.8) practice attempts to successfully use the suppression strategy. In contrast, individuals assigned to the emotion acceptance condition required on average 1.78 (SD = 0.9) practice attempts to successfully use the acceptance strategy. The difference in average number of practice attempts between conditions was statistically significant, -0.34, 95% CI [-0.66, -0.01], t(104) = -2.05, p = .043. As such, emotion acceptance appears to be a more difficult or less well-utilized emotion regulation skill in comparison to emotion suppression.

For those who were successful in practicing either emotion regulation strategy with the IAPS, it is unclear how successfully they were able to use the strategy while completing the written narrative. Thus, it is unknown if participants stuck with their assigned regulatory strategy or adopted other strategies either intentionally or unintentionally (e.g., cognitive reappraisal). Future studies may benefit from asking participants about their success with using the assigned strategy. Yet, asking participants about their perception of successfulness with their assigned emotion regulatory strategy taps into a more metacognitive process, for which you may also see large individual differences.
Still, metacognitive processes may be particularly relevant for investigations of trauma memory. Several studies have documented that traumatic memories are rated as more fragmented and disorganized than memories of nontraumatic events (Bryne, Hyman, & Scott, 2001; Foa & Riggs, 1993; Koss, Figueredo, Bell, Tharan, & Tromp, 1996; Tromp, Koss, Figueredo, & Tharan, 1995; Van der Kolk & Fisler, 1995). Importantly, in these studies, participants rated their own memories using questionnaires (Bennett & Wells, 2010). Thus, one could argue that previous studies largely investigated metamemory processes (i.e., attributions of one’s own memory; Bennett & Wells, 2010), whereas this study investigated objective memory structure as rated by others.

Thus, as an extension of information processing theory, the metacognitive model of PTSD (Wells, 2000) posits that fragmented and disorganized memory is only important when the individual interprets the fragmented or disorganized memory as meaning something negative (Bennett & Wells, 2010). For example, “I don’t have a clear memory of the trauma, so maybe it didn’t really happen,” or “I’m losing my mind because I can only remember certain pieces of the trauma.” Consistent with the metacognitive model, Halligan, Michael, Clark, and Ehlers (2003) found that metamemory was a better predictor of PTSD symptoms than objective ratings of memory disorganization. Bennett and Wells (2010) also found that metamemory was an important predictor of PTSS above and beyond objective ratings of memory disorganization. It may be that alexithymia is more strongly related to metamemory processes than the objective ratings of memory investigated in this study. Perhaps, alexithymia and metamemory are part of a similar pattern of thinking regarding one’s abilities, for example, a tendency to interpret events, thoughts, behaviors, and emotions in a negative, rigid, and catastrophic manner (e.g., “I can’t handle my emotions,” “Feeling scared means I am losing control”). Future research could
reasonably extend this study by asking participants to rate their own memory across the indices investigated in this study and by asking participants to interpret their own emotion regulatory processes. In this way, objective (as coded by a research team) and subjective (as coded by the participant) ratings could be compared.

One should also consider the implications of using computerized coding programs (e.g., Coh-Metrix). In this study, the coding completed by the research team performed slightly better than the computerized coding using Coh-Metrix. Although there are consistent clinical and theoretical accounts of the fragmented and disjointed nature of trauma memory, data-driven findings are inconclusive (O’Kearney & Perrott, 2006). O’Kearney and Perrott (2006) conducted a literature review of 19 empirical studies investigating the nature of trauma memory. The authors conclude that existing research on narrative disorganization, or fragmentation, suffers from marked problems of measurement, construct heterogeneity, and inconsistent findings (O’Kearney & Perrott, 2006). The methods used in this study seem to support this view. The nonsignificant correlations between the research-team-coded indices of trauma memory and the Coh-Metrix-analyzed indices suggest lack of consistency in conceptual classifications and measurement, despite basing the coding scheme on definitions outlined by the Coh-Metrix authors. Thus, a priority for future research should be to use existing knowledge of autobiographical memory to derive comprehensive and consistent definitions of aspects that appear to be disrupted in traumatic memory. Valid and reliable measures of these aspects also need to be developed or improved.

Future research should consider the implications of the written narrative directions used in this study. The directions used in this study asked participants to “look back on the most traumatic event you have experienced and write about it.” Unexpectedly, these instructions
allowed the participant to decide a) what constitutes trauma and b) what was the most traumatic event they had ever experienced. Notably, there is considerable debate in the literature regarding how broadly versus narrowly trauma should be defined (Weathers & Keane, 2007). The Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5), defines trauma as exposure to death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence by direct exposure, witnessing the trauma, learning that the event occurred to a close family member or friend, or by indirect exposure to aversive details of the trauma, usually in the course of professional duties (American Psychological Association, 2013). ¹

Yet, prominent figures in the field argue that key aspects of trauma are a) life threat, b) uncontrollability, and/or c) unpredictability (Foa, Zinbarg, & Rothbaum, 1992). Others suggest that trauma is an event that overwhelms or exceeds a person’s capacity to cope (Cloitre, Cohen, & Koenen, 2011). Thus, witnessing a loved one die slowly over time would not meet the narrow definition of trauma outlined in the DSM-5, but it could meet the broader definitions of trauma outlined by researchers and clinicians in the field (e.g., Cloitre et al., 2011; Foa et al., 1992). As PTSD was not a primary outcome of this study, a broader definition of trauma was adopted. The broader conceptualization of “what counts” as trauma led to the inclusion of a) narratives written about DSM-5 Criterion A events and b) the unexpected death of a loved one (Breslau, 1998). Narratives written about break-ups with romantic partners, verbal arguments, suicide ideation, loss of possessions, and witnessing a parent under the influence of drugs or alcohol were excluded. Thus, although this study collected 88 narratives, 18 did not meet the definition of trauma adopted by this study. Of the remaining 70 narratives used for data analysis, 28.57% (n = 20) were written about the unexpected, nonaccidental, nonviolent death of a loved one.

¹ In cases of actual or threatened death the event must have been violent or accidental.
Although the majority of narratives collected in this study (71.43%; n = 50) were written about DSM-5 Criterion A events, the impact of these non-Criterion A written accounts should be taken seriously.

It may be that the type and severity of traumatic events written about by participants in this study did not evoke sufficient distress for the hypothesized effects of alexithymia and emotion regulation to be observed. This idea is somewhat supported by participants’ reports of state affect before and after writing the trauma narrative. Prior to writing the trauma narrative, the mean score for positive affect was 25.61 and 15.53 for negative affect. Scores on the PANAS range from 10-50, suggesting that participants had moderate levels of positive affect and low levels of negative affect prior to writing the trauma narrative. Following the written trauma narrative, the mean score for positive affect was 23.06 and 17.97 for negative affect. Thus, although positive affect decreased, $t(65) = 2.78, p = .007$, and negative affect increased, $t(68) = -3.39, p = .001$, participants were not particularly distressed by the written trauma account. This is consistent with research suggesting that trauma-related research can lead to some acute distress, but the distress is typically not extreme (Jaffe, DiLillo, Hoffman, Haikalis, & Dykstra, 2015). Evoking more severe levels of distress may be necessary to observe the effects on memory documented in the literature. That is, perhaps the hypothesized effects of alexithymia and emotion regulation on memory are only observed under conditions of more extreme distress.

Returning to the number of narratives written about unexpected, nonaccidental, nonviolent death of a loved one, this type of event, though quite distressing, may not evoke the level of “traumatic” distress that is captured by DSM-5 Criterion A events. In this way, the number of non-Criterion A narratives in this study could have diminished or “watered down” power to detect significant effects. Future research could investigate these ideas in a sample of individuals
who currently meet the DSM-5 diagnostic criteria for PTSD.

The current conceptualization of posttraumatic symptoms suggests that the individual can experience intense, *involuntary* memory of the traumatic event (e.g., symptom B3-flashbacks) and *voluntary* recall of the traumatic memory, which tends to be effortful, fragmented, and disorganized (e.g., symptom C3- the inability to remember important aspects of the event). Thus, another idea pertaining to the nonsignificant results of this study, may be that the voluntary retrieval of trauma memory remains unaffected by alexithymia and emotion regulation, whereas involuntary retrieval (e.g., intrusive memory, flashbacks) is impacted.

This study investigated voluntary retrieval of traumatic memory, which arguably already has a semantic structure (Brewin, 2014), reflecting how the participant has created meaning from their experience. Consistent with Pennebaker and Seagal (1999), the act of writing about and organizing a traumatic memory into a narrative format likely supported the meaning-making process and further strengthened the semantic structure of the memory. One could argue that the involuntary aspects of traumatic memory were not included in the written accounts as these aspects may be more perceptual in nature and not fully integrated into the contextualized, verbal memory (Brewin, 2011, 2014). Yet, it may be these portions of the memory structure that are most impacted by one’s emotion regulation capacity, or targeted by an alexithymic processing style.

This study hypothesized that the reactivation of traumatic memory could pose a distinct challenge for individuals with alexithymia. Namely, individuals with alexithymia are more reluctant to engage in traumatic memory retrieval due to the strong emotional nature of traumatic memory. It may be that the written trauma narratives collected in this study reflect the aspects of traumatic memory that are not avoided and have less emotional impact. Indeed, the clinical
literature uses the term “hotspots” to refer to specific parts of trauma memory that cause the highest levels of emotional distress (Ehlers & Clark, 2000; Foa & Rothbaum, 1998; Grey, Holmes, & Brewin, 2001; Grey, Young, & Holmes, 2002; Holmes, Grey, & Young, 2005; Richards & Lovell, 1999). In prolonged exposure therapy, these hotspots are discussed in great detail, while tolerating high affect until habituation occurs (Foa, Hembree, & Rothbaum, 2007). As such, future research may benefit from collecting narratives focused on the worst moment(s) in the trauma memory, rather than the memory as a whole.

Notably, in prolonged exposure therapy, accounts of traumatic events are spoken aloud, in the present tense, with a therapist in the room. It is possible, that the fragmentation and disorganization of trauma memory are more readily observed in spoken accounts of trauma memory than in written accounts of trauma memory. Research comparing vocal and written accounts of traumatic memory have found comparable therapeutic changes in biology, mood, and cognition (Donnelly & Murray, 1991; Esterling, Antoni, Fletcher, Margulies, & Schneiderman, 1994; Murray, Lamnin, & Carver, 1989; Murray & Segal, 1994). However, to my knowledge, comparisons of fragmentation and disorganization across vocal and written modalities have not been investigated.

Results of this study are limited in their generalizability. The sample collected in this study consisted of college students in an introductory psychology course who had one or more previous traumatic experiences. Trauma can have devastating effects on occupational (e.g., school) functioning. Thus, the very fact that these trauma survivors enrolled in and attended college suggests to some degree a capacity to overcome the difficult effects of trauma. A sample of nonworking or nonstudent trauma survivors may perform quite differently in comparison to
the current sample. Future studies could investigate this idea by collecting two samples for comparison: a college student sample and a community-based, nonworking sample.

Nevertheless, just over 50% of the sample in this study endorsed clinically significant PTSD symptoms. The representation of probable PTSD in the current sample was unexpected, as the study did not select for PTSD-positive individuals. The nearly even split between PTSD-positive and PTSD-negative individuals in the sample may be masking significant effects, as the representation of PTSD-positive versus PTSD-negative individuals was not controlled when assigning individuals to study conditions. To examine this idea, a chi-square analysis was performed. There were no significant differences in the ratio of PTSD-negative and PTSD-positive individuals across conditions (Pearson $\chi^2 = .334$). In the suppression condition, 62.9% of individuals met the threshold for PTSD symptoms and 37.1% did not. In the acceptance condition, 51.4% met the threshold for PTSD and 48.5% did not. As such, PTSD was adequately represented across the study conditions. Nevertheless, future research might benefit from incorporating samples that are more homogeneous in PTSD presentation.

It is notable that alexithymia and PTSD symptoms were not significantly correlated in this study, $r(70) = .233, p > .05$. This finding stands in contrast to the number of studies that have found a positive association between PTSD and alexithymia (e.g., Badura, 2003; Hyer et al., 1990; Söndergaard & Theorell, 2004; Zlotnick et al., 2001). It may be that trauma type and severity are important variables to consider in investigations of alexithymia and PTSD. Studies that have documented the positive association between PTSD and alexithymia have been in samples of combat veterans (Badura, 2003; Hyer et al., 1990), refugees (Söndergaard & Theorell, 2004), and childhood abuse survivors (Zlotnick et al., 2001). Not only do these samples
meet DSM-5 Criterion A, one could argue that these types of traumatic events are particularly severe and more likely to give rise to negative posttrauma sequelae, including alexithymia.

In summary, this study examined the effect of alexithymia and emotion regulation (i.e., emotion suppression: emotion acceptance) on variables associated with trauma memory (i.e., narrativity, cohesiveness, connectivity, and use of emotion words). Two significant results emerged from the data collected in this study. First, alexithymia was significantly associated with cohesiveness, such that greater alexithymia was associated with less cohesive trauma narratives. Second, emotion suppression significantly moderated the relationship between alexithymia and narrativity. All other hypothesized effects were nonsignificant. Future research on this topic would benefit from consideration of the theoretical and methodological limitations that may have led to the nonsignificant findings of this study.
REFERENCES


Hayes, A. F. (2013). The PROCESS macro for SPSS and SAS (version 2.13) [Software].


APPENDIX A

BRIEF STUDY DESCRIPTION
Memory and Emotion

Brief description: (NIU students receive 2 credits)
Participants must be 18 years of age or older to participate. In this study, participants will be asked to attend a laboratory session where they will be taught a brief emotion regulation strategy and asked to describe a memory from an adverse life event. Participants will receive 2 course credits for participating.

Detailed description:
Participants in this study will be asked to attend an in-person, laboratory session where they will be taught a brief emotion regulation strategy and asked to describe a memory from an adverse life event. They will be asked to report on their socio-demographic characteristics (e.g., age, race, education) and current difficulties with emotional experiences. The study will take approximately 1 hour to complete and participants will receive 2 course credits in exchange for participating.
APPENDIX B

INVITATION EMAIL
Dear [Student],

You are eligible to participate in the study titled “Memory and Emotion.”

Participation in this study will involve attending an in-person, laboratory session where you will be taught a brief emotion regulation strategy and asked to describe a memory from an adverse life event. You will be asked to report on your socio-demographic characteristics (e.g., age, race, education) and current difficulties with emotional experiences. The study will take approximately one hour to complete and you will receive two course credits in exchange for participating.

If you would like to participate in this study, please sign-up for a session via SONA systems.

Sincerely,
Jennifer Milliken, M.A.
APPENDIX C

INFORMED CONSENT FOR RESEARCH
Principal Investigator: Jennifer Milliken, M.A.
Faculty Advisor: Michelle M. Lilly, Ph.D.

Project Title: Memory and Emotion

Project Description: You are being asked to volunteer for a research study titled Memory and Emotion. This study is being conducted at Northern Illinois University. The coordinating Principal Investigator (PI) in charge of this study is Jennifer Milliken, M.A. The purpose of this study is to examine the role of emotion regulation strategies on memory. The study will also evaluate difficulty with emotional experiences.

You are being asked to participate in this study because you are 18 years of age or older and are enrolled in a psychology course at NIU. Your participation will consist of learning a brief emotion regulation strategy, writing about a memory from an adverse life event, and reporting on current difficulties with emotional experiences. You will also be asked to report on your personal demographic characteristics (e.g., gender, race, education, SES). Participation in this study is estimated to take 1 hour. All surveys will be administered through a secure online survey system (i.e., Qualtrics).

Risks: The potential risks and/or discomforts you could experience during this study include discomfort in thinking about previous distressing experiences that you have had. The study is unlikely to result in significant or ongoing distress, but if you become upset during the assessment, you may refuse to answer any questions or cease participation at any time. You are encouraged to skip any questions that you do not wish to answer. You are free to do this without penalty and will receive full credit regardless of your level of participation in the study. Should the need for crisis management or mental health services arise, a Master’s level clinician will be available. Participants who experience aversive reactions will be encouraged to contact national agencies, including the National Alliance on Mental Illness (NAMI; 1-800-950-6264), therapists at the Counseling Center: (815) 753-1206 who are available for crisis management, and/or Dr. Lilly and therapists at the Psychological Services Center may also be of assistance with respect to a referral for counseling.
**Benefits:** The intended benefits of this study include furthering the knowledge available about emotion regulation and memory. You will also receive a list of local mental health resources attached to this form. Further, you will receive 2 course credits in exchange for completing this study.

**Confidentiality:** All information gathered during this experiment will be kept confidential, as your name will not be connected to your data. A trained research assistant will be responsible for providing credit to participants through SONA Systems. This assistant will not be aware of your responses during the study, which will also not be personally identifiable. All data will be stored on password-protected computers, and data analyses used for manuscripts, presentations, or other public dissemination, will be done in aggregate. Signed informed consent documents will be stored in a locked research laboratory separate from any data that you provide after the informed consent process.

I understand that any information gathered during this research study is intended to be used for research purposes only and will be kept confidential to the extent permitted by law. I understand that the researcher does not have authority to address, or a duty to report, sexual violence, misconduct or harassment. If I wish to report an instance of sexual violence, misconduct or harassment, I understand that I need to contact the University’s Title IX Coordinator, Karen L. Baker, at 815-753-6017 or kbaker@niu.edu, or visit the University’s Title IX website at http://www.hr.niu.edu/ServiceAreas/DiversityResources/TitleIX/index.cfm for other reporting options.

**Contact Person:** If you have any questions or concerns relating to this research project, feel free to contact the investigator, Jennifer Milliken, at jmilliken88@gmail.com. If you have questions about your rights as a research participant, please contact the Office of Research Compliance at Northern Illinois University at (815) 753-8588.

**Freedom to Withdraw:** Your participation is voluntary; you may cease to answer questions and/or be withdrawn at any time without penalty or prejudice. You will still receive course credit if you choose to withdraw from the study. Your withdrawal will not adversely affect your relationship with the investigators or Northern Illinois University and your decision will not result in the loss of benefits to which you were otherwise entitled. If you agree to participate, you can still withdraw from this research, or refuse to answer any questions, at any time.
Consent:
I understand that my consent to participate in this project does not constitute a waiver of any legal rights or redress I might have as a result of my participation. I have read the description, including the nature and purpose of this study, the risks and benefits involved, and the option to withdraw at any time. If I have any questions or concerns about my participation, I will contact the PI.

Consent for participation:
By signing below, I am indicating that I freely agree to participate in this research study. If I do not sign, I am indicating that I choose to not participate in this study and will not provide answers to the study.

Participant Signature: ________________________________ Date: _____________

Researcher Signature: ________________________________ Date: _____________

DeKalb County Resources

Campus Services

Counseling & Consultation Services, NIU (STUDENTS ONLY) (formerly The Counseling and Student Development Center - CSDC)
Phone: 815/753-1206
Address: Campus Life Building-200
Fees: None for counseling. Modest testing fees.
Hours: 8:00 a.m. – 4:30 p.m. Monday-Friday
Open whenever NIU is open, including breaks.
After Hours: Assistance after hours available by calling—815/753-1212

Description of Services: This service provides students with short-term, individual and group counseling for a broad range of personal concerns. Career counseling services include interest assessment, workshops, and use of computerized career counseling programs. Educational counseling services include assistance with test anxiety and study skills. Assessments of drug and alcohol abuse are also provided. First appointment scheduled with 3-7 days. (Handicapped Accessible).

Community Counseling Training Center, NIU (formerly The Counseling Laboratory)
Phone: 815/753-9312
Address: 416 Graham Hall
Fees: None for students, faculty, or staff.

Hours: Call for available counseling hours.

Description of Services: A wide range of services are offered by the counselors including both personal and vocational counseling. In general, the approach used is one that promotes growth and focuses on increasing emotional well-being and self-awareness. All counselors are doctoral or masters level students who are being supervised by members of the counseling faculty. First appointments scheduled within 3-5 days.

The Couple and Family Therapy Clinic of NIU, NIU (formerly The Family Therapy Clinic)

Phone: 815-753-1684

Address: Wirtz Hall 146

Fees: The cost of services are determined by a sliding fee scale. No client is turned away due to the inability to pay. This gives clients of all income levels access to our high-quality care.

Hours: Monday, Tuesday – 12 noon – 9:00 pm; Wednesday, Thursday - 9:00 am - 9:00pm; Friday - 9:00 am - 5:00 pm

Website: http://www.chhs.niu.edu/familytherapyclinic/contact/index.shtml

Description of Services: The Couple and Family Therapy Clinic at NIU is a training and research facility that is an integral component of the specialization in Marriage and Family Therapy Program (SMFT). They provide clinical services to individuals, couples, and families with a unique perspective of addressing the issues in a larger systemic context. They follow rigorous training standards as set forth by our accrediting organization, being accredited by the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE).

Psychological Services Center, NIU

Phone: 815/753-0591

Address: Normal Rd and Lincoln Hwy.

Fees: No fee for therapy for students; fee for assessments for students. Faculty, staff, and community members charged on a sliding scale.

Hours: Monday – 11:00 a.m. – 7:00 p.m.
Tuesday – 12:00 noon – 8:00 p.m.
Wednesday-Friday-9:00 a.m. to 5:00 p.m. Open whenever NIU is open, including breaks.

Description of Services: Individual, couples, family, and group psychotherapy, Intellectual, personality, and academic assessments. Clients are generally seen by advanced level graduate student staff under faculty supervision. Services tailored to meet a client’s specific needs. First appointment scheduled with 7 days. (Handicapped accessible.)

Community Resources

KishHealth System Behavioral Health Services (formerly Ben Gordon Center)

Phone: 815/756-4875
Braden Counseling Center
Phone:  815/787-9000
Address:  2580 DeKalb Ave., Suite C., Sycamore, IL 60178
         951 S. 7th St., Suite G., Rochelle, IL 60168
Fees:  Sliding fee scales based on income. Insurance accepted.

Description of Services: Free initial consultation. Specializes in counseling individuals, couples and families in various stages of life. Has flexible scheduling with Sycamore and Rochelle locations. Also offers a variety of evaluations, including same-day DUI evaluations, and legal and forensic work for attorneys.

Village Counseling
Phone:  815/756-9907
Address:  1211 Sycamore Rd., DeKalb, IL 60115
Fees:  Sliding fee scales based on income. Insurance accepted.
Hours:  Monday-9:00 a.m.-10:00 p.m.
       Wednesday/Thursday-9:00 a.m.-9:00 p.m.
       Friday-10:00 a.m.-10:00 p.m.

Description of Services: Provides relationship-centered counseling, including life counseling for individuals, couples, families, adolescents, and children, as well as marriage and family counseling.

Family Service Agency, Center for Counseling
Phone:  815/758-8616
Address:  14 Health Services Dr.-DeKalb
Fees:  $75.00 per visit. Insurance accepted, including NIU Student Insurance. Payment plans and scholarship funds available.
Hours:  Monday-Wednesday-9:00 a.m. – 8:00 p.m.
       Thursday – Friday – 8:00 a.m. – 4:00 p.m. Additional hours available by appointment.
Description of Services: Individual, couple, group counseling for children, adults, senior citizens, and families. First appointment scheduled within 1-7 days. (Handicapped accessible and on Campus Bus Route).

**Living Rite, The Center for Behavioral Medicine.**
Phone: 815-758-8400  
Address: 1958 Aberdeen Court, Suite 2, Sycamore, IL 60178  
Fees: Based on insurance. Self-pay options are available.

Description of Services: Individual and Group Therapy. Therapy to deal with chronic pain.

**Safe Passage, Inc.**
Phone: 815-756-7930  
Hotline/Crisis: 815-756-5228  
Address: P.O. Box 621, DeKalb, IL 60115

Description of Services: A wide variety of services are offered to victims and perpetrators of domestic and sexual violence including crisis intervention and medical advocacy for victims of domestic and sexual violence, short- and long-term housing for victims and their children, counseling, legal advocacy, children's services, community education, a batterer's intervention program, and a Latina outreach program.
Thank you for participating in the study Memory and Emotion. This study is designed to examine the role of emotion regulation on memory for traumatic events that sometimes occur in people’s lives.

If you have any questions or comments about this study or the results obtained, please contact the Principal Investigator, Jennifer Milliken; jmilliken88@gmail.com. The questionnaires and tasks that you completed today have been used previously in research. Though participants may feel some stress or discomfort related to completion of these tasks or measures, the distress is typically fleeting. However, if you find that you are distressed following your participation in this study, please contact either Jennifer Milliken, M.A. or Dr. Lilly (the faculty advisor of this project, mlilly1@niu.edu) or one of the local or national resources provided to you. You may also seek out therapy services at a local facility (see the attached list of local resources).

Thank you again for your participation. Please sign below to indicate that you have read and understand this form, and that you will contact Jennifer Milliken, M.A. or Dr. Lilly if you have any questions or concerns about the study, and Northern Illinois University’s Office of Research Compliance at (815) 753-8588 if you have any questions about your rights as a research participant.

Participant Signature: ________________________________ Date: _____________

Researcher Signature: ________________________________ Date: _____________
DeKalb County Resources

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Hours:  Call for available counseling hours.

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The Couple and Family Therapy Clinic of NIU, NIU (formerly The Family Therapy Clinic)
Phone:  815-753-1684
Address:  Wirtz Hall 146
Fees:  The cost of services are determined by a sliding fee scale. No client is turned away due to the inability to pay. This gives clients of all income levels access to our high-quality care.
Hours:  Monday, Tuesday – 12 noon – 9:00 pm; Wednesday, Thursday - 9:00 am - 9:00pm; Friday - 9:00 am - 5:00 pm
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Community Resources

KishHealth System Behavioral Health Services (formerly Ben Gordon Center)
Phone: 815/756-4875
Address: 12 Health Services Dr., DeKalb, IL 60115
Fees: Sliding fee scales based on income. Insurance accepted.
Hours: Monday-Thursday- 8:00 a.m. – 8:30 p.m.
     Friday-8:00 a.m.-5:00 p.m.
After Hours: 815/758-6655 Crisis Line
Description of Services: Comprehensive counseling services to all residents of DeKalb County. Services to all persons affected by mental health problems, substance abuse, and family/child welfare concerns. 24-hour sexual assault/abuse services can be accessed through the Crisis Line. First appointment scheduled within 30 days. (Handicapped accessible and on Campus Bus Route).

Braden Counseling Center
Phone: 815/787-9000
Address: 2580 DeKalb Ave., Suite C., Sycamore, IL 60178
       951 S. 7th St., Suite G., Rochelle, IL 60168
Fees: Sliding fee scales based on income. Insurance accepted.
Description of Services: Free initial consultation. Specializes in counseling individuals, couples and families in various stages of life. Has flexible scheduling with Sycamore and Rochelle locations. Also offers a variety of evaluations, including same-day DUI evaluations, and legal and forensic work for attorneys.

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     Friday-10:00 a.m.-10:00 p.m.
Description of Services: Provides relationship-centered counseling, including life counseling for individuals, couples, families, adolescents, and children, as well as marriage and family counseling.

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Hours: Monday-Wednesday-9:00 a.m. – 8:00 p.m.
     Thursday – Friday – 8:00 a.m. – 4:00 p.m. Additional hours available by appointment.
Description of Services: Individual, couple, group counseling for children, adults, senior citizens, and families. First appointment scheduled within 1-7 days. (Handicapped accessible and on Campus Bus Route).

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APPENDIX E

SOCIO-DEMOGRAPHIC QUESTIONNAIRE
1. What is your sex?     [] Male     [] Female

2. What is your gender identity? ______

3. What is your current age? ______

4. How many years of schooling have you completed? _____
   (e.g., graduated high school = 12; graduated college = 16)

5. What is your current employment status? (check only one)
   [] Part time
   [] Full time
   [] Retired
   [] Unemployed
   [] Student

6. What is your current marital status? (check only one)
   [] Single
   [] Partnered
   [] Living with significant other
   [] Engaged
   [] Married
   [] Divorced, separated, or widowed

7. What is your sexual orientation? ________________

8. What is your ethnic background? (check only one)
   [] Hispanic or Latino
   [] Not Hispanic or Latino
   [] Unknown

9. What is your racial background? (check all that apply)
   [] Caucasian or White
   [] African American or Black
   [] Asian
   [] American Indian or Alaskan Native
   [] Native Hawaiian/other Pacific Islander
   [] Unknown

10. Please estimate your parents’ total annual household income.
    [] Less than $25,000
    [] $25,000-$50,000
    [] $50,000-$75,000
    [] $75,000-$100,000
    [] more than $100,000
    [] Unknown
11. Please estimate your total annual income.

- [] Less than $25,000
- [] $25,000-$50,000
- [] $50,000-$75,000
- [] $75,000-$100,000
- [] more than $100,000
- [] Unknown

12. Have you ever received mental health treatment?

13. If yes to Question 12, what did you receive mental health treatment for?

14. If yes to Question 12, describe the type of treatment you received.
APPENDIX F

20-ITEM TORONTO ALEXITHYMIA SCALE (TAS-20)
Using the scale provided as a guide, indicate how much you agree or disagree with each of the following statements. Give only one answer for each statement.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Moderately Disagree</td>
<td>Neither Disagree Nor Agree</td>
<td>Moderately Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

1. I am often confused about what emotion I am feeling.  
2. It is difficult for me to find the right words for my feelings.  
3. I have physical sensations that even doctors don’t understand.  
4. I am able to describe my feelings easily.  
5. I prefer to analyze problems rather than just describe them.  
6. When I am upset, I don’t know if I am sad, frightened, or angry.  
7. I am often puzzled by sensations in my body.  
8. I prefer to just let things happen rather than to understand why they turned out that way.
9. I have feelings that I can’t quite identify.  
10. Being in touch with emotions is essential.  
11. I find it hard to describe how I feel about people.  
12. People tell me to describe my feelings more.  
13. I don’t know what’s going on inside me.  
14. I often don’t know why I am angry.  
15. I prefer talking to people about their daily activities rather than their feelings.  
16. I prefer to watch “light” entertainment shows rather than psychological dramas.  
17. It is difficult for me to reveal my innermost feelings, even to close friends.  
18. I can feel close to someone, even in moments of silence.  
19. I find examination of my feelings useful in solving personal problems.  
20. Looking for hidden meanings in movies or plays distracts from their enjoyment.
APPENDIX G

POSITIVE AND NEGATIVE AFFECT SCHEDULE (PANAS)
This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. **Indicate to what extent you feel this way right now, that is, at the present moment.**

<table>
<thead>
<tr>
<th></th>
<th>Very Slightly or Not at All</th>
<th>A Little</th>
<th>Moderately</th>
<th>Quite a Bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interested</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Distressed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Excited</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Upset</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Strong</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Guilty</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Scared</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Hostile</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Enthusiastic</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Proud</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. Irritable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. Alert</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. Ashamed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. Inspired</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. Nervous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. Determined</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17. Attentive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. Jittery</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19. Active</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20. Afraid</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
APPENDIX H

LIFE EVENT CHECKLIST AND PTSD CHECKLIST FOR DSM-5
Listed below are a number of difficult of stressful things that sometimes happen to people. For each event check one or more of the boxes to the right to indicate that: (a) it happened to you personally; (b) you witnessed it happen to someone else; (c) you learned about it happening to a close family member or close friend; (d) you were exposed to it as part of your job (for example, paramedic, police, military, or other first responder); (e) you’re not sure if it fits; or (f) if it does not apply to you. Be sure to consider your entire life (growing up as well as adulthood) as you go through the list of events.

1. **Natural disaster (for example, flood, hurricane, tornado, earthquake)**
   a. Happened to me
   b. Witnessed it
   c. Learned about it
   d. Part of my job
   e. Not Sure
   f. Doesn’t Apply

2. **Fire or explosion**
   a. Happened to me
   b. Witnessed it
   c. Learned about it
   d. Part of my job
   e. Not Sure
   f. Doesn’t Apply

3. **Transportation accident (for example, car accident, boat accident, train wreck, plane crash)**
   a. Happened to me
   b. Witnessed it
   c. Learned about it
   d. Part of my job
   e. Not Sure
   f. Doesn’t Apply

4. **Serious accident at work, home, or during recreational activity**
   a. Happened to me
   b. Witnessed it
   c. Learned about it
   d. Part of my job
   e. Not Sure
   f. Doesn’t Apply

5. **Exposure to toxic substance (for example, dangerous chemicals, radiation)**
   a. Happened to me
   b. Witnessed it
   c. Learned about it
d. Part of my job  
e. Not Sure  
f. Doesn’t Apply

6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)  
a. Happened to me  
b. Witnessed it  
c. Learned about it  
d. Part of my job  
e. Not Sure  
f. Doesn’t Apply

7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)  
a. Happened to me  
b. Witnessed it  
c. Learned about it  
d. Part of my job  
e. Not Sure  
f. Doesn’t Apply

8. Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm)  
a. Happened to me  
b. Witnessed it  
c. Learned about it  
d. Part of my job  
e. Not Sure  
f. Doesn’t Apply

9. Other unwanted or uncomfortable sexual experience  
a. Happened to me  
b. Witnessed it  
c. Learned about it  
d. Part of my job  
e. Not Sure  
f. Doesn’t Apply

10. Combat or exposure to war-zone (in the military or as a civilian)  
a. Happened to me  
b. Witnessed it  
c. Learned about it  
d. Part of my job  
e. Not Sure  
f. Doesn’t Apply

11. Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)  
a. Happened to me  
b. Witnessed it  
c. Learned about it  
d. Part of my job
e. Not Sure
f. Doesn’t Apply

12. Life-threatening illness or injury
   a. Happened to me
   b. Witnessed it
   c. Learned about it
   d. Part of my job
   e. Not Sure
   f. Doesn’t Apply

13. Severe human suffering
   a. Happened to me
   b. Witnessed it
   c. Learned about it
   d. Part of my job
   e. Not Sure
   f. Doesn’t Apply

14. Sudden violent death (for example, homicide, suicide)
   a. Happened to me
   b. Witnessed it
   c. Learned about it
   d. Part of my job
   e. Not Sure
   f. Doesn’t Apply

15. Sudden accidental death
   a. Happened to me
   b. Witnessed it
   c. Learned about it
   d. Part of my job
   e. Not Sure
   f. Doesn’t Apply

16. Serious injury harm of death you caused to someone else
   a. Happened to me
   b. Witnessed it
   c. Learned about it
   d. Part of my job
   e. Not Sure
   f. Doesn’t Apply

17. Any other very stressful event or experience
   a. Happened to me
   b. Witnessed it
   c. Learned about it
   d. Part of my job
   e. Not Sure
   f. Doesn’t Apply
PART 2:

A. If you checked anything for #17 in PART 1, briefly identify the event you were thinking of:

________________________________________________________________________
________________________________________________________________________

B. If you have experienced more than one of the events in PART 1, think about the event you consider the worst event, which for this questionnaire means that event that currently bothers you the most. If you have experienced only one of the events in PART 1, use that one as the worst event. Please answer the following questions about the worst event (check all options that apply):

1. Briefly describe the worst event (for example, what happened, who was involved, etc.).

________________________________________________________________________
________________________________________________________________________

2. How long ago did it happen? ____________________ (please estimate if you are not sure)

3. How did you experience it?

    ____ It happened to me directly
    ____ I witnessed it
    ____ I learned about it happening to a close family member or close friend
    ____ I was repeatedly exposed to details about it as part of my job (for example, paramedic, police, military, or other first responder)
    ____ Other, please describe:

4. Was someone’s life in danger?

    ____ Yes, my life
    ____ Yes, someone else’s life
    ____ No

5. Was someone seriously injured or killed?

    ____ Yes, I was seriously injured
3. Did it involve sexual violence?
   ____ Yes
   ____ No

7. If the event involved the death of a close family member or close friend, was it due to some kind of accident or violence, or was it due to natural causes?
   ____ Accident or violence
   ____ Natural causes
   ____ Not applicable (The event did not involve the death of a close family member or close friend)

8. How many times altogether have you experienced a similar event as stressful or nearly as stressful as the worst event?
   ____ Just once
   ____ More than once (please specify or estimate the total # of times you have had this experience ____)

PART 3:

Below is a list of problems that people sometimes have in response to a very stressful experience. Keeping your worst event in mind, please read each problem carefully and then circle one of the numbers to indicate how much you have been bothered by that problem in the past month.

**In the past month, how much were you bothered by:**

1. Repeated, disturbing, and unwanted memories of the stressful experience?
   0= Not at all
   1= A little bit
   2= Moderately
   3= Quite a bit
   4= Extremely

2. Repeated, disturbing dreams of the stressful experience?
   0= Not at all
   1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

3. Suddenly feeling or acting as if the stressful experience was actually happening again (as if you were actually back there reliving it)?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

4. Feeling very upset when something reminded you of the stressful experience?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

6. Avoiding memories, thoughts, or feelings related to the stressful experience?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

8. Trouble remembering important parts of the stressful experience?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

10. Blaming yourself or someone else for the stressful experience or what happened after it?
   0= Not at all
   1= A little bit
   2= Moderately
   3= Quite a bit
   4= Extremely

11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?
   0= Not at all
   1= A little bit
   2= Moderately
   3= Quite a bit
   4= Extremely

12. Loss of interest in activities that you used to enjoy?
   0= Not at all
   1= A little bit
   2= Moderately
   3= Quite a bit
   4= Extremely

13. Feeling distant or cut off from the other people?
   0= Not at all
   1= A little bit
   2= Moderately
   3= Quite a bit
   4= Extremely

14. Trouble experiencing positive feelings (for example, being unable to feel happiness or having loving feelings for people close to you)?
   0= Not at all
   1= A little bit
   2= Moderately
   3= Quite a bit
   4= Extremely

15. Irritable behavior, anger outbursts, or acting aggressively?
   0= Not at all
   1= A little bit
   2= Moderately
   3= Quite a bit
   4= Extremely

16. Taking too many risks or doing things that could cause you harm?
   0= Not at all
17. Being “super-alert” or watchful or on guard?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

18. Feeling jumpy or easily startled?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

19. Having difficulty concentrating?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely

20. Trouble falling or staying asleep?
0= Not at all
1= A little bit
2= Moderately
3= Quite a bit
4= Extremely
APPENDIX I

CENTER FOR EPIDEMIOLOGIC STUDIES DEPRESSION SCALE (CES-D)
Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

<table>
<thead>
<tr>
<th></th>
<th>During the Past Week</th>
<th>Rarely or none of the time (less than 1 day)</th>
<th>Some or a little of the time (1-2 days)</th>
<th>Occasionally or a moderate amount of time (3-4 days)</th>
<th>Most or all of the time (5-7 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I was bothered by things that usually don’t bother me.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2.</td>
<td>I did not feel like eating; my appetite was poor.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3.</td>
<td>I felt that I could not shake off the blues even with help from my family or friends.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4.</td>
<td>I felt I was just as good as other people.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5.</td>
<td>I had trouble keeping my mind on what I was doing.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6.</td>
<td>I felt depressed.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>7.</td>
<td>I felt that everything I did was an effort.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>8.</td>
<td>I felt hopeful about the future.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>9.</td>
<td>I thought my life had been a failure.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>10.</td>
<td>I felt fearful.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>11.</td>
<td>My sleep was restless.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>12.</td>
<td>I was happy.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>13.</td>
<td>I talked less than usual.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>15.</td>
<td>People were unfriendly.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>16.</td>
<td>I enjoyed life.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>17.</td>
<td>I had crying spells.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>18.</td>
<td>I felt sad.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>19.</td>
<td>I felt that people dislike me.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>20.</td>
<td>I could not get “going.”</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
APPENDIX J

EMOTION REGULATION QUESTIONNAIRE (ERQ)
We would like to ask you some questions about how you typically control (that is, regulate and manage) your emotions. For each item, please answer using the following scale:

1. ___ When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about.

2. ___ When I want to feel less negative emotion (such as sadness or anger), I change what I’m thinking about.

3. ___ When I’m faced with a stressful situation, I make myself think about it in a way that helps me stay calm.

4. ___ When I want to feel more positive emotion, I change the way I’m thinking about the situation.

5. ___ I control my emotions by changing the way I think about the situation I’m in.

6. ___ When I want to feel less negative emotion, I change the way I’m thinking about the situation.
APPENDIX K

ACCEPTANCE AND ACTION QUESTIONNAIRE
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 choice.

1 = Never True  
2 = Very Rarely True  
3 = Seldom True  
4 = Sometimes True  
5 = Frequently True  
6 = Almost Always True  
7 = Always True

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My painful experiences and memories make it difficult for me to live a life that I would value.</td>
<td>1  2  3  4  5  6  7</td>
</tr>
<tr>
<td>2. I’m afraid of my feelings.</td>
<td>1  2  3  4  5  6  7</td>
</tr>
<tr>
<td>3. I worry about not being able to control my worries and feelings.</td>
<td>1  2  3  4  5  6  7</td>
</tr>
<tr>
<td>4. My painful memories prevent me from having a fulfilling life.</td>
<td>1  2  3  4  5  6  7</td>
</tr>
<tr>
<td>5. Emotions cause problems in my life.</td>
<td>1  2  3  4  5  6  7</td>
</tr>
<tr>
<td>6. It seems like most people are handling their lives better than I am.</td>
<td>1  2  3  4  5  6  7</td>
</tr>
<tr>
<td>7. Worries get in the way of my success.</td>
<td>1  2  3  4  5  6  7</td>
</tr>
</tbody>
</table>
APPENDIX L

BRIEF EMOTION REGULATION INTERVENTION INSTRUCTIONS
Instructions for the brief emotion suppression intervention will be as follows:

*For the purpose of this experiment, it is important that you try to suppress any emotional responses you may be having. What I mean by this is that you should try to adopt a detached and unemotional attitude. Try to think objectively in such a way that you don’t feel anything at all. Further, if you have any feelings try not to let these show and keep a ‘straight face’. In other words, try to behave in such a way that a person watching would not know that you were feeling anything. For example, when you feel anxious, but you know you have to do something, you can push the feelings away in order to accomplish the task. That's what I am going to encourage you to do today. Try not to feel anything, try not to think emotional thoughts, try to just get through the task with as little emotion and discomfort as possible.*

Instruction for the brief emotion acceptance intervention will be as follows:

*For the purpose of this experiment, it is important that you try to accept any emotional responses you may be having. What I mean by this is that you should try to adopt an attitude of willingness to experience emotions; even if they are painful. Try to engage with your emotional experience in such a way that you are present with your emotional experience, able to visualize the feeling, or able to experience the feeling in the body. Further, if you have any feelings at all try to let these show and don’t hold anything back. Willingness to experience your thoughts and feelings, good and bad, can free you up to focus on what really matters in your life. If you are willing to feel happy, sad, anxious, unsure, joyful and any other emotions that come up for you, you can choose the activities that you want to participate in, so that you ultimately choose your directions in life, instead of letting your fear of anxious thoughts and feelings make those choices for you.*
APPENDIX M

POSITIVE MOOD INDUCTION
Instruction: Below is an uplifting story from NBC News. The story is intended to promote a positive mood in the reader. Please read the story while feeling positive.

Headline: Grandmother Graduates after 42 Years

Thursday was the graduation day a Hamden grandmother has been looking forward to for 42 years.

Dora Anne Council, 76, was among the 870 graduates to receive their diplomas at Gateway Community College Thursday night.

“They said, ‘Grandma, you’re one of a kind.’ But I’m not one of kind because all you have to do is want something bad enough,” Council said...

In 1969, she first enrolled in what was then called South Central Community College. Shortly after, she decided to put her education on hold to help support her family.

“I wanted to go to college when I was young, but I knew I couldn’t because I had to get a job,” Council said. “I lucked out and got a job as a telephone operator and that was a good accomplishment.”

Thirty years later, she decided it was time to go back to school, and she had the full support of her family when she went back to what is now Gateway Community College.

“I told her, ‘Look mom, you want to go back. It’s your turn now,’” her son, Jimmy-Lee Moore, said. “Hey, I have the money, I’ll pay for whatever you need. You let me know.”

On Thursday night, Council sat amongst her classmates, most of whom are around the same age as her grandchildren.

“They think I’m so smart. I said, ‘I’m no smarter than you are,’” Council said. “The answers are in the book.”

When Dora’s name was called out, there was a huge round of applause.

“It feels wonderful! Wonderful! Wonderful!” she exclaimed following graduation.

She received an associate degree in general studies.
APPENDIX N

CODING WORKBOOK
Narrativity:
Q.1 The narrative contains characters, places, or events.
   2=
   • Characters, places, or events used are contextually important and consistent throughout the narrative.
   1=
   • Some characters, places, or events are dropped, tangential, or ambiguous where specificity matters.
   0=
   • Many characters, places, or events that are contextually important are missing, dropped, inconsistent, or ambiguous where specificity matters.
   • No information about characters, places, or events relevant to the narrative are present.

Q.2 The writer conveys a story using common language or language that most people can follow.
   2=
   • The language used or word choice makes the narrative easy to understand.
   • Word choice heavily reflects the language used by the majority of the population in the U.S.
   • The language is conversational and would be easy for the average person to follow/understand
   1=
   • Language or word choice makes the narrative somewhat difficult to follow or understand.
   0=
   • The writer uses jargon or special words/expression only used by a particular profession or group INSTEAD of identifying the object/noun.
   • There was specialized or technical language used in the narrative that made it difficult to understand.
   • There were several slang words or phrases that the reader needed to infer meaning from.
   • The language use was regarded as very informal.

Cohesiveness:
Q.3 The narrative contains tangential information or superfluous (unnecessary, redundant) writing or ideas.
   2=
   • The way the narrative is written feels as though the writer is avoiding talking about the trauma.
   • There is significantly more background information or follow-up information in the text than actual detail or content about the trauma.
   • Irrelevant details are included (e.g., X and Y happened, and here is what I had for dinner on Sunday night).
1=
- There are a few extraneous details included in the narrative, but for the most part the writer focused on the telling of the trauma story or included some irrelevant details about the trauma.

0=
- All information included in the narrative is essential to the telling of the trauma story.
- Details about the trauma are written about, including thoughts or feelings the person had at the time of the trauma.
- Core themes or concepts are identifiable and present throughout the narrative.

Q.4 The narrative is coherent (logical, cogent, clear, comprehensible).

2=
- There are words that indicate logical connections within the text (e.g., therefore, thus, so).
- All information is included. There are no missing pieces of information.
- The reader does not have to infer meaning or “read between the lines.”
- The reader was able to visualize the trauma in their mind.
- It was easy for the reader to follow the narrative and understand what happened.

1=
- The writer did not include small pieces of information that would have contributed to overall understanding of what happened.
- The reader had to fill in some missing information or make minor inferences about what the writer was trying to convey.

0=
- The reader was required to re-read the narrative to understand what happened.
- There were significant gaps in the narrative or large chunks of missing information.
- The reader had to fill in large chunks of information or make large inferences about what the writer was trying to convey.

Connectivity:
Q.5 The narrative is linear (organized, progressing in a linear fashion).

2=
- There is a beginning, middle, and end to the person’s story about their trauma.
- There are words/phrases that indicate temporality (e.g., then, after, during).
- Word tense (i.e., past, present, future) flows linearly OR if there is shifting from past, present, or future tense the writer makes these shifts without confusing the reader.
- There are words/phrases that indicate additivity or connections from one sentence/topic to another (e.g., also, moreover).

1=
- There is presence of linear flow to the narrative but it is interrupted by disjointed insertions of information.
  - E.g., A happened then B, but B may have happened because of C
Some places where connective words could be useful to help the understanding of the narrative are missing.
  o E.g., A happened. B happened. C happened, etc.

The narrative jumps around in time (e.g., X and Y happened, but before that A and B happened, and now I feel ....)
The narrative feels disjointed, disconnected, or fragmented.

Q.6 There are paragraphs or other indicators of narrative organization.

2=
  • There are paragraphs or bullet points or indentations indicating organizational structure.
  • There are words that indicate causality (e.g., because, so).
  • Sentences are simple, following an actor-action-object template.
  • Sentence structure is well formed with proper punctuation, capitalization, and emphasis that helps to convey meaning.
  • There are few words placed before the main verb of the sentence/clause.
  • The author uses the active voice, rather than the passive voice. (active voice= the subject of the sentence performs the action; passive voice= the subject of the sentence receives the action).

1=
  • The narrative is one, long paragraph (a paragraph is typically 5-7 sentences).
    o However:
      1. There are some words to indicate causality (e.g., because, so) or temporality (e.g., then, after, during), which helps the reader organize the text.
      2. Sentences are simple, easy to follow.
  • Topic sentences or conclusive sentences are out of order.

0=
  • The narrative does not contain paragraphs, bullet points, or indentations to create organizational structure.
  • There are long, run-on sentences.
  • Sentences are complex and difficult to follow.
  • Sentence structure lacks proper punctuation, capitalization, and emphasis making it difficult for the reader to interpret meaning.
  • There are too few or no words to indicate temporality or causality.

Use of Emotion Words:
Q.7 How many emotion words are used?

• Does the word make sense in this structure:
  o “I am feeling ______________.” OR “I am ______________.”
    • Yes → probably an emotion word
    • No → probably not an emotion word

List is not exhaustive:
• Anger
• Hurt
• Hostile
• Frustrated
• Irritated
• Betrayed
• Devastated
• Critical
• Resentful
• Furious
• Bitter
• Pissed-off
• Disgust
• Revolting
• Distaste
• Loath
• Detest
• Repulsive
• Appalled
• Fear
• Inadequate
• Helpless
• Confused
• Paralyzed
• Overwhelmed
• Vulnerable
• Insignificant
• Abandoned
• Shocked
• Numb
• Bewildered
• Trapped
• Happiness
• Joy
• Playful
• Curious
• Creative
• Sensuous
• Cheerful
• Hopeful
• Stimulated
• Daring
• Imaginative
• Alive
- Optimistic
- Sadness
- Depressed
- Lonely
- Ashamed
- Worthless
- Bored
- Tired
- Hopeless
- Empty
- Humiliated
- Despairing
- Disconnected
- Cold
- Hurt
- Devastated
- Surprise
- Shock
- Astonish
- Amaze