

THE EFFECTS OF AN EXPRESSIVE WRITING INTERVENTION ON
FACILITATING POSTTRAUMATIC GROWTH

by

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ABSTRACT

JESSICA MARIE GROLEAU. The effects of an expressive writing intervention on facilitating posttraumatic growth. (Under the direction of DR. LAWRENCE G. CALHOUN).

Traumatic experiences are highly prevalent, and their consequences potentially severe. As such, there is a pressing need for the development of novel interventions which may ameliorate the negative consequences of trauma and promote positive outcomes. The present study investigated the effects of a novel expressive writing intervention on posttraumatic growth (PTG) and other outcomes in a sample of university students ($N = 79$). Participants who had experienced a recent trauma or highly stressful event were assigned to one of three study groups. They were then instructed to write about either a neutral topic, any thoughts and feelings they had about the traumatic experience (standard expressive writing), or the positive aspects of their experience (directed expressive writing). The directed expressive writing activity was developed as a novel intervention for this study. Participants engaged in the writing activity three times over the course of one week, and follow-up assessments were conducted four weeks later. It was expected that the directed expressive writing activity would promote the most positive outcomes, including higher levels of PTG and lower levels of psychological distress. The results of this study show that participants in each of the three writing groups did not report significant differences in any of the major dependent variables at the follow-up assessment, including psychological distress, intrusive rumination, deliberate rumination, found meaning, and PTG. These results indicate that, among this sample of participants, both the standard and directed writing interventions did not

promote improved outcomes over time. Potential explanations for the lack of significant results are explored, and limitations and implications for future research are discussed.

DEDICATION

This project is dedicated to my incredibly supportive husband, Brett. Thank you for the countless sacrifices that you have made over the past six years, for always believing that I would make it, and for encouraging me when I needed it most. This project, this degree, and the person that I have become would not be possible without you.

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TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION	1
Expressive Writing	1
Physical Health Benefits	2
Psychological Benefits	5
Negative Outcomes	6
Mechanisms of Change	7
Narrative Structure	7
Working Memory	8
Cognitive Reappraisal	8
Meaning-making	9
Self-affirmation	10
Methodological Variations	11
Expressive Writing Instructions	11
Number of Writing Sessions	12
Length of Writing Sessions	13
Posttraumatic Growth	14
Expressive Writing and Posttraumatic Growth	17
Positively-Focused Expressive Writing	19
The Present Study	23
Hypotheses	24
CHAPTER 2: METHODS	26
Participants	26

	viii
Inclusion Criteria	27
Exclusion Criteria	27
Recruitment	27
Overview and Design	28
Description of the Experimental Conditions	30
Standard Expressive Writing Condition	30
Directed Expressive Writing Condition	31
Control Condition	32
Measures	32
Demographic Information	32
Stressfulness of Event	32
The Posttraumatic Growth Inventory	33
The Event Related Rumination Inventory	33
The Meaning in Life Questionnaire	33
The Core Beliefs Inventory	34
The Depression Anxiety Stress Scales	34
Human Subjects Concerns	35
Plan of Analysis	36
Hypotheses 1-4	36
Hypotheses 5 and 6	37
CHAPTER 3: RESULTS	38
Preliminary Analyses	38
Demographics	39

	ix
Hypothesis 1	41
Posttraumatic Growth	41
Psychological Distress	42
Hypothesis 2	42
Hypothesis 3	43
Intrusive Rumination	43
Deliberate Rumination	43
Hypothesis 4	44
Hypothesis 5	44
Hypothesis 6	45
CHAPTER 4: DISCUSSION	46
Hypothesis 1	47
Hypothesis 2	50
Hypothesis 3	51
Hypothesis 4	52
Hypotheses 5 and 6	53
Summary of Results	53
Limitations	54
Future Directions	56
REFERENCES	59
APPENDIX A: LIST OF QUALIFYING TRAUMATIC EXPERIENCES	65
APPENDIX B: INFORMED CONSENT STATEMENT	66
APPENDIX C: DEBRIEFING STATEMENT	68

	x
APPENDIX D: STUDY MEASURES	69
The Post Traumatic Growth Inventory	69
The Event Related Rumination Inventory	71
The Core Beliefs Inventory	73
The Depression Anxiety Stress Scales	74
The Meaning in Life Questionnaire	77
APPENDIX E: TABLES	78
Demographic Statistics	78
Descriptive Statistics and Zero-Order Correlations	79
Descriptive Statistics for Dependent Variables by Group	80
APPENDIX F: FIGURES	81
Cell Means of PTG	81
Cell Means of Psychological Distress	82
Cell Means of Intrusive Rumination	83
Cell Means of Deliberate Rumination	84
Cell Means of Found Meaning	85

CHAPTER 1: INTRODUCTION

According to the National Comorbidity Survey (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995), approximately 51% of women and 60% of men will experience at least one traumatic event in their lifetime. Traumatic events have long been associated with a number of physical and mental health consequences. For example, individuals who have lost a loved one in a car accident report higher rates of depression, divorce, physical illness, and work absence than those who have not experienced a similar trauma (Lehman, Wortman, & Williams, 1987). Survivors of the 2004 tsunami in Thailand evidenced significantly higher rates of depression, anxiety disorders, and posttraumatic stress disorder (PTSD) than the general population (Hussain, Weisaeth, & Heir, 2011). Finally, those who suffer from PTSD often experience one or more comorbid psychiatric diagnoses. The comorbidity rate of PTSD and substance abuse, for example, is extremely high at around 50% for men and 28% for women (Najavits, Weiss, & Shaw, 1997). Because the consequences of traumatic events are potentially severe, a great deal of research has been dedicated to understanding how PTSD develops and ways in which positive outcomes may be promoted.

Expressive Writing

One intervention which has shown a great deal of promise in ameliorating the negative consequences of trauma is expressive writing, or writing about one's deepest thoughts and emotions surrounding the traumatic experience. In the aftermath of trauma, it has been theorized that talking about a traumatic event with others can serve as a

catharsis (Rachman, 1980; Scheff, 1979), thus minimizing emotional suffering.

Additionally, it has been empirically documented that individuals who disclosed their traumatic experiences to others reported better health outcomes than those who did not (Pennebaker & Hoover, 1986). Pennebaker and Beall (1986) hypothesized that individuals may not necessarily need to disclose their experience to other people in order to reap the health benefits of disclosure. Rather, they believed that written disclosure, or expressive writing, may serve the same function. They first used this intervention with a group of college students who were asked to write about an extremely stressful or upsetting event they had experienced. Participants completed the expressive writing task for four consecutive days. The results indicated that, compared to control subjects who wrote about daily activities, participants in the expressive writing condition experienced short-term increases in negative affect and physiological arousal. However, these subjects also experienced long-term health benefits, such as fewer visits to the university health center and fewer days of school missed due to illness during the six months following the intervention (Pennebaker & Beall, 1986).

Physical Health Benefits

Since Pennebaker and Beall's (1986) initial study on expressive writing, the health benefits of this intervention have been replicated many times. Several meta-analyses have been conducted to review these findings. Smyth (1998) first performed such an analysis on thirteen studies which had been conducted with non-clinical populations of individuals who did not meet criteria for diagnosis of a psychological disorder. Expressive writing has often been used in non-clinical populations because, although their symptoms do not meet the threshold for a diagnosis, the physical and mental health outcomes of trauma

may still be highly distressing and interfere with daily functioning. The participants in each study had been randomly assigned to write about either a neutral (control) topic or the standard expressive writing topic. The results showed an average medium effect size ($d = .47$) across studies. Moreover, the effect size was largest for physiological outcomes ($d = .68$), including blood pressure, heart rate, and cholesterol levels (Smyth, 1998). Thus, this analysis found expressive writing to be most beneficial for markers of physiological functioning.

While much of the early research on expressive writing was conducted on undergraduate populations with unspecified trauma histories, research has since focused on the effects of writing in specific trauma populations. For example, among women with breast cancer, those who participated in an expressive writing intervention experienced fewer negative physical symptoms, as well as fewer cancer-related medical visits, than those in a control condition (Creswell et al., 2007; Stanton et al., 2002).

In a sample of veterans with PTSD, expressive writing has been found to be associated with decreased cortisol reactivity (Smyth, Hockemeyer, & Tulloch, 2008). That is, three months after participating in three expressive writing sessions, participants evidenced lower cortisol reactivity and faster recovery when asked to imagine the traumatic event than those in the control group. This indicates that expressive writing may facilitate a reduced stress response to re-exposure to the trauma (Smyth, Hockemeyer, & Tulloch, 2008). It has been well-documented that chronic stress and cortisol activation are associated with a number of negative health consequences, including depression, anxiety, and cardiovascular problems (Lehman, Taylor, Kiefe, &

Seeman, 2009). Therefore, the finding that expressive writing lowers cortisol reactivity has important implications for a host of health benefits.

In one of the largest meta-analyses of the expressive writing literature, Frattaroli (2006) found a small average effect size ($r = .06$) for physical health outcomes among 146 studies on expressive writing interventions. While this effect size seems small, it was still statistically significant, and the author noted that the effect size may have been deflated due to the inclusion of unpublished studies in the analysis. Moreover, time since the intervention was not found to be a moderator of physical health outcomes, indicating that the physical benefits of expressive writing are durable over time (Frattaroli, 2006).

Though the meta-analysis by Frattaroli (2006) found the physical benefits of expressive writing to be enduring, Sloan, Feinstein, and Marx (2009) criticized her work because the studies included in the analysis varied greatly in terms of methodology. For example, Frattaroli's (2006) meta-analysis included both studies which used clinical samples as well as those with and non-clinical samples. Additionally, the outcomes measures and time between the intervention and follow-up assessments varied widely among the studies. Therefore, in order to address the question of the durability of health benefits more directly, the authors conducted their own study of college freshman who were followed for a period of six months. The results of the study revealed no changes in physical health functioning at any time point. That is, regardless of intervention group, none of the participants in this study reported improved health outcomes. These results contradict those found in the majority of the literature. The authors acknowledge that their sample consisted of healthy young adults who reported surprisingly low levels of perceived stress and symptomatology. Therefore, it is possible that such a high-

functioning group of participants would have less to gain from such an intervention (Sloan et al., 2009).

Psychological Benefits

Individuals who participate in expressive writing have consistently reported better mental health outcomes than their control-group counterparts. These include lower levels of depressive symptomatology (Danoff-Burg, Mosher Seawell, & Agee, 2010), perceived stress (Danoff-Burg et al., 2010), anxiety (Frattaroli, 2006), and higher levels of positive emotions (Frattaroli, 2006; Smyth, 1998).

While the meta-analysis conducted by Smyth (1998) found the effect size of expressive writing interventions to be largest for physiological variables ($d = .68$), a medium effect size ($d = .66$) for psychological outcomes was also reported. Additionally, these two effect sizes were not significantly different from one another. The author found that participants who engaged in expressive writing fared better than their counterparts in symptoms of anxiety, positive and negative affect, intrusive thinking, and adjustment (Smyth, 1998). Frattaroli (2006) also found a significant small effect size ($r = .056$) for psychological health outcomes in a much larger meta-analysis of 146 studies. However, unlike the finding for physical health benefits, time since the intervention moderated the effect of expressive writing on psychological benefits, indicating that the positive outcomes in psychological health tended to wane over time (Frattaroli 2006). Sloan et al. (2009) also found that, while psychological symptoms in the expressive writing decreased at two-months follow-up, these gains were not maintained at the six-month assessment. The results of this study seem to indicate that the benefits of expressive writing are short-lived and present only for certain indicators of health (Sloan et

al.,2009). Despite these results, expressive writing has been shown to provide at least short-term symptom relief for individuals under a great deal of stress. When used consistently over longer periods of time, the benefits of expressive writing on psychological outcomes may be more durable.

Negative Outcomes

Whereas the majority of studies on expressive writing have shown this activity to be beneficial in helping people adjust to major life stressors or traumas, it is important to note that one recent study has found expressive writing to impede emotional adjustment. Sbarra, Boals, Mason, Larson, and Mehl (2013) assigned recently separated or divorced participants to either a control, standard expressive writing, or narrative expressive writing (NEW) condition. Those in the narrative group were asked to write a coherent story about the end of their relationship. They found that, at both 3-months and 9-months follow-up, those participants who were still actively engaged in the search for meaning reported significantly worse outcomes when assigned to either of the expressive writing conditions. Specifically, these participants reported greater symptoms of depression and higher levels of intrusive rumination than their counterparts (Sbarra et al., 2013).

While the results of this study seem to suggest that expressive writing is harmful for individuals who have not yet found meaning in their trauma, several methodological considerations must be made when interpreting these results. First, this is the only known study that focuses on relationship dissolution as the stressful event, and therefore the results may be unique to that population. Additionally, the procedure used by the authors differed from that of standard expressive writing procedures in that participants completed a stream-of-consciousness (task) prior to the writing exercise. In this task, they

were first asked to visualize their ex-partner for 30 seconds, and then to speak about whatever came to mind regarding the separation for four minutes. The authors' rationale for this technique was to utilize it as a "valid probe for assessing adults' psychological responses to marital separation" (p.3). However, it is possible that this task was upsetting to many participants, therefore dampening the benefits of expressive writing. Finally, the SOC transcript was used to code for meaning-making by two independent raters. That is, participants were never directly asked the extent to which they had found meaning in the break-up, but rather this was assessed indirectly on the basis of what they spoke about during the SOC task. It is possible that this is not a valid measure of meaning-making.

Mechanisms of Change

Narrative Structure

It has been suggested that expressive writing may help people form a more coherent narrative of the traumatic or stressful event, which may in turn facilitate positive outcomes. This assumption is in accordance with cognitive change theory, which asserts that when traumatic experiences are not stored into a coherent narrative of the event, they emerge as symptoms of PTSD such as re-experiencing and obsessive rumination (Smyth & Pennebaker, 1999; Smyth, Hockemeyer, & Tulloch, 2008). As such, when a coherent, meaningful narrative is formed, the symptoms will resolve. This assumption has been empirically tested in a study by Danoff-Burg, Mosher, Seawell, and Agee (2010), who analyzed expressive writing essays for narrative structure and found that participants who were better able to form a coherent narrative about their experience reported lower levels of depressive symptomatology and perceived stress at 1-month follow-up. It has been suggested that use of cognitive words in expressive writing is indicative of greater

narrative coherence. It has also been demonstrated that individuals who use more cognitive words in their writings report better physical and mental health outcomes (Klein & Boals, 2001; Pennebaker, Mayne, & Francis, 1997). Thus, expressive writing may allow individuals to create a more coherent narrative of their experience, which may be partially responsible for improved health outcomes.

Working Memory

Expressive writing has also been shown to increase working memory capacity in college students. Klein and Boals (2001) assessed participants' working memory prior to them engaging in the standard expressive writing activity about the stresses of coming to college. Students wrote for 20 minutes on three separate occasions over the course of two weeks. Six weeks later, participants who had engaged in expressive writing showed significantly greater increases in working memory capacity than those in the control group. Additionally, increases in working memory capacity were positively associated with a decrease in intrusive thinking about the stressful event. The authors hypothesize that expressive writing allows for the expression of intrusive thoughts, thus "clearing out" such thoughts to make room for more deliberate, productive thinking associated with increased working memory (Klein & Boals, 2001).

Cognitive Reappraisal

While emotional expression has long-been assumed to contribute to positive outcomes following trauma (Rachman, 1980; Scheff, 1979), Ullrich and Lutgendorf (2002) hypothesized that cognitive processing may also play an important role in explaining the health benefits of expressive writing. They tested this assumption by randomly assigning participants to a control, emotional expression, or combined

emotional expression and cognitive reappraisal group. Participants in the emotion-focused group were instructed to write only about their feelings regarding a highly stressful or traumatic experience. Participants in the combined group were also given these instructions, but were additionally directed to write about how they made sense of or dealt with the situation. All participants wrote for ten minutes twice a week, for four weeks. At the four-week follow-up, those who had been assigned to be combined emotional expression and cognitive reappraisal group reported the most improved outcomes. These included greater awareness of positive consequences of the event, fewer episodes of illness, and lower symptom severity when illness did occur (Ullrich & Lutgendorf, 2002). These results suggest that encouraging cognitive reappraisal of a stressful event may enhance the benefits of expressive writing.

Meaning-making

One type of cognitive reappraisal that has been found to be adaptive is meaning making (Park, 2010). Meaning has been defined as a “mental representation of possible relationships among things, events, and relationships. Thus, meaning “connects things” (Baumeister, 1991; p. 15), and the ability to make connections between a traumatic event and other aspects of one's life, such as relationships or subsequent events, may potentially enhance positive outcomes. In order to test this hypothesis, Boals (2012) examined the extent to which participants engaged in meaning-making processes when performing an expressive writing task. Participants wrote for three-20 minute sessions over the course of a week, and returned to the lab for follow-up assessments six weeks later. The expressive writing essays were rated by independent coders for their level of meaning-making engagement on a scale of 1 (no search for meaning) to 5 (active meaning-making

process). Essays were also qualitatively analyzed for cognitive word use, which was used as a second indicator of engagement in meaning-making. At follow-up, those participants who engaged in greater meaning-making, evidenced by judges' ratings, reported lower levels of intrusive thoughts. Moreover, these results were only present when participants wrote about a highly stressful event. For participants who wrote about less distressing events, meaning-making was not associated with positive outcomes (Boals, 2012). This, meaning-making may be one mechanism through which expressive writing promotes better outcomes in the aftermath of a highly stressful event.

Boals, Banks, Hathaway, and Shuettler (2011) found further evidence that expressive writing facilitates the meaning-making process in their study of undergraduates who wrote about a significant negative life event. Participants were instructed to either write a description of the negative event or to engage in expressive writing (i.e., writing about one's deepest thoughts and feelings about the event). The authors found that the essays of participants in the expressive writing group contained more themes of meaning-making than those in the descriptive writing group (Boals et al., 2011). Thus, it appears that expressive writing encourages individuals to think about themes of meaning in their experience.

Self-affirmation

Self-affirmation, or a positive reflection of the self on a valued domain, has been found to buffer physiological stress responses (Creswell, Welch, Taylor, Sherman, Gruenewald, & Mann, 2005). Therefore, Creswell et al. (2007) conducted a study to examine the role of self-affirmation in expressive writing. In this study, participants with breast cancer wrote about their experiences four times over the course of three weeks.

Their essays were then coded for self-affirming statements, as well as statements about meaning-making and cognitive processing. At three months follow-up, self-affirmation fully mediated the effect of expressive writing on reduced physical health symptoms and fewer cancer-related medical visits. The results indicated that cognitive processing and meaning-making were not significant mediators of this effect (Creswell et al., 2007). In this case, statements of self-affirmation explained the influence of expressive writing on health.

Methodological Variations

Since expressive writing was first developed as an intervention in the 1980's, researchers have manipulated the standard expressive writing paradigm in search of optimal health benefits. These experiments have varied greatly in terms of number and spacing between writing sessions, as well as what participants have been instructed to write about.

Expressive Writing Instructions

In their first study using expressive writing, Pennebaker and Beall (1986) assigned participants to four different writing conditions: 1) trauma-factual information only; 2) trauma-emotional information only; 3) trauma-combined factual and emotional information; and 4) control group. Those in the control group wrote about non-trauma related topics, such as a description of a room in their homes. The results of this study showed that participants in the trauma-combined group, who wrote both factual information about the trauma and their associated feelings, experienced the greatest health benefits (Pennebaker & Beall, 1986). Based on these findings, a standard

expressive writing paradigm has been adopted in which participants are encouraged to write about the event, as well as their deepest thoughts and feelings surrounding it.

There is evidence to suggest that altering expressive writing instructions can be used to target specific outcomes. One study (Danoff-Burg et al., 2010) attempted to facilitate greater narrative structure by instructing participants to write a complete story of the traumatic event, including its antecedents, the actual event, and its consequences. The authors then compared the content of these essays to those of participants in either a standard expressive writing group or a control condition. The results indicated that the narrative-directed writing instructions were successful in facilitating greater narrative structure as compared to the other two study conditions. However, both writing conditions reported equally improved physical and mental health outcomes compared to the control group (Danoff-Burg et al., 2010). Thus, the narrative-directed writing instructions were able to facilitate greater narrative coherence, but not better health outcomes, than the standard instructions.

Additionally, numerous studies have altered the standard expressive writing instructions to encourage individuals to consider the positive consequences of their highly stressful or traumatic experience (Lewandowski, 2009; Lichtenthal & Cruess, 2010; Low, Stanton, & Danoff-Burg, 2006; Lu & Stanton, 2010; Ullrich & Lutgendorf, 2002). A more detailed review of these studies is provided later in this paper (see Expressive Writing and Posttraumatic Growth).

Number of Writing Sessions

A second major methodological variation in the expressive writing literature is the number of writing sessions that participants engage in. Pennebaker and Beall (1986)

originally had their participants engage in writing sessions once a day for four consecutive days. Since then, studies have varied widely from utilizing only a single writing session (Boals et al., 2011; Slavin-Spenny et al., 2011) to eight writing sessions over the course of four weeks (Ullrich & Lutgendorf, 2002). However, of the studies reviewed in this paper, the most common number of writing sessions was three (Klein & Boals, 2001; Lewandowski, 2009; Lichtenthal & Cruess, 2010; Low, et al., 2006; Lu & Stanton, 2010; Sloan, Feinstein, & Marx, 2009). In a recent book chapter, Pennebaker and Chung (2011) recommended that a minimum of three sessions be utilized in order to maximize the benefits of expressive writing.

Length of Writing Sessions

Finally, there has been some variability in how long participants engage in the writing activity. In a meta-analysis of 13 expressive writing studies, Smyth (1998) found no effect of length of writing session on physical and mental health outcomes. The range of session length in Smyth's study was between 15 and 30 minutes. In a later meta-analysis which included studies that used a wider range of session length, Frattaroli (2006) found that sessions which lasted for 15 minutes or longer tended to yield greater health benefits than those which lasted for less than 15 minutes. However, Burton and King (2008) found a significant positive effect of expressive writing on physical health outcomes after participants wrote for just two minutes a day for two consecutive days. Thus, it appears that even a small dose of expressive writing may be enough to yield improved outcomes.

Posttraumatic Growth

In addition to the negative consequences of trauma, some individuals report positive experiences in the aftermath of their experience. This phenomenon, called posttraumatic growth (PTG), refers to the experience of a positive change in one or more domains of one's life as the result of the struggle with a traumatic event (Tedeschi & Calhoun, 1996). The phenomenon of PTG is not new, and indeed is a concept that can be found in ancient literature. For example, themes of growth can be found in most of the major world religions, including Judaism, Christianity, Buddhism, and Islam (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 2004). However, posttraumatic growth has only recently become the subject of systematic empirical investigation.

Researchers have identified five main domains in which growth is likely to occur: relating to others, personal strength, new possibilities, greater appreciation of life, and spiritual change (Morris, Shakespeare-Finch, Rieck, & Newbery, 2005; Tedeschi & Calhoun, 1996). The domain of relating to others refers to a sense of improvement or deepening of one's interpersonal relationships. Individuals who report a positive change in the domain of personal strength often report that, before the event, they were unaware of their own strength and capabilities. Moreover, individuals may endorse feeling more capable of handling future traumatic, challenging, or otherwise stressful experiences. The domain of new possibilities refers to new interests or opportunities that arise from the struggle with a traumatic event. Greater appreciation for life arises when individuals experience a positive change in priorities or an increased recognition of the value of life. Finally, some individuals may experience a strengthening of spiritual beliefs or a greater understanding of one's own spirituality (Tedeschi & Calhoun, 1996).

Just as trauma has been associated with numerous negative consequences, PTG has been linked to many health benefits. For example, in a sample of women who had been diagnosed with breast cancer at least five years earlier, PTG was positively associated with self-reported happiness, vitality, and overall mental well-being (Lelorain, Bonnaud-Antignac, & Florin, 2010). A meta-analysis of the PTG literature also found growth to be negatively associated with symptoms of depression, as well as positively associated with overall levels of well-being (Hegelson, Reynolds, & Tomich, 2006). Among individuals with HIV, individuals who report higher levels of PTG were also more likely to have lower viral loads and higher CD4 T-cell counts, which are indicators of lower levels of the HIV virus in the body and improved immune functioning. These individuals were also more likely to engage in positive health behaviors such as adherence to antiretroviral medication regimens, drinking less alcohol, and eating a more healthy diet. Thus, in this sample PTG was associated with both biological and behavioral markers of improved health (Milam, 2004). Finally, among cardiac patients, those who reported higher levels of growth were less likely to experience a second cardiac event than their counterparts who did not report growth (Affleck, Tennen, Croog, & Levine, 1987).

Several variables have been found to be associated with posttraumatic growth. One such important factor is disruption to core beliefs. According to Janoff-Bulman (1992), people generally assume that the world is a fair and good place. However, in the face a traumatic event many people subsequently experience a challenge to their assumptive worlds, or to the core beliefs that an individual holds about oneself and the external world. According to PTG theory, this disruption to one's core beliefs is necessary

in order for growth to occur; that is, distress creates a need to examine and rebuild the core beliefs that were disrupted, during which opportunities for growth may be recognized or realized (Calhoun & Tedeschi, 1999). It has been empirically demonstrated, in a sample of both college undergraduates and leukemia patients, that those who experienced a higher level of challenge to core beliefs also tended to report higher levels of PTG (Cann, et al., 2010).

Following this disruption to the assumptive world, many individuals may struggle to understand, make sense of, or find meaning in what has happened. This struggle may lead to rumination, or repetitive thinking about the event. PTG researchers have hypothesized that a certain degree of rumination or cognitive processing about the event is also a prerequisite for the development of growth. Specifically, without thinking about the event, growth cannot occur, as an individual cannot come to recognize positive life changes as the result of the event without first considering what those may be (Tedeschi & Calhoun, 2004; Calhoun, Cann, & Tedeschi, 2010). However, the literature makes a distinction between two types of rumination; intrusive and deliberate. Intrusive rumination refers to unwanted thoughts about the event which individuals typically find difficult to control. This type of rumination has been associated with negative outcomes, including symptoms of PTSD. Deliberate rumination, on the other hand, is intentional, and occurs when individuals make a conscious attempt to think about and make sense of the event. It is this type of rumination which has been shown to be positively associated with growth (Cann, Calhoun, Tedeschi, Triplett, Vishnevsky, & Lindstrom, 2011; Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2012).

Finally, many individuals search for meaning in the aftermath of a traumatic event. In a sample of cancer patients, it has been demonstrated that those who were able to find meaning in their disease were more likely to experience higher levels of PTG (Park, Edmondson, Fenster, & Blank, 2008). Groleau, Calhoun, Cann, and Tedeschi (2012) also found higher levels of found meaning to be positively associated with growth, while those who were still engaged in the process of searching for meaning endorsed greater symptoms of distress.

Expressive Writing and Posttraumatic Growth

As mentioned previously, expressive writing has been associated with numerous health benefits (Creswell et al., 2007; Danoff-Burg et al., 2010; Danoff-Burg et al., 2010; Frattaroli, 2006; Lehman et al., 2009; Pennebaker & Beall, 1986; Smyth, 1998; Smyth et al., 2008; Stanton et al., 2002). As such, it may reasonably be assumed that expressive writing may also lead to posttraumatic growth. Recently, this assumption has been empirically investigated, and indeed a positive association between expressive writing and PTG has been documented.

Smyth et al. (2008) found a positive association between traditional expressive writing and PTG in their study of participants with PTSD. At the 3-month follow-up assessment, participants who had participated in three consecutive days of expressive writing reported higher overall levels of PTG than those in the control condition. When the authors examined each of the five domains of growth, they found expressive writing to be associated with higher levels of growth in the domains of personal strength, new possibilities, and appreciation of life. No differences in the domains of spiritual growth or relating to others were found (Smyth et al., 2008).

In another study, Slavin-Spenny, Cohen, Oberleitner, and Lumley (2011) investigated the influence of different types of self-disclosure on PTG. One group of participants engaged in traditional expressive writing as a means of written disclosure, while two other groups engaged in spoken self-disclosure to either an active or passive listener. All groups were provided with the same instructions, which are almost identical to those used in traditional expressive writing: to write (or speak) about both thoughts and feelings about the event, and to be as open as possible, even if they felt reluctant to do so. The authors found that all participants who engaged in one 30-minute session of self-disclosure, regardless of whether it was written or spoken, reported higher levels of PTG at 6-weeks follow-up than those in the control condition. All groups, including the control group, improved in terms of stress symptoms such as intrusive rumination, avoidance, and physical symptoms. The authors conclude that any form of self-disclosure may be effective in facilitating PTG, but that this effect is unrelated to a reduction in symptoms of stress (Slavin-Spenny et al., 2011).

Ullrich and Lutgendorf (2002) also investigated the effect of expressive writing on PTG in their study of college students who had experienced a traumatic or highly stressful event which was a continual source of distress. The authors used two different expressive writing paradigms. In the emotional expression group, participants were given the standard expressive writing instructions to write about their deepest thoughts and feelings surrounding the event. In the second writing group, participants were given the standard instructions, plus cognitive processing instructions which encouraged them to consider how they dealt with and made sense of the event. Participants wrote for ten minutes twice weekly for four weeks. The results showed that participants who wrote

about both emotional expression and cognitive processing reported greater increases in PTG from baseline than those in the standard or control groups (Ullrich & Lutgendorf, 2002). This finding indicates that writing about one's thoughts and feelings about a trauma, as well as how one coped with and made sense of what happened, may promote optimal levels of posttraumatic growth.

Finally, a recent study by Stockton, Joseph, and Hunt (2014) found that participants who participated in the standard expressive writing exercise reported higher levels of posttraumatic growth at follow-up than the control group, who wrote about their daily routine. In this internet-based study participants wrote for 15 minutes on three separate occasions spaced three days apart. At the follow-up assessment eight weeks later those who had written about their thoughts and feelings about a traumatic experience reported a significant increase in PTG. The control group, on the other hand, were asked to write about daily activities and to avoid including feelings and opinions in the narrative. This group did not report an increase in PTG over time (Stockton et al., 2014). This study provides further evidence that emotional disclosure about traumatic experiences helps to promote posttraumatic growth.

Positively-Focused Expressive Writing

While some studies have examined the association between expressive writing and PTG, others have explicitly instructed participants to focus on the positive aspects of their trauma. For example, in a sample of adults with an autoimmune disorder such as lupus or rheumatoid arthritis, Danoff-Burg, Agee, Romanoff, Kremer, and Strosberg (2006) asked some participants to write about the positive aspects of their illness. This study also included a control group and a standard expressive writing group, and

participants wrote for four 20-minute sessions over a three-week period. A significant reduction in fatigue and pain was found in both the standard expressive writing groups at three-months follow-up. These changes were not seen at the one-month follow-up assessment. No significant group effects were found for psychological variables of depression and positive mood (Danoff-Burg et al., 2006). These results suggest that benefit-focused expressive writing may be as effective as standard expressive writing for physical symptoms.

Low, Stanton and Danoff-Burg (2006) asked women who had been diagnosed with breast cancer to write about their positive thoughts and feelings about their experience with the illness. The results of this study showed that women in the positive thoughts and emotions group did indeed write more about the positive aspects of their illness than those in the standard expressive writing or control conditions. Moreover, use of positive words in the essays was associated with improved health outcomes, including better self-reported mood and quicker heart rate recovery (Low et al., 2006). While PTG was not directly measured in this study, the results indicate that instructing participants to focus on the positive aspects of their experience may enhance positive outcomes.

The results of Low et al.'s (2006) study were recently replicated by Jaeger, Lindblom, Parker-Gilbert, and Zoellner (2014). While the participants in this study did not ask participants to write about positive consequences of trauma, they did examine the content of trauma narratives written by 35 individuals who had been diagnosed with PTSD. They found that those who used more positively-valenced emotion words in their essays also reported lower PTSD symptomatology, while negatively-valenced emotion word use was associated with higher symptomatology. On the other hand the structural

components of the narratives, such as disorganization and sentence fragments, were not related to symptoms. The authors conclude that the content of trauma narratives reflects how individuals are able to emotionally process the traumatic event (Jaeger et al., 2014).

Lu and Stanton (2010) also investigated the impact of asking participants to write about positive consequences of trauma. The authors assigned participants to either a standard expressive writing or a cognitive reappraisal condition. They defined cognitive reappraisal as "a positive change in the evaluation of stressors and/or the self" (p. 670), which is very similar to the definition of PTG. Participants in the cognitive reappraisal group were instructed to write about both positive and negative consequences of the event, as well as the positive ways in which they coped with it. The authors also included a combined group in which participants were instructed to write about both emotional disclosure and cognitive reappraisal. The results showed that participants in the combined group experienced the most benefits from the activity, including fewer physical symptoms, greater emotional expression, and decreased negative affect (Lu & Stanton, 2010). These results replicate those found by Ullrich and Lutgendorf (2002).

Lewandowski (2009) investigated the effect of expressive writing on emotions in the aftermath of the dissolution of a romantic relationship. Participants were assigned to write about either positive or negative thoughts and feelings about the experience or a control condition which wrote about a neutral topic. They wrote for 20 minutes a day on three consecutive days, and returned to the laboratory for a post-test assessment about two days following the last writing condition. At follow-up, the three groups did not significantly differ in levels of negative emotions. However, those in the positive-focused

writing group showed greater increases in positive emotions from baseline than those in the negative-focused or control groups (Lewandowski, 2009).

One study (Creswell et al., 2007) found that, among breast cancer patients, writing about positive thoughts and feelings about their illness was associated with fewer physical symptoms and cancer-related medical visits at three-months follow-up. However, these results were not significantly different than those of participants who participated in the standard expressive writing activity. Thus, any type of expressive writing, regardless of the instructions, was related to improved health outcomes (Creswell et al., 2007).

Finally, Lichtenthal and Cruess (2010) investigated the effects of a directed expressive writing paradigm on undergraduate students who had recently experienced a significant interpersonal loss. Participants were randomly assigned to either a standard, meaning-making, or benefit-finding expressive writing condition. They completed three 20-minute writing sessions over the course of one week and completed follow-up measures three months later. While participants in all three writing groups reported improved physical and mental health symptoms at follow-up, those in the benefit-finding group, who were instructed to consider the positive life changes that had happened as a result of the loss, improved the most (Lichtenthal & Cruess, 2010).

The results of the aforementioned studies (Lewandowski, 2009; Lichtenthal & Cruess, 2010; Low et al., 2006; Lu & Stanton, 2010; Ullrich & Lutgendorf, 2002) indicate that, with one exception (Creswell et al., 2007), explicitly directing participants to consider the positive aspects of their trauma enhances positive outcomes. However, no study to date has attempted to facilitate posttraumatic growth through such positive

writing instructions. Specifically, individuals have never been asked to write about the positive life changes they have experienced as a consequence of trauma.

The Present Study

The present study utilized an expressive writing paradigm that was hypothesized to facilitate posttraumatic growth. As previously mentioned, several mechanisms have been proposed through which expressive writing promotes improved health outcomes, including cognitive reappraisal of the event (Ullrich & Lutgendorf, 2002) and meaning-making (Boals, 2012; Boals et al., 2011). Additionally, expressive writing has been associated with lower levels of intrusive rumination (Klein & Boals 2001). All of these processes have also been shown to be important factors in the development of posttraumatic growth. For example, lower levels of intrusive rumination and higher levels of productive rumination have been associated with higher levels of PTG (Cann et al., 2011; Groleau et al., 2012; Triplett et al., 2012). Individuals who have been able to find meaning in their experience have also reported higher levels of growth (Groleau et al., 2012; Park et al., 2008). Because the processes through which expressive writing promotes improved health are so closely related to those associated with the development of posttraumatic growth, it can be reasonably assumed that expressive writing may facilitate PTG. That is, expressive writing may allow for the expression of intrusive thoughts, causing them to be less dominant. This may, in turn, facilitate the development of deliberate rumination, allowing the individual to consider more positive consequences of their highly stressful experience. Additionally, increased deliberate rumination may allow for the re-building of one's assumptive world as well as finding meaning in the event.

An association between expressive writing and PTG has been previously documented (Slavin-Spenney et al., 2011; Smyth, Hockemeyer, & Tulloch, 2008; Ullrich & Lutgendorf, 2002). Moreover, it has been demonstrated that asking participants to write about the positive aspects of their experience enhances positive outcomes (Lewandowski, 2009; Lichtenthal & Cruess, 2010; Low et al., 2006; Lu & Stanton, 2010; Ullrich & Lutgendorf, 2002). However, no study to date has investigated the possible mediators of the association between expressive writing and PTG. As such, the present study fills a gap in the literature by investigating the mechanisms through which expressive writing facilitates growth.

Hypotheses

1. Individuals who engage in expressive writing will report improved outcomes, including lower reported levels of perceived stress, depression, and anxiety, and higher levels of posttraumatic growth than those in the control condition.
2. Individuals in the directed expressive writing condition, who are explicitly instructed to write about the *positive consequences* of their traumatic experience, will report the highest levels of posttraumatic growth.
3. Levels of intrusive rumination will decrease in both the standard and expressive writing conditions, while levels of deliberate rumination will increase in both the standard and expressive writing conditions.
4. Participants in the directed expressive writing condition will report the greatest changes in both intrusive and deliberate rumination. That is, it is expected that participants in this group will experience the greatest reduction in intrusive rumination and the greatest increase in deliberate rumination.

5. The relationship between both standard and directed expressive writing and posttraumatic growth will be partially mediated by rumination. That is, it is expected that expressive writing will facilitate higher levels of deliberate rumination and lower levels of intrusive rumination, thus promoting higher levels of PTG.
6. The relationship between both standard and directed expressive writing and posttraumatic growth will be partially mediated. It is expected that expressive writing will facilitate higher levels of found meaning, this promoting higher levels of PTG.

CHAPTER 2: METHODS

Participants

Participants in this study ($N = 79$) consisted of undergraduate and graduate students at the University of North Carolina at Charlotte. Sixty-three women and eighteen men completed the study, and participants ranged in age from 18 to 55 years (see Table 1). Another 23 participants (18 women, 5 men) began the study but terminated their participation before completing all parts of the study.

The use of college students in research has sometimes been criticized as not being representative of the larger population, and that therefore the results of such studies may not be generalizable. However, there is evidence to suggest that the prevalence of trauma in college students is high. Read, Ouimette, White, Colder, and Farrow (2011) found that 66% of college students had experienced at least one traumatic event, and nearly 9% met criteria for a diagnosis of posttraumatic stress disorder (PTSD). The American Psychiatric Association (APA) estimates that approximately 51% of women and 60% of men will experience at least one traumatic event in their lifetime. They report the lifetime prevalence of PTSD to be about 8% (APA, 2000). Therefore, the rates of traumatic exposure and PTSD among college students are similar to those found in the larger population, thus making college students a suitable sample population for this study.

Inclusion Criteria

Participants must have been at least 18 years of age and indicated that they had experienced one or more traumatic events from a commonly-used list of traumas.

Examples of qualifying events include sexual assault, being diagnosed with a potentially life-threatening illness, witnessing a violent crime, etc. (see Appendix A). Finally, the event must have occurred within the past two years. The rationale behind this criterion was that the event must have occurred recently enough that it was still salient, increasing the likelihood that participants could accurately recall and answer questions about their experience.

Exclusion Criteria

Prior to beginning study procedures, participants were asked to rate the stressfulness of their stressful or traumatic experience on a scale of 1 (not at all stressful) to 7 (extremely stressful). Individuals who rate their experience as less than a 4 on this 7-point scale of stressfulness were excluded from participation.

Recruitment

Recruitment and data collection of this study began in January 2014 and concluded in November 2014, and several recruitment strategies were employed. The majority of participants were recruited through the online Sona research system (Sona Systems, 2015) at UNC Charlotte. This software system allows undergraduate students to identify research studies in which they may participate in order to fulfill course requirements. This study was also advertised through a weekly newsletter sent out to graduate students and faculty by the Center for Graduate Life. The principal investigator also recruited participants through attending several psychology classes and explaining

the study to students. An additional incentive for participation was that all individuals who completed the study were provided with a \$10 Target gift card. Finally, flyers were posted on the UNC Charlotte campus which advertised the study. The flyer that was used was approved by the UNC Charlotte Institutional Review Board prior to being posted.

Once all study procedures were completed, including the one-month follow-up assessment, participants were awarded six research credits in the SONA system as well as a \$10 Target gift card. Those who did not complete the entire study were granted 0.5 research credits for each part that they did complete. For example, a participant who completed all three writing sessions but failed to complete the follow-up assessment was granted 1.5 research credits. Finally, everyone who completed the entire study was given a \$10 Target gift card.

Overview and Design

This study was conducted entirely online using Qualtrics software (Qualtrics, 2014). Qualtrics software allows for a wide variety of online data collection. Once participants were deemed eligible for the study based on the inclusion/exclusion criteria, they were randomly assigned to one of the three experimental conditions using a random number generator (random.org) and assigned a 3-digit study identification code. Participants were then sent an email which contained their 3-digit identification code, as well as a link to the Qualtrics study website. They were asked to enter their 3-digit code immediately upon entering the Qualtrics server, which allowed for the principal investigator to keep track of participant responses while also maintaining confidentiality. These codes, along with participant identifying information (first name and last initial only) were kept separate from all study data in a locked file cabinet. Once their ID code

was entered, participants were then able to complete all study measures through the Qualtrics server.

Prior to all study procedures, participants were provided with informed consent about study procedures (see Appendix B). They were told that the purpose of the study was "to learn more about how people adjust to extremely stressful events", as adapted from the method used by Low, Stanton, and Danoff-Burg (2006). Participants were also told that they would be able to discontinue participation at any point in time without consequence. Finally, participants were provided with contact information for the University Counseling Center and encouraged to contact the center should they become distressed at any point during the study.

Once consent was obtained, baseline assessments were then administered, which consisted of the following: stressfulness of event, posttraumatic growth, event-related rumination, meaning-making, depression, anxiety, and perceived stress (see Measures section). These measures were administered in random order to control for order effects, which is a function of the Qualtrics software. Immediately following the baseline assessments, participants engaged in their first writing session. Depending on which study group they had been assigned to, participants were instructed to write about their daily events, all thoughts and feelings about the traumatic experience, or positive thoughts, feelings, and consequences of the traumatic experience. They were instructed to write for fifteen full minutes. The Qualtrics software was set to not allow participants to submit their writing responses until at least 15 minutes had passed, therefore increasing the likelihood that participants would continue to think about and write their responses during that time.

Participants then repeated the writing activity through the Qualtrics server two more times over the course of the following week, for a total of three 15-minute writing sessions within the first seven days of the study. The link for these two writing sessions was again emailed to participants the day after they completed the baseline assessments and first writing session. The principal investigator sent up to three reminder emails to participants over the course of the next seven days in order to increase participation and minimize attrition. Follow-up assessments, which were identical to the baseline assessments with the exception of stressfulness of event, were administered four weeks after the third writing session. Participants were given a seven day window within which to complete the follow-up assessments, with up to two reminder emails being sent during that time. Therefore, all follow-up measures were completed between four and five weeks after the last writing session. Participants who did not complete the follow-up measures within this time frame were excluded from analysis.

Upon completion of the study, participants were debriefed (see Appendix C). While the full hypotheses of the study were not disclosed, participants were told that the purpose of the study was to "determine how writing about one's experiences may influence adjustment to trauma." Contact information for the principal investigator was also provided should participants have any additional questions.

Description of the Experimental Conditions

1. Standard Expressive Writing (SEW). Participants in this condition were provided with the standard expressive writing instructions as follows:

"You previously indicated that you have experienced an extremely stressful event within the past two years. For the next 15 minutes, I would like you to write about your

deepest thoughts and feelings about that event. In your writing, I would like you to really let go and write about your very deepest emotions and thoughts. Everything that you write will be kept completely confidential, so please do not hold back. Don't worry about spelling or grammar in your writing. Please do your best to write for the entire 15 minutes."

These instructions have been adapted from those used by Pennebaker and Beall (1986).

2. Directed Expressive Writing (DEW). In this condition, participants were asked to write about the positive consequences of their trauma. As previously noted, several studies have been conducted in which participants were directed to write positively (Creswell et al., 2007; Lewandowski, 2009; Low, Stanton, & Danoff-Burg, 2006; Lu & Stanton, 2010). While some authors (Low, Stanton, & Danoff-Burg, 2006; Lu & Stanton, 2010) asked participants to focus on both positive and negative thoughts and feelings others (Creswell et al., 2007; Lewandowski, 2009) instructed them to focus only on the positive aspects of their experience. Both types of instructions have been found to yield positive health outcomes. As the purpose of this study is to enhance positive outcomes, participants were asked to consider only positive ways in which they have changed as a result of their trauma. Participants were provided with the following instructions:

"You previously indicated that you have experienced an extremely stressful event within the past two years. For the next 15 minutes, I would like you to write about your deepest thoughts and feelings about that event. In particular, I would like you to focus on the positive ways that you, or some aspect of your life, has changed as a result of dealing with this experience. Please try to really let go and write down everything that comes to

mind about ways in which you have changed for the better. Everything that you write will be kept completely confidential, so please do not hold back. Don't worry about spelling or grammar in your writing. Please do your best to write for the entire 15 minutes."

3. Control Condition. Participants in the control condition were asked to write about the trivial topic of daily activities and events. They received the following instructions:

"For the next 15 minutes, I would like you to write as about the events of your day, including what you have done since you got up this morning and what you plan to do after you finish writing. Please write as objectively as possible. In other words, simply write about the events, and not your thoughts or feelings about them. Please do your best to write for the entire 15 minutes."

Measures

The following measures were administered to all participants before the expressive writing exercise (baseline) and at four-weeks follow-up. The exceptions to this are demographic information and stressfulness of event, which were only collected at baseline. See Appendix D for complete copies of all measures.

Demographic Information. Participants provided basic demographic information including age, gender, race, and religious affiliation.

Stressfulness of Event. Participants were asked to rate the level of stress they experienced at the time of the event on a Likert scale ranging from 1 ("not stressful at all") to 7 ("extremely stressful"). Those who rated the event as less than 4 on this 7-point scale of stressfulness were excluded from analysis.

The Posttraumatic Growth Inventory. The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) is a 21-item self-report inventory which assesses the extent to which individuals have experienced a positive life change as a result of the struggle with a traumatic experience. The inventory provides an assessment of growth in each of the five domains discussed previously, although a total score is most frequently reported. Items are rated on a 6-point scale ranging from 0 ("I did not experience this change as a result of the event") to 5 ("I experienced this change to a very great degree as a result of the event"). The PTGI has good internal consistency (Cronbach's $\alpha = .90$) and test-retest reliability of .71 over a period of two months between assessments (Tedeschi & Calhoun, 1996).

The Event Related Rumination Inventory. The ERRI (Cann et al., 2011) is a 20-item measure which assesses the extent to which individuals engage in repetitive thinking about a highly stressful or traumatic event. Ten items of the scale assess intrusive rumination, while the other ten items measure deliberate rumination about the event. Items are rated on a 4-point scale ranging from 0 ("Not at all") to 3 ("Often"). The authors of the scale report good internal reliability for both intrusive (Cronbach's $\alpha = .94$) and deliberate (Cronbach's $\alpha = .88$) rumination items (Cann et al., 2011).

The Meaning in Life Questionnaire. The MiLQ (Steger, Frazier, Oishi, & Kaler, 2006) is a 10-item questionnaire designed to assess two dimensions of meaning. The Presence of Meaning dimension (MiLQ-P) contains 5 items which measure the degree to which respondents feel that they have achieved meaning in life. The other five questions comprise the Search for Meaning dimension (MiLQ-S), which assesses the extent to which an individual is continuing to attempt to understand the meaning of one's life.

Items are rated of a 7-point scale ranging from 1 ("Absolutely untrue) to 7 ("Absolutely true"). Scores on each subscale are reported as means. The authors of the scale report good internal reliability for both subscales (MiLQ-P $\alpha = .86$; MiLQ-S $\alpha = .87$). In addition, the scale shows good convergent and discriminant validity (Steger et al., 2006).

The Core Beliefs Inventory. The CBI (Cann, Calhoun, Tedeschi, Kilmer, et al., 2010) is a 9-item inventory which assesses the extent to which one's assumptive world is disrupted as the result of a highly stressful experience. This includes beliefs about oneself, others, and the world. Items are rated on a scale from 0 (not at all) to 5 (to a very great degree). Scores are reported as means on the 6-point scale. This inventory has shown good internal reliability (Cronbach's $\alpha = .82$) and test-retest reliability ($r = .69$).

The Depression Anxiety Stress Scales. The DASS (Lovibond & Lovibond, 1995a) is a 42-item scale which assesses negative affect and stress. It contains three subscales which measure symptoms of depression, anxiety, and perceived stress, each of which contains fourteen items. Investigations of the psychometric properties of the DASS have reported excellent internal consistencies of .97 for depression, .92 for anxiety, and .95 for stress (Antony, Bieling, Cox, Enns, & Swinson, 1998). Additionally, Lovibond and Lovibond (1995b) found the DASS to have better discriminant validity than the frequently-used Beck Depression Inventory (BDI; Beck & Steer, 1987) and Beck Anxiety Inventory (BAI; Beck & Steer, 1990). Thus, the DASS has been found to be a valid measure of depression, anxiety, and stress.

Human Subjects Concerns

The risks associated with participating in this study were minimal. The greatest risk was that of the potential for increased emotional distress due to writing about a traumatic experience. However, none of the studies on expressive writing that have been reviewed for the purpose of this study noted problematic levels of distress due to being asked to recall a significantly stressful event. Nevertheless, several precautions were taken to minimize the possibility of heightened distress. First, all participants were fully consented before study procedures began (see Appendix B). Participants were made aware that they could terminate participation in the study at any time, and would not be penalized for doing so. Finally, participants were provided with information about the university counseling services in both the informed consent and debriefing statements (see Appendices B and C). Participants were encouraged to utilize these services should they experience distressing emotions as a result of participation in this study.

Another risk of this study was that of confidentiality. Again, precautions were taken to maintain participant confidentiality. First, participants were provided with a 3-digit identification code that they entered at every study session. Therefore, participants' names and other potentially identifying information were never entered into the online Qualtrics system, and thus, not linked to any personal information about the traumatic experience. The principal investigator was the only person who had access to the participant code key, which was kept separate from all study data. Finally, upon completion of data collection the participant code key was destroyed. As such, participant confidentiality was maintained throughout the study.

Plan of Analysis

This study utilized a mixed-methods approach consisting of both quantitative and qualitative methods. However, all of the hypotheses concerned quantitative data, which were analyzed using the Statistical Package for the Social Sciences (SPSS) version 21.0 (IBM Corp., 2012). A significance level of $p = .05$ was used for all analyses. Prior to collecting data, a power analysis was conducted to determine the sample size. Using G*Power 3 statistical software (Faul, Erdfelder, Lang, & Buchner, 2007), it was determined that a total sample size of 120 participants would be required for a power of .80, using mixed design analyses of variance (ANOVA).

Preliminary analyses were conducted prior to main analyses of each of the six hypotheses. Dependent variables were checked for normality using The Kolmogorov-Smirnov statistic and z-scores. Independent samples t-tests were used to compare mean scores between those who completed the study and those who did not, in order to determine if there were any significant between-group differences in any of the major study variables. Finally, a one-way between groups analysis of variance (ANOVA) was conducted to test for baseline group differences in the dependent variables for the three study groups.

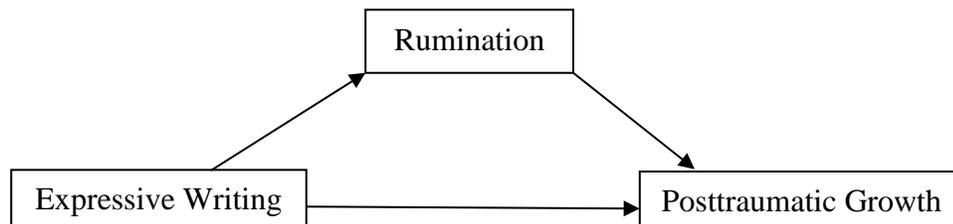
Hypotheses 1-4

The first four study hypotheses predicted that there would be significant group differences in the dependent variables (posttraumatic growth, psychological distress, intrusive rumination, and deliberate rumination) at the follow-up assessment, controlling for baseline levels of each variable. To test these assumptions, separate repeated-measures mixed design analyses of variance (ANOVA) were conducted.

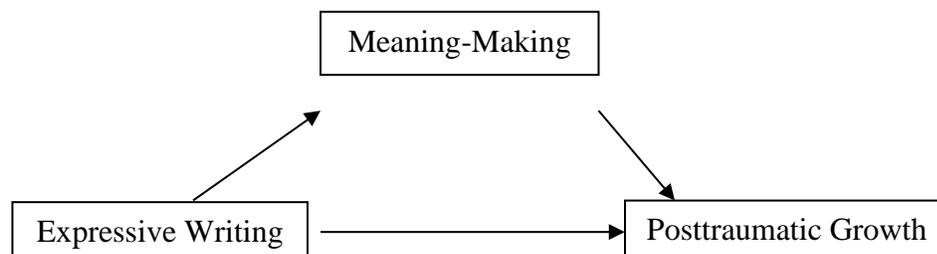
Hypotheses 5 and 6

The fifth and sixth hypotheses predicted that the relationship between expressive writing and PTG would be partially mediated by rumination and meaning-making, respectively. To test these hypotheses, two separate hierarchical multiple regression analyses to test for mediation were planned, as outlined by Baron and Kenny (1986). The following models were tested:

1)



2)



CHAPTER 3: RESULTS

Preliminary Analyses

Prior to conducting the main analyses, preliminary analyses were used to check for errors in the data set. First, histograms and boxplots for all dependent variables were created to check for potential outliers. Two of the participants' scores were found to be outliers on three or more dependent variables. One of these cases was found to have completed both the baseline and follow-up measures in a very short amount of time, indicating potential random responding. The other took an unusually long amount of time to complete both the baseline and follow-up measures, which could indicate inattention or distraction. Therefore, both cases were excluded from analyses.

Next, all dependent variables were checked for normality. The Kolmogorov-Smirnov statistic was used for this test. The majority of the dependent variables yielded significant Kolmogorov-Smirnov values ($p < .05$), indicating violations of normality. Therefore, z-tests were performed using skewness values and standard errors of skewness. Z-scores for all of the dependent variables were less than 5, which suggest that the data are reasonably normal. Moreover, the ANOVAs used in the main analyses are assumed to be robust to a moderate departure from normality (Kim, 2013). As such, the distributions of scores on all dependent variables are assumed to be normal.

Finally, descriptive statistics were calculated for all variables of interest, which revealed an adequate amount of variability in the data. Correlations among dependent

variables were consistent with the model of posttraumatic growth. For example, PTG was found to be significantly correlated with both intrusive rumination ($r = .32$) and deliberate rumination ($r = .47$) (Cann et al., 2011). See Table 2 for correlations of all major study variables. The correlations among the three subscales of the Depression Anxiety and Stress Scale were all quite high ($r > .70$). This high level of intercorrelation suggests that in this sample the DASS did not measure three separate constructs of depression, anxiety, and stress, but rather one construct of overall distress. Therefore, the three DASS subscales were collapsed and only total DASS score was used. This construct will now be referred to as “psychological distress.”

In order to test for baseline group differences in the dependent variables for participants who completed the study, a one-way between groups analysis of variance (ANOVA) was conducted. These analyses examined baseline levels of posttraumatic growth, psychological distress, intrusive rumination, deliberate rumination, search for meaning, and presence of meaning. Using a p -value of .05, no statistically significant between-group differences were found. See Table 3 for baseline means of the dependent variables by group. Because no significant differences were found, completed participants in each of the three intervention groups did not significantly differ on any of the dependent variables at the baseline assessment.

Demographics

One hundred twenty-four total participants enrolled in the study; however, 22 of these never began the study and therefore baseline data were not collected. Of the 102 participants for whom baseline data were collected, 83 completed all four parts of the study. Twelve participants were excluded from participation after baseline data were

collected because they rated the stress of the event at the time it occurred as less than 4 on a 7-point scale. Because participants were told that they could end participation in the study at any time without penalty, no follow-up was conducted with those who decided not to complete all four parts of the study. It is therefore unclear why they chose to end their participation in the study. Of the 83 participants who completed, two did not meet inclusion criteria because their traumatic experience had occurred more than two years prior to the beginning of the study. The data from these two participants were therefore not included in the analyses. Two other cases were found to be outliers (described earlier) and were also excluded. Therefore, the final data set consisted of 79 participants.

The a priori power analysis conducted revealed that a sample size of 120 participants would be required for a power of .80. However, given the time constraints of this study it was not possible to recruit such a large number of participants. A second, post hoc power analysis was conducted using the final sample size, which revealed that the final sample size of 79 yielded a power of .60.

The 79 participants who met inclusion criteria and completed the entire study ranged in age from 18 to 55 years ($M = 22.35$ years, $SD = 7.31$). While the sample was predominantly female (77.2%), there was a significant amount of diversity of ethnicity and religious affiliation. Participants also endorsed a wide range of traumatic experiences. See Table 1 for complete demographic data. The amount of time that had passed since the traumatic experience occurred ranged from less than one month to 24 months, with an average of 9.43 months ($SD = 7.36$). Reported stressfulness at the time of the traumatic experience ranged from 4 to 7 on a 7-point Likert scale, with an average stressfulness rating of 6.24 ($SD = 1.18$).

Demographic data between those who completed the entire study ($N = 79$) and those who did not ($N = 24$) were compared to examine for between-group differences. An independent samples t-test indicated that there were no differences in age between the completers ($M = 22.35$ years, $SD = 7.31$) and non-completers ($M = 22.05$ years, $SD = 3.38$; $t(102) = .32$, $p = .75$, two-tailed). However, a significant difference in the amount of time since the trauma was found between completers ($M = 9.43$ months, $SD = 7.36$) and non-completers ($M = 17.55$ months, $SD = 12.12$; $t(102) = -2.82$, $p = .10$, two-tailed). This indicates that a significantly greater amount of time had passed since the trauma for non-completers, whereas the completers' traumas occurred more recently.

Hypothesis 1

The first hypothesis asserts that participants that engage in any form of expressive writing, whether following the standard or directed writing instructions, would report improved outcomes. These include lower reported levels of perceived stress, depression, and anxiety, and higher levels of posttraumatic growth, than participants in the control condition. To test these assumptions, two separate mixed design analyses of variance (ANOVA) were conducted.

Posttraumatic Growth

A 3x2 mixed ANOVA was conducted in order to determine if levels of posttraumatic growth changed over time, and if there were any group differences in follow-up levels of PTG. The main effect of time approached significance, $F(1, 76) = 3.70$, $p = .06$, partial $\eta^2 = .05$. This indicates that, across the entire study sample, an increase in PTG was found that is approaching significance (see Figure 1). For the overall sample, the baseline mean of PTG was 62.34, and the follow-up mean was 66.24.

However, the between-subjects test did not yield a significant main effect for group, $F(2, 76) = 1.27, p = .29$, partial $\eta^2 = .95$. Therefore, the groups did not report significantly different levels of posttraumatic growth at the follow-up assessment. The interaction effect was also not significant, $F(2, 76) = .20, p = .82$, partial $\eta^2 = .01$. Because the interaction effect was not significant, the three groups did not significantly differ in change over time and Hypothesis 1 is not supported.

Psychological Distress

As previously mentioned, the three domains of the Depression Anxiety and Stress Scale were highly correlated, and therefore the measure was collapsed into one construct of psychological distress. To test the second part of Hypothesis 1, another 3x2 mixed ANOVA was conducted to measure for group differences in psychological distress over time. No main effect of time was found, $F(1, 76) = .97, p = .33$, partial $\eta^2 = .01$. There was also no main effect of group $F(2, 76) = .19, p = .83$, partial $\eta^2 = .01$. Finally, the interaction effect was also not significant, $F(2, 76) = 1.96, p = .15$, partial $\eta^2 = .05$. Therefore the participants did not report significant changes in psychological distress between the baseline and follow-up assessments, and this finding was the same among all three study groups (see Figure 2). Because participants who engaged in standard or directed expressive writing did not differ from the control group on follow-up levels of PTG or psychological distress, Hypothesis 1 was not supported.

Hypothesis 2

The second hypothesis of this study asserted that participants in the directed writing condition who were explicitly asked to write about the positive consequences of trauma would report the highest levels of post-intervention posttraumatic growth,

compared to the standard writing and control groups. The results of the analysis from Hypothesis 1 revealed no group differences in PTG post-intervention, as well as no significant interaction effect. Therefore, Hypothesis 2 was also not supported.

Hypothesis 3

It was hypothesized that participants in both the standard and directed expressive writing conditions would report a significant decrease in intrusive rumination and a significant increase in deliberate rumination. No changes in rumination were expected for the control group. To test for significant changes in intrusive and deliberate rumination, two separate 3x2 mixed ANOVAs were conducted.

Intrusive Rumination

The data were submitted to a 3x2 mixed ANOVA with intrusive rumination as the dependent variable. The results show a significant main effect of time, $F(1, 76) = 7.78$, $p = .01$, partial $\eta^2 = .09$, indicating that there is a significant decrease in intrusive rumination over time. No main effect of group was found, $F(2, 76) = 1.71$, $p = .19$, partial $\eta^2 = .04$. There was also no interaction effect $F(2, 76) = .08$, $p = .92$, partial $\eta^2 < .01$ (see Figure 3). Therefore there were no group differences in change in intrusive rumination over time, and all participants reported a decrease in this outcome regardless of group.

Deliberate Rumination

With deliberate rumination as the dependent variable, no significant main effects for time, $F(1, 76) = 1.17$, $p = .28$, partial $\eta^2 = .02$, or group $F(2, 76) = 1.72$, $p = .19$, partial $\eta^2 = .04$, were found. There was also no interaction, $F(2, 76) = .11$, $p = .89$, partial $\eta^2 < .01$ were found (see Figure 4). This suggests that there was no change in deliberate

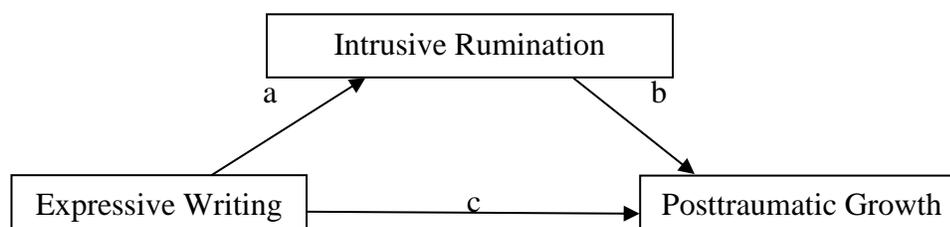
rumination over time, regardless of intervention group. As such, Hypothesis 3 was not supported.

Hypothesis 4

We hypothesized that participants in the directed expressive writing condition would report the greatest changes in both intrusive and deliberate rumination, above and beyond the change that was expected in the standard expressive writing group. The results of Hypothesis 3 show no significant differences among any of the three groups in either intrusive or deliberate rumination. Because no group differences or interaction effects were found, Hypothesis 4 was also not supported.

Hypothesis 5

Hypothesis 5 asserts that the relationship between expressive writing and posttraumatic growth would be partially mediated by rumination. A mediation analysis, as outlined by Baron and Kenny (1986), was proposed to test the following model:

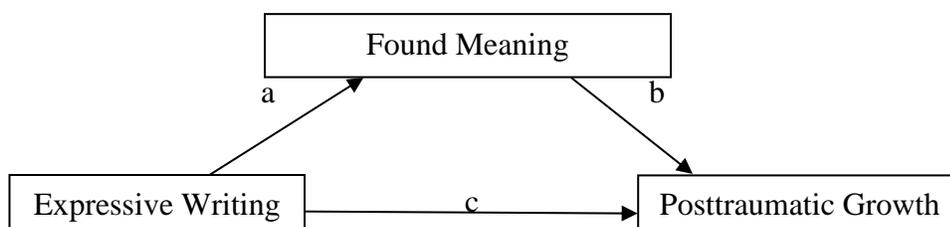


According to Baron and Kenny (1986), the first step in a mediation analysis is to determine if there is a significant direct effect of Path C. In other words, it must first be shown that expressive writing group does in fact have a significant impact on levels of PTG. This assumption was already disproved in the analysis for Hypothesis 1. Because no significant effect for Path C was found in that analysis, the grounds for a mediation

analysis were not met. Therefore, the remaining steps of the mediation analysis could not be conducted.

Hypothesis 6

It was also hypothesized that the relationship between expressive writing and posttraumatic growth would be partially mediated by found meaning. Specifically, it was predicted that expressive writing would facilitate higher levels of found meaning, which would in turn promote higher levels of PTG as demonstrated by the following model:



Similar to hypothesis 6, the mediation analysis could not be conducted because there was no significant relationship between writing group and levels of PTG. To test for any group differences in found meaning, the data were submitted to a 3x2 mixed ANOVA with found meaning as the dependent variable. No main effect of time was found, $F(1, 76) = .87, p = .35, \text{partial } \eta^2 = .01$. There was also no main effect of group, $F(2, 76) = .19, p = .83, \text{partial } \eta^2 = .01$. Finally, there was no significant interaction effect, $F(2, 76) = .18, p = .66, \text{partial } \eta^2 = .01$ (see Figure 5). Therefore participants did not report a significant change in found meaning over time, and this finding was the same across groups.

CHAPTER 4: DISCUSSION

The present study examined the effects of a brief expressive writing intervention on posttraumatic growth. There is a wealth of literature that demonstrates that expressive writing is helpful for individuals who have experienced a traumatic or highly stressful event, in that it is associated with a variety of physical and mental health benefits (Creswell et al., 2007; Lehman et al., 2009; Danoff-Burg et al., 2010; Pennebaker & Beall, 1986; Smyth, Hockemeyer, & Tulloch, 2008; Stanton et al., 2002). In particular, expressive writing has also been associated with posttraumatic growth (Lewandowski, 2009; Lichtenthal & Cruess, 2010; Low et al., 2006; Lu & Stanton, 2010; Slavin-Spenny et al., 2011; Smyth et al., 2008; Ullrich & Lutgendorf, 2002). Therefore, based on a thorough review of the expressive writing and PTG literatures, the following hypotheses were developed for this study: 1) Participants who engage in any kind of expressive writing would report improved outcomes, including lower reported levels of perceived stress, depression, and anxiety, and higher levels of posttraumatic growth than those in the control condition; 2) Those in the directed expressive writing condition, who were explicitly instructed to write about the positive consequences of their traumatic experience, would report the highest levels of posttraumatic growth at post-test than will the individuals in the other two conditions; 3) Levels of intrusive rumination would decrease, and deliberate rumination would increase, in both expressive writing conditions; 4) Participants in the directed expressive writing group would report the

greatest decrease in intrusive rumination and increase in deliberate rumination, compared to the standard writing and control groups; 5) The relationship between expressive writing and posttraumatic growth would be partially mediated by rumination; and 6) The relationship between expressive writing and posttraumatic growth will be partially mediated by found meaning. Although none of these hypotheses were supported, the results offer important information about the utility of an expressive writing intervention in the aftermath of trauma.

Hypothesis 1

Contrary to expectations, participants in the standard and directed expressive writing groups did not report a greater increase in posttraumatic growth than those in the control condition. A 3x2 mixed ANOVA revealed a main effect of time that approached significance ($p = .06$), indicating that overall the participants experienced an increase in PTG between baseline and follow-up assessments. However, no interaction effect was found. This indicates that there was no differential change in PTG over time among the three groups and that, among this sample, expressive writing did not facilitate PTG as expected.

Hypothesis 1 also predicted that participants in the standard and directed writing groups would report a greater decrease in psychological distress over time, compared to the control condition. This hypothesis was also not supported. Overall there was no significant change in psychological distress between the baseline and follow-up assessments, regardless of group. This once again suggests that the expressive writing intervention was not successful in reducing distress.

The results regarding Hypothesis 1 run contrary to previous findings which show an association between expressive writing and improved psychological outcomes (Danoff-Burg et al., 2010; Frattaroli, 2006; Pennebaker & Beall, 1986; Smyth, 1998). Several considerations must be made when interpreting the findings of the present study. First, for many participants in this sample a significant amount of time had passed since the traumatic experience ($M = 9.43$ months; $SD = 7.36$). In many of the previous studies on expressive writing, including those by Pennebaker and Beall (1986) and Danoff-Burg et al. (2010), participants were not required to have experienced a specific trauma in order to participate, but rather were asked to reflect on any recent traumatic or highly stressful event when writing. Therefore, it may be that participants in these previous studies were reflecting on a much more recent experience. It is possible that too much time had passed since the event for participants in this sample, thus reducing the likelihood that the intervention would be effective.

There is evidence to support the assertion that too much time had passed since the traumatic experience among this sample, which reduced the potential effectiveness of the intervention. First, participants in all groups reported a fairly high level of posttraumatic growth at baseline, with a mean score of 62.34 ($SD = 21.47$) out of a potential score of 105. This high baseline level of PTG indicates that growth had already developed in this sample of participants between the time of the traumatic experience and the baseline assessment.

Another potential problem was that the average level of reported psychological distress in this sample was quite low, with an average score of 40.32 ($SD = 29.63$) out of a potential range of scores between 0 and 126. Although a minimum level of stress (4 out

of 7) was a requirement for participation in this study, only stress at the time of the event was measured. Overall current stress was measured using the DASS, yet participants' current experience of stress specific to the traumatic experience was not measured. It can be reasonably assumed that stress regarding the event decreased over time. According to PTG theory, distress is necessary for growth because it challenges one's core beliefs and thus creates a need for re-examination of those beliefs, during which opportunities for growth may be recognized (Tedeschi & Calhoun, 2004). Without that distress, participants in this study may not have had the motivation to re-examine their beliefs and consider opportunities for growth. It is possible that, among a sample of participants with low levels of baseline PTG and high levels of baseline distress, the expressive writing intervention would have been effective and Hypothesis 1 would have been supported.

To test the hypothesis that levels of distress in the present sample were unusually low, they were compared to the levels of distress reported in the literature. In the development of the DASS-42, Antony et. al (1998) reported distress levels for several different samples. Compared to the present mean of 40.32, Antony et al. (1998) found mean levels of distress of 49.22 for individuals with panic disorder, 68.13 for individuals with major depressive disorder, 41.49 for those with social phobia, and 7.73 for nonclinical volunteers. Therefore, although the present sample reported significantly more distress than the nonclinical volunteers, they reported less distress than many of the clinical samples. This supports the assumption that higher distress would likely be found in a clinical sample, and therefore the intervention may have been more effective.

The lack of group differences in PTG also runs contrary to the results reported by Stockton et al. (2014), whose study design was very similar to that of the present study.

The authors used an internet-based intervention in which participants engaged in either standard expressive writing or writing about a neutral topic. At 8-weeks follow-up, the authors found that participants in the standard writing condition reported a significant increase in PTG, while no such increase was found in the control group. Although the participants in this group reported that more time had occurred since the event ($M = 8.82$ years, $SD = 9.81$) than participants in the current sample, they also endorsed high levels of distress, including current symptoms of avoidance, hyperarousal, and intrusive thoughts (Stockton et al., 2014). This supports the theory that a higher level of distress at baseline may have been necessary in order for the intervention to be successful at promoting PTG.

Hypothesis 2

Stemming from Hypothesis 1, the second hypothesis predicted that participants in the directed expressive writing group, who were explicitly asked to write about positive consequences of their experience, would report the greatest increase in posttraumatic growth from baseline. This hypothesis was also not supported, as the analyses from Hypothesis 1 revealed no group differences in PTG as well as no significant interaction effect. Therefore, asking participants to write positively did not facilitate growth. Rather, participants in all groups reported an increase in PTG over time that approached significance ($p = .06$).

In considering other potential reasons why Hypothesis 2 was not supported, qualitative essays for the directed writing group were reviewed. None of the studies on expressive writing that were reviewed made mention of the length of essays, and therefore it is not possible to determine how the length of essays in the present study

compares with what is typical for other studies. However, in reviewing the essays it did appear that the vast majority of the essays were reasonably long, indicating that participants wrote for much of the 15 minutes that they were instructed to write for. Additionally, the content of all of the essays was about the traumatic experience, and all participants in the directed writing group mentioned growth in their essays. While some participants indicated that they had not experienced any positive changes since the trauma, the fact that they all wrote about their trauma and mentioned growth, or lack thereof, in the essays indicates that participants followed the directions and were thoughtful about their answers. Many participants in the directed writing group did, however, write about experiences of growth in the first essay, which was written immediately following the baseline assessment. This is consistent with the high level of baseline PTG found in all groups, and in the directed writing group in particular ($M = 64.62$, $SD = 20.19$). Because levels of PTG were high to begin with, it is possible that a ceiling effect occurred and the effect of the intervention on facilitating PTG was limited. It is likely that a greater effect would have been seen in a sample of participants with lower baseline levels of PTG, such as those who had experienced the trauma more recently and without enough time to have passed for much growth to occur.

Hypothesis 3

Based on research indicating that expressive writing promotes positive changes in rumination (Klein & Boals 2001), it was hypothesized that participants in both writing groups would endorse a significant decrease in intrusive rumination and a significant increase in deliberate rumination. No significant changes in rumination were expected for the control group. The analyses revealed no significant group differences, nor any

significant interaction effects, for either intrusive or deliberate rumination. However, a main effect of time on intrusive rumination was found. Therefore, across groups the participants experienced a significant reduction in intrusive rumination between the baseline and follow-up assessments. The results of Hypothesis 3 suggest that engaging in any type of writing, whether about a traumatic experience or a neutral topic, may facilitate a reduction in intrusive rumination.

Although not expected, the results of Hypothesis 3 may be consistent with Klein and Boals' (2001) theory about the effects of writing on working memory. In their 2001 study, the authors instructed undergraduates to write about the stresses of coming to college three times over the course of two weeks. Compared to the control group, those who engaged in expressive writing showed a significant increase in working memory and decrease in intrusive thinking at 6-weeks follow-up. The present study replicated the results about intrusive thoughts, with the exception that a reduction in intrusive thinking was also found in the control group. Thus, although Klein and Boals (2001) did not find a significant decrease in intrusions in the control group, it is possible that any kind of writing activity may help to clear one's thoughts and thus reduce intrusive thinking. In this sample there appears to have been some benefit of any type of writing.

Hypothesis 4

Stemming from Hypothesis 3, the fourth Hypothesis predicted that participants in the directed expressive writing group would report the greatest changes in rumination, above and beyond those in the standard writing group. This included a greater decrease in intrusive rumination, as well as a greater increase in deliberate rumination. The results of

Hypothesis 3 revealed no group differences and no interaction effects for either types of rumination, and therefore Hypothesis 4 was also not supported.

Hypotheses 5 and 6

Hypotheses 5 and 6 predicted that the relationship between expressive writing and posttraumatic growth would be partially mediated by changes in rumination and increased meaning, respectively. Because no interaction effects were found in the analyses for Hypotheses 1 and 3, there was no effect of the expressive writing intervention on the development of PTG. Therefore the grounds for mediation analysis were not met, and Hypotheses 5 and 6 could not be tested.

Another important consideration to be made when interpreting the results of the present study is that of publication bias, or the “file drawer problem.” The present study was designed based on a thorough review of the literature, and the design closely mirrored those of other studies which produced significant results (Danoff-Burg et al., 2006; Stockton et al., 2014). However, as Rosenthal (1979) highlighted many years ago, only those studies which produce significant results are likely to be published. It may be assumed, then, that the literature review for the present study represents only a small percentage of all of the research that has been conducted on expressive writing, as many studies which produced non-significant results were likely not published.

Summary of Results

The present study investigated the effects of an expressive writing intervention on facilitating posttraumatic growth in the aftermath of a traumatic or highly stressful experience. Participants in this study engaged in either a standard expressive writing activity, a directed expressive writing activity which asked participants to consider the

positive consequences of their experience. Despite the study having been designed based on a thorough review of the expressive writing literature, none of the major hypotheses were supported.

Specifically, participants in each of the three groups did not differ on any major dependent variables at the follow-up assessment. These included psychological distress, intrusive rumination, deliberate rumination, found meaning, and PTG. These results indicate that, among this sample, participating in different types of expressive writing activities did not produce different outcomes, and the directed expressive writing intervention was not successful at facilitating PTG. Several possible explanations for these null results have been provided. These include low levels of distress in the sample, long periods of time that had passed since the event, and high levels of PTG in the sample at baseline.

Limitations

Several limitations must be considered when interpreting the results of this study. A main limitation is that this study was conducted entirely online. Because participants were able to complete each part of the study at any time and place they wished, there was no way to control for potential confounding factors, such as outside distractions, or even the possibility that someone else was involved during the study. A review of the qualitative essays in this study did indicate that the vast majority of responses were indeed done according to the writing instructions. Most essays were also long enough to assume that the participants wrote for much, if not all of the 15 minutes. However, it is not possible to know if participants were distracted when completing the study, particularly during the quantitative assessments at baseline and follow-up. If participants

were distracted or doing something else while completing these assessments, they may have responded randomly or not given much thought to their answers. Conducting this study in a laboratory setting would control for this potential problem, but it might also reduce enrollment as it would require more time and effort of participants.

Another limitation of this study is the small sample size ($N = 79$). As mentioned previously, the post hoc power analysis revealed that the final sample size of 79 yielded a power of .60. Thus, the relatively small sample size caused a reduction in power to detect significant relationships between study variables. It is possible that significant results may have been found in a larger sample of participants. The small sample size also limits the extent to which the results can be generalized to a larger population of trauma survivors.

This study also included participants with a wide range of traumatic experiences. Many of the published research studies on expressive writing utilized more homogeneous samples of participants who had experienced a similar type of highly stressful event, such as adjustment to college (Klein & Boals, 2001, Pennebaker & Beall, 1986) and breast cancer (Creswell et al., 2007; Stanton et al., 2002), or had been diagnosed with a specific disorder such as posttraumatic stress disorder (Smyth et al., 2008). It may be the case that people with similar types of traumatic or highly stressful experiences go through a similar process of growth and transformation. With the variability of traumatic experiences in the present sample of participants, growth trajectories may also have varied widely, thus making it more difficult to detect significant effects of the intervention.

A final limitation of the present study is that the follow-up assessment was conducted only four weeks after the final writing session was completed. Many of the

studies reviewed utilized a longer follow-up period, ranging from two months (Sloan et al., 2009; Stockton et al., 2014) to six months (Pennebaker & Beall, 1986). A shorter follow-up period was used in this study in order to enhance participant retention, as participants were primarily students and their participation was constrained by the academic calendar. Therefore, it may be the case that the follow-up assessment in the present study was conducted too soon after the intervention, and that significant changes in the dependent variables had not yet developed. In future studies, multiple follow-up assessments should be conducted in order to increase the likelihood that significant effects are detected.

Future Directions

Several areas of future research are needed in order to provide a clearer picture of the potential impact of expressive writing on facilitating posttraumatic growth, as the present study did not yield any significant results. First, it has been previously mentioned that the current sample of participants reported very low levels of psychological distress during the baseline assessment, despite the fact that they all rated their stress level at the time of the event as at least a 4 out of 7. Posttraumatic growth theory asserts that at least a moderate level of threat to core beliefs is a prerequisite for growth (Cann et al., 2010; Tedeschi & Calhoun, 2004). This threat to core assumptions results, in turn, in psychological distress. Even if distress was high at the time of the event, if distress had declined by the time of the intervention then growth is unlikely to occur. To avoid this potential confound, future studies should consider using this intervention with a clinical sample of participants whose distress levels are higher than those found in the present sample. For example, this intervention may be more effective in a sample of participants

who have been diagnosed with PTSD. It would also be prudent to measure not only stress at the time of the event, but also current stress surrounding the traumatic experience.

Those who rate low levels of current distress should be excluded from participation.

Another future consideration would be to include the Core Beliefs Inventory (Cann et al., 2010) in order to evaluate how challenge to core beliefs relates to the development of posttraumatic growth through expressive writing. Finally, it would be ideal to utilize this intervention on a sample of participants who had experienced a very recent trauma. This would decrease the likelihood that PTG had already developed organically within the participant sample, and thus enhance the effectiveness of the intervention.

It is also possible that the intervention “dose” in the current study was not large enough to facilitate significant changes in the dependent variables. A review of the literature revealed a modal number of three writing sessions (Klein & Boals, 2001; Lewandowski, 2009; Lichtenthal & Cruess, 2010; Low et al., 2006; Lu & Stanton, 2010; et al., 2009), and Pennebaker and Chung (2011) recommend that a minimum of three sessions be used in order to maximize the benefits of expressive writing. However, because the current sample of participants reported high levels of PTG at baseline, it may be that more writing sessions were necessary in order to facilitate additional growth. Future studies should seek to compare outcomes between groups of participants who have engaged in a different number of writing sessions, in order to determine which “dose” of writing sessions yields maximum benefits.

Several studies have documented an association between expressive writing and PTG (Slavin-Spenny et al., 2011; Smyth et al., 2008; Stockton et al., 2014; Ullrich & Lutgendorf, 2002). The present study aimed to add to the literature by not only

replicating the results of these studies, but also by investigating the possible mechanisms through which growth is mediated. Specifically, it was hypothesized that increases in deliberate rumination and meaning-making would promote growth. However, no intervention effect was found in the present study, and therefore the mediation analyses could not be run. Therefore, the mechanisms through which expressive writing promote PTG remain unclear. Future studies should continue to aim to fill this gap in the literature.

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APPENDIX A: LIST OF QUALIFYING TRAUMATIC EXPERIENCES

1. I experienced the UNEXPECTED or VIOLENT death of a close relative, close friend, or significant other.
2. I PERSONALLY experienced a VERY SERIOUS medical problem.
3. A close friend, significant other or close family member experienced a VERY SERIOUS medical problem.
4. I experienced an accident that led to SERIOUS INJURY to me.
5. Someone very close to me experienced an accident that led to SERIOUS INJURY.
6. I caused an accident that led to a SERIOUS INJURY to someone.
7. MY place of residence was SERIOUSLY damaged by fire or other natural cause.
8. I experienced a situation in which I felt I faced potential death or serious bodily harm.
9. I witnessed a SEVERE assault of a friend or family member.
10. I was a victim of a SEVERE physical assault.
11. I was sexually assaulted.
12. I experienced SERIOUS physical abuse by an intimate partner.
13. I was robbed or mugged.
14. I was stalked.
15. I was deployed with the military to an active combat zone.

APPENDIX B: INFORMED CONSENT STATEMENT

This study involves a web-based writing intervention designed to help us understand how people respond to, think about, and adjust to stressful life events. You are eligible to participate in this study because you indicated that you have experienced a stressful event in the past 2 years. The study is being conducted by Jessica Groleau, who is a doctoral student in the Clinical Health Psychology Program, under the supervision of Professors Arnie Cann, Lawrence Calhoun, and Richard Tedeschi of the Psychology Department, as well as Professor Susan Furr of the Counseling Department at UNC Charlotte. This study has been approved by the University Institutional Review Board (approved on ____). No deception is involved, and the study involves no more than minimal risk to participants (i.e., the level of risk encountered in daily life). While there may be no direct benefits to you for participation, the information obtained could help to better understand how people deal with highly stressful events.

You must be at least 18 years of age to be eligible to participate in this study. You also must have experienced a highly stressful event in the past 2 years. There are no other criteria for participation.

During this study, you will be asked to think about the stressful event you experienced. You may also be asked to write about this event. Thinking about and writing about a stressful event can be upsetting for some people. Therefore, if you believe that being asked about the stressful event may be upsetting for you, you should not continue. Also, if you become upset at any point while participating in the study, you may end your participation. There will be no penalty to you for not completing this study.

This study will be conducted over four separate sessions. Today, you will complete a few brief questionnaires. These questionnaires will assess background information about you (age, etc.), aspects of your personal style, and your experiences in dealing with the recent stressful event. You will then be provided instructions for a writing exercise and asked to write for 20 minutes. You may be asked to write about the stressful event that you have previously identified. Over the course of the next week, you will repeat this writing exercise 2 more times (for a total of 3 writing sessions). Four weeks after you complete the last writing session, you will be asked to complete a few more brief questionnaires. Once you have completed these questionnaires, your participation in this study will be complete. You will be awarded six research credits once you complete this study. You will also be entered in a drawing for a chance to win a \$20 Target gift card.

All responses are anonymous and will be treated as confidential, and in no case will responses from individual participants be identified. The data available to the researchers is identified by a code assigned by the software, but your identity is not available to the researchers. Rather, all data will be pooled and published in aggregate form only. You should be aware, however, that the experiment is not being run from a "secure" https server of the kind typically used to handle credit card transactions, so there is a very

small possibility that responses could be viewed by unauthorized third parties (e.g., computer hackers).

You are a volunteer. The decision to participate in this research is completely up to you. If you decide to be in the study, you may stop at any time. You will not be treated any differently if you decide not to participate in the study or if you stop once you have started. Although unlikely, participating in this research, or any research, may involve risks that are currently unforeseeable. If you experience any distress as a result of the procedures used you may discontinue participation. Also, if you find that responding to questions or writing about the stressful event causes you to become upset, you should be aware of the availability of counseling services at no cost through the UNC Charlotte Counseling Center, 158 Atkins (704.687.0311). The UNC Charlotte Counseling Center provides free counseling services to all undergraduate and graduate students of the University, as well as free consultations and referrals to UNC Charlotte faculty and staff members.

If you have any questions during the course of this study, after the research is completed, or if you want information about the results, contact the primary researcher, Jessica Groleau in the Psychology Department by phone (603) 455-6338, or email (jschill5@uncc.edu). UNC Charlotte wants to insure that you are treated in a fair and respectful manner. If you have further questions or concerns about your rights as a participant in this study, contact the Compliance Office at UNC Charlotte (704) 687-3309.

I have read the information in this consent form. I have been provided with contact information so that I have been able to ask questions about this study. I am at least 18 years of age and I agree to participate in this research. By clicking on the button below, I affirm my agreement

APPENDIX C: DEBRIEFING STATEMENT

Thank you for your participation in this study! Because you have completed this study, you will be awarded 6 research credits to your SONA account (if applicable). You will also be awarded a \$10 Target gift card. Instructions for how to pick up your gift card will be sent to you by the primary researcher, Jessica Groleau, via email.

The purpose of this study was to help us understand how people respond to, think about, and adjust to stressful life events. Additionally, we wanted to know how writing about life events may influence these processes. While you may not experience any direct benefits of participating in this study, the information obtained could help us to better understand how people deal with highly stressful events.

Thinking about and writing about stressful events can be upsetting. If you became distressed or upset at any point during the course of this study, you should be aware of the availability of counseling services at no cost through the UNC Charlotte Counseling Center, 158 Atkins Building (704.687.0311). The UNC Charlotte Counseling Center provides free counseling services to all undergraduate and graduate students of the University, as well as free consultations and referrals to UNC Charlotte faculty and staff members.

If you have any questions or comments about this study, please contact the primary researcher, Jessica Groleau, in the Psychology Department by phone (603) 455-6338, or email (jschill5@uncc.edu). UNC Charlotte wants to insure that you are treated in a fair and respectful manner. If you have further questions or concerns about your rights as a participant in this study, contact the Compliance Office at UNC Charlotte (704) 687-3309.

Again, thank you for your participation.

APPENDIX D: STUDY MEASURES

The Posttraumatic Growth Inventory

Indicate for each of the statements below the degree to which this change occurred in your life **as a result of your trauma**, using the following scale:

- 0** = I did not experience this change as a result of my crisis.
- 1** = I experienced this change to a very small degree as a result of my crisis.
- 2** = I experienced this change to a small degree as a result of my crisis.
- 3** = I experienced this change to a moderate degree as a result of my crisis.
- 4** = I experienced this change to a great degree as a result of my crisis.
- 5** = I experienced this change to a very great degree as a result of my crisis.

1. I changed my priorities about what is important in life.
2. I have a greater appreciation for the value of my own life.
3. I developed new interests.
4. I have a greater feeling of self-reliance.
5. I have a better understanding of spiritual matters.
6. I more clearly see that I can count on people in times of trouble.
7. I established a new path for my life.
8. I have a greater sense of closeness with others.
9. I am more willing to express my emotions.
10. I know better that I can handle difficulties.
11. I am able to do better things with my life.
12. I am better able to accept the way things work out.
13. I can better appreciate each day.
14. New opportunities are available which wouldn't have been otherwise.
15. I have more compassion for others.

16. I put more effort into my relationships.
17. I am more likely to try to change things which need changing.
18. I have a stronger religious faith.
19. I discovered that I'm stronger than I thought I was.
20. I learned a great deal about how wonderful people are.
21. I better accept needing others.

The Event Related Rumination Inventory

Intrusive Items

After an experience like the one you reported, people sometimes, but not always, find themselves having thoughts about their experience even though they don't try to think about it. Indicate for the following items how often, if at all, you had the experiences described during the weeks immediately after the event. The rating scale is as follows:

- 0** = Not at all
- 1** = Rarely
- 2** = Sometimes
- 3** = Often

1. I thought about the event when I did not mean to.
2. Thoughts about the event came to mind and I could not stop thinking about them.
3. Thoughts about the event distracted me or kept me from being able to concentrate.
4. I could not keep images or thoughts about the event from entering my mind.
5. Thoughts, memories, or images of the event came to mind even when I did not want them.
6. Thoughts about the event caused me to relive my experience.
7. Reminders of the event brought back thoughts about my experience.
8. I found myself automatically thinking about what had happened.
9. Other things kept leading me to think about my experience.
10. I tried not to think about the event, but could not keep the thoughts from my mind.

Deliberate Items

After an experience like the one you reported, people sometimes, but not always, deliberately and intentionally spend time thinking about their experience. Indicate for the following items how often, if at all, you deliberately spent time thinking about the issues indicated during the weeks immediately after the event. The rating scale is as follows:

- 0** = Not at all
- 1** = Rarely

2 = Sometimes

3 = Often

1. I thought about whether I could find meaning from my experience.
2. I thought about whether changes in my life have come from dealing with my experience.
3. I forced myself to think about my feelings about my experience.
4. I thought about whether I have learned anything as a result of my experience.
5. I thought about whether the experience has changed my beliefs about the world.
6. I thought about what the experience might mean for my future.
7. I thought about whether my relationships with others have changed following my experience.
8. I forced myself to deal with my feelings about the event.
9. I deliberately thought about how the event had affected me.
10. I thought about the event and tried to understand what happened.

The Core Beliefs Inventory

Some events that people experience are so powerful that they ‘shake their world’ and lead them to seriously examine core beliefs about the world, other people, themselves, and their future.

Please reflect upon the event about which you are reporting and indicate the extent to which it led you to seriously examine each of the following core beliefs. Please rate each item on the following rating scale:

- 0 = not at all
- 1 = to a **very small** degree
- 2 = to a small degree
- 3 = to a moderate degree
- 4 = to a great degree
- 5 = to a **very great** degree

1. Because of the event, I seriously examined the degree to which I believe things that happen to people are fair.
2. Because of the event, I seriously examined the degree to which I believe things that happen to people are controllable.
3. Because of the event, I seriously examined my assumptions concerning why other people think and behave the way that they do.
4. Because of the event, I seriously examined my beliefs about my relationships with other people.
5. Because of the event, I seriously examined my beliefs about my own abilities, strengths and weaknesses.
6. Because of the event, I seriously examined my beliefs about my expectations for my future.
7. Because of the event, I seriously examined my beliefs about the meaning of my life.
8. Because of the event, I seriously examined my spiritual or religious beliefs.
9. Because of the event, I seriously examined my beliefs about my own value or worth as a person.

The Depression Anxiety Stress Scales

Please read each statement and circle a number 0, 1, 2 or 3 that indicates how much the statement applied to you **over the past week**. There are no right or wrong answers. Do not spend too much time on any statement. The rating scale is as follows:

0 = Did not apply to me at all

1 = Applied to me to some degree, or some of the time

2 = Applied to me to a considerable degree, or a good part of time

3 = Applied to me very much, or most of the time

1. I found myself getting upset by quite trivial things
2. I was aware of dryness of my mouth
3. I couldn't seem to experience any positive feeling at all
4. I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)
5. I just couldn't seem to get going
6. I tended to over-react to situations
7. I had a feeling of shakiness (eg, legs going to give way)
8. I found it difficult to relax
9. I found myself in situations that made me so anxious I was most relieved when they ended
10. I felt that I had nothing to look forward to
11. I found myself getting upset rather easily
12. I felt that I was using a lot of nervous energy
13. I felt sad and depressed
14. I found myself getting impatient when I was delayed in any way (eg, elevators, traffic lights, being kept waiting)
15. I had a feeling of faintness
16. I felt that I had lost interest in just about everything

17. I felt I wasn't worth much as a person
18. I felt that I was rather touchy
19. I perspired noticeably (eg, hands sweaty) in the absence of high temperatures or physical exertion
20. I felt scared without any good reason
21. I felt that life wasn't worthwhile
22. I found it hard to wind down
23. I had difficulty in swallowing
24. I couldn't seem to get any enjoyment out of the things I did
25. I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)
26. I felt down-hearted and blue
27. I found that I was very irritable
28. I felt I was close to panic
29. I found it hard to calm down after something upset me
30. I feared that I would be "thrown" by some trivial but unfamiliar task
31. I was unable to become enthusiastic about anything
32. I found it difficult to tolerate interruptions to what I was doing
33. I was in a state of nervous tension
34. I felt I was pretty worthless
35. I was intolerant of anything that kept me from getting on with what I was doing
36. I felt terrified
37. I could see nothing in the future to be hopeful about
38. I felt that life was meaningless

39. I found myself getting agitated
40. I was worried about situations in which I might panic and make a fool of myself
41. I experienced trembling (eg, in the hands)
42. I found it difficult to work up the initiative to do things

The Meaning in Life Questionnaire

Please take a moment to think about what makes your life feel important to you. Please respond to the following statements as truthfully as you can, and also please remember that these are very subjective statements and that there are no right or wrong answers.

Scale to be used:

- 1** = Absolutely untrue
- 2** = Mostly untrue
- 3** = Somewhat untrue
- 4** = Can't say true or false
- 5** = Somewhat true
- 6** = Mostly true
- 7** = Absolutely true

1. I understand my life's meaning.
2. I am looking for something that makes my life feel meaningful.
3. I am always looking to find my life's purpose.
4. My life has a clear sense of purpose.
5. I have a good sense of what makes my life meaningful.
6. I have discovered a satisfying life purpose.
7. I am always searching for something that makes my life feel significant.
8. I am seeking a purpose or mission for my life.
9. My life has no clear purpose.
10. I am searching for meaning in my life.

APPENDIX E: TABLES

TABLE 1: Demographic statistics

Variable	Frequency	Percentage
Gender		
Female	61	77.2
Male	18	22.8
Ethnicity		
White	45	57.0
African/African American	21	26.6
Asian/Asian American	1	1.3
Latino/Latina	7	8.9
American Indian/Alaska Native	0	0
Native Hawaiian/Pacific Islander	0	0
Other	5	6.3
Religious Affiliation		
Protestant	17	21.5
Catholic	13	16.5
Jewish	0	0
Muslim	3	3.8
Buddhist	0	0
Other	35	44.3
None	11	13.9
Traumatic Experience		
Death of a friend or relative	25	31.6
Serious medical problem – self	8	10.1
Serious medical problem - friend or relative	20	25.3
Serious injury/accident – self	2	2.5
Serious injury/accident – other	6	7.6
Caused injury to another	0	0
Fire or natural disaster	2	2.5
Fear of death or bodily harm	3	3.8
Witness assault of friend or relative	1	1.3
Victim of physical assault	0	0
Victim of sexual assault	6	7.6
Victim of intimate partner violence	1	1.3
Victim of robbery or mugging	3	3.8
Victim of stalking	2	2.5
Deployed to active combat zone	0	0

Note. $N = 79$

TABLE 2: Descriptive statistics and zero-order correlations for dependent variables at baseline

	M	SD	1	2	3	4	5
1. Posttraumatic Growth	62.34	21.47					
2. Intrusive Rumination	3.30	.69	.32**				
3. Deliberate Rumination	2.95	.65	.47**	.51**			
4. Psychological Distress	40.32	29.63	.17	.34**	.34**		
5. Found Meaning	5.09	1.32	.19	.03	.17	-.24*	
6. Search for Meaning	4.79	1.56	.06	-.22*	-.05	.05	-.14

Note. N = 79. **indicates $p < .01$. *indicates $p < .05$. Range of potential scores for each variable are as follows: Posttraumatic Growth (21-126), Intrusive Rumination (1-4), Deliberate Rumination (1-4), Psychological Distress (0-126), Found Meaning (1-7), Search for Meaning (1-7).

TABLE 3: Descriptive statistics for dependent variables by group

	<i>Baseline Mean (SD)</i>	<i>Follow-up Mean (SD)</i>
<i>Control Group</i>		
Posttraumatic growth	58.18 (25.84)	61.14 (24.68)
Psychological distress	34.36 (25.51)	39.61 (33.25)
Intrusive rumination	3.22 (.74)	3.04 (.77)
Deliberate rumination	2.86 (.76)	2.96 (.59)
Search for meaning	5.11 (1.45)	4.49 (1.65)
Presence of meaning	4.94 (1.47)	4.92 (1.54)
<i>Standard Group</i>		
Posttraumatic growth	64.64 (17.07)	67.68 (20.36)
Psychological distress	46.20 (26.07)	37.28 (29.48)
Intrusive rumination	3.51 (.57)	3.26 (.61)
Deliberate rumination	3.14 (.62)	3.16 (.59)
Search for meaning	4.67 (1.50)	4.73 (1.79)
Presence of meaning	5.18 (1.21)	4.95 (1.31)
<i>Directed Group</i>		
Posttraumatic growth	64.62 (20.19)	70.35 (17.48)
Psychological distress	41.08 (36.18)	35.62 (38.46)
Intrusive rumination	3.20 (.73)	2.98 (.74)
Deliberate rumination	2.87 (.52)	2.97 (.53)
Search for meaning	4.55 (1.72)	4.12 (2.12)
Presence of meaning	5.16 (1.29)	5.12 (1.31)

Note. Control $N = 28$. Standard $N = 25$. Directed $N = 26$. Range of potential scores for each variable are as follows: Posttraumatic Growth (0-105), Intrusive Rumination (1-4), Deliberate Rumination (1-4), Psychological Distress (0-126), Found Meaning (1-7), Search for Meaning (1-7).

APPENDIX F: FIGURES

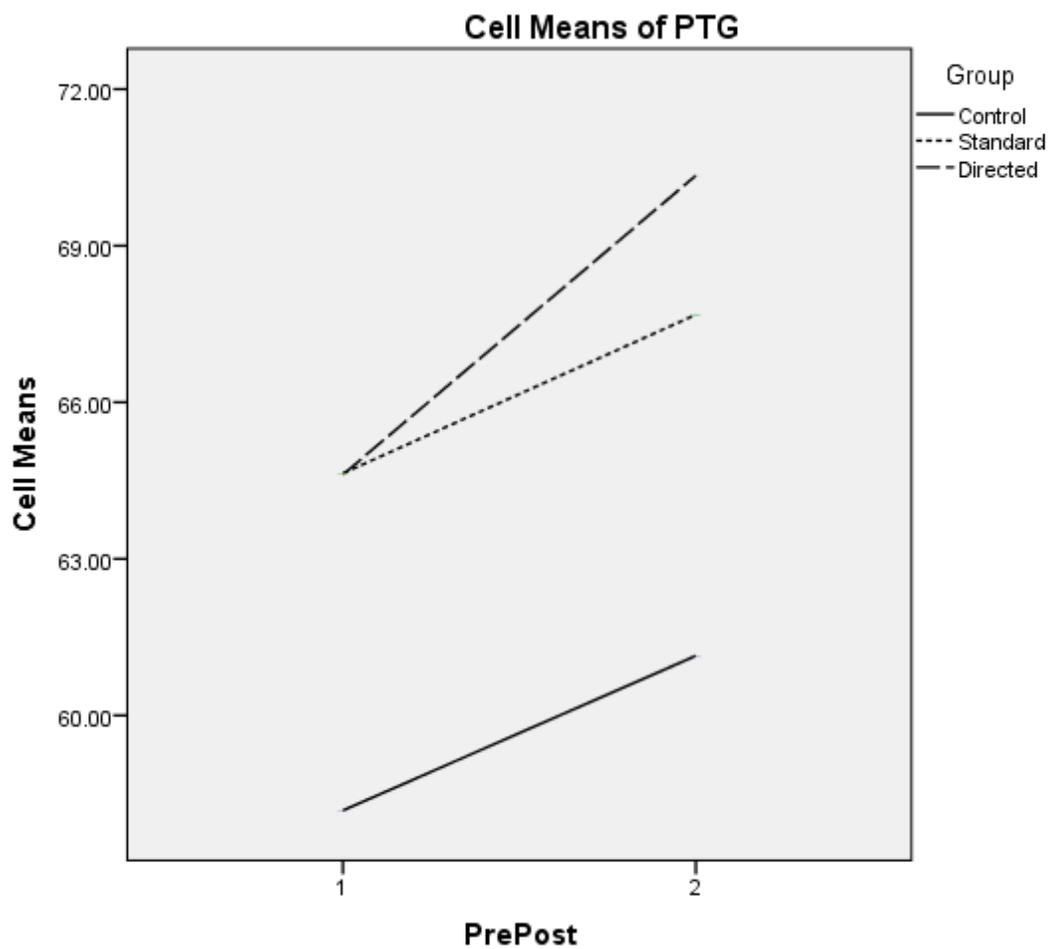


Figure 1: Mean scores on the PTGI for control ($N = 28$), standard ($N = 25$), and directed ($N = 26$) writing groups for baseline and post-intervention assessments.

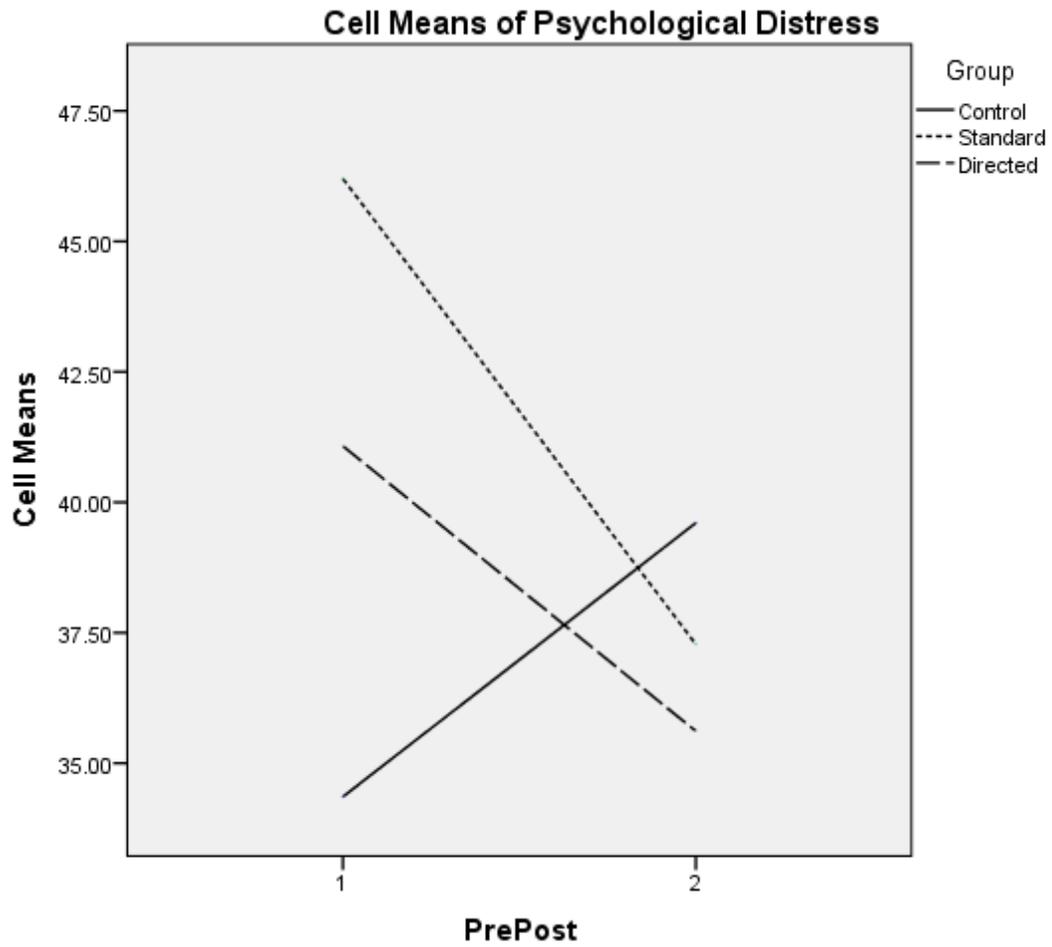


Figure 2: Mean scores of psychological distress (DASS) for control ($N = 28$), standard ($N = 25$), and directed ($N = 26$) writing groups for baseline and post-intervention assessments.

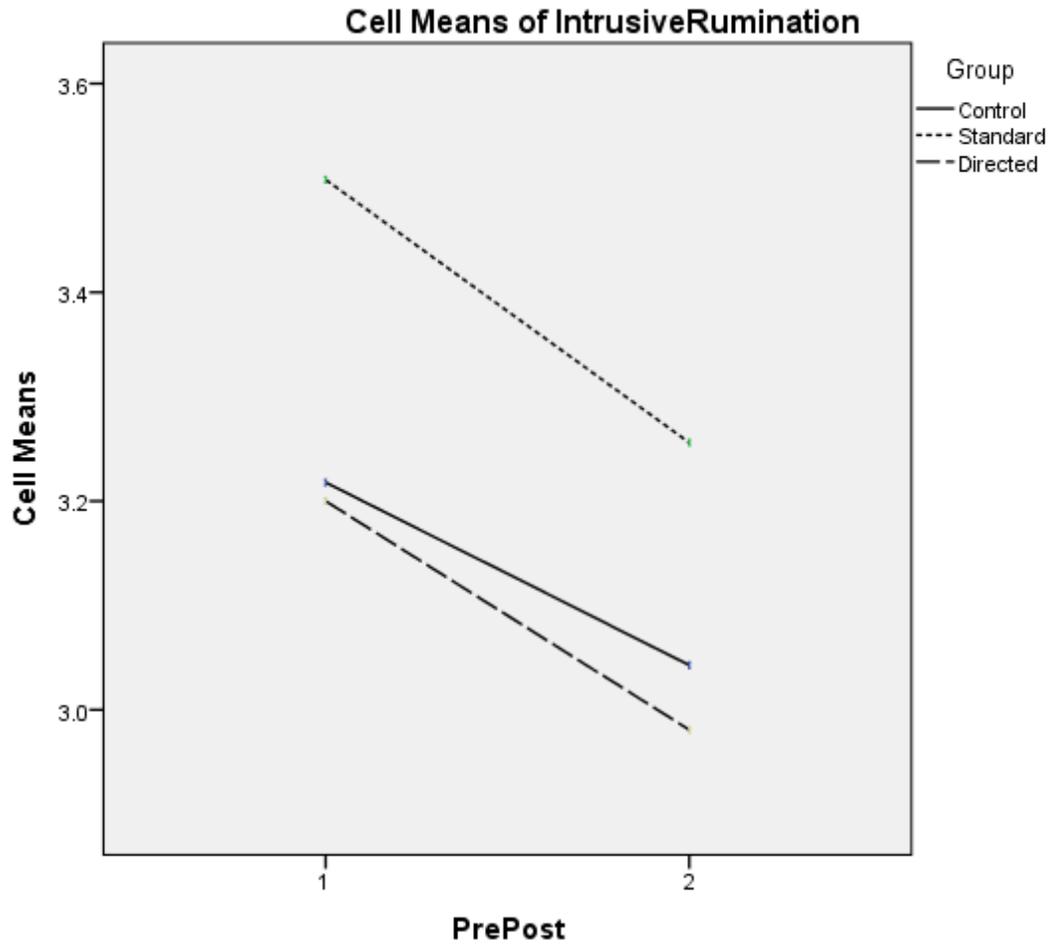


Figure 3: Mean scores on the ERRI-I for control ($N = 28$), standard ($N = 25$), and directed ($N = 26$) writing groups for baseline and post-intervention assessments.

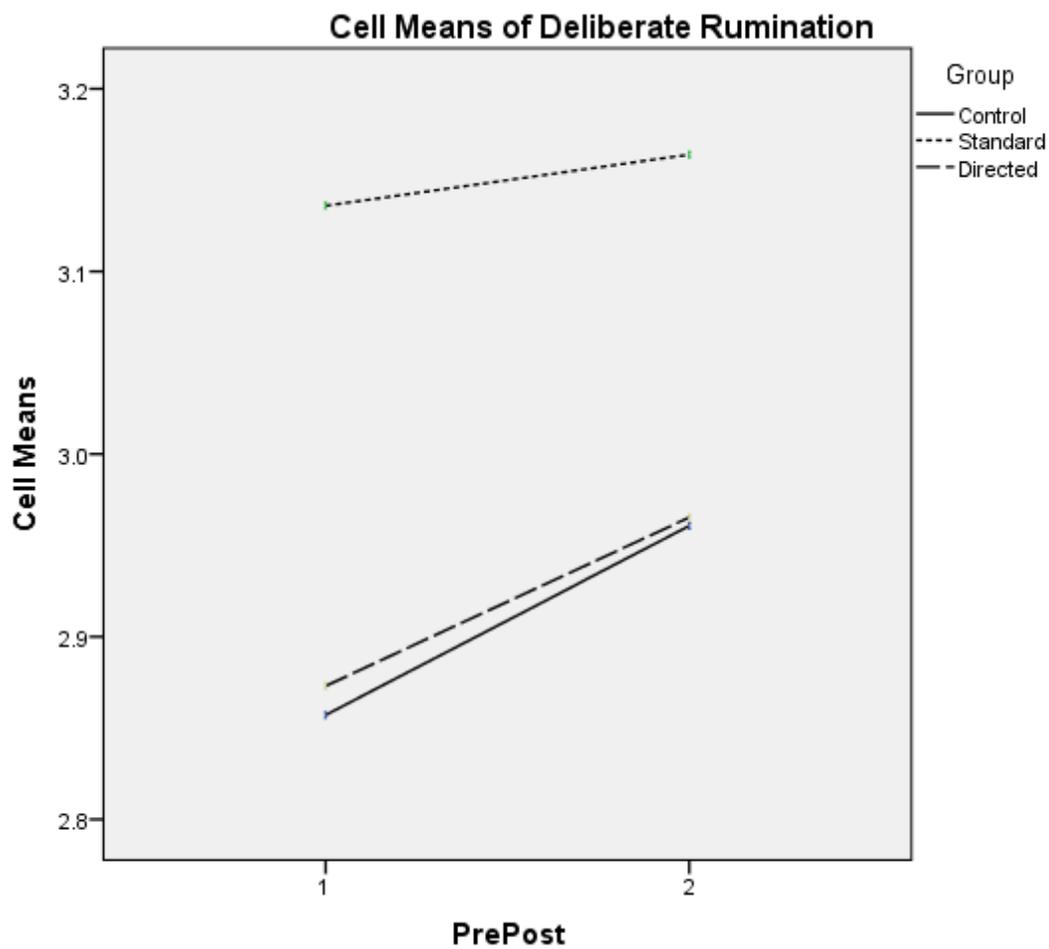


Figure 4: Mean scores on the ERRI-D for control ($N = 28$), standard ($N = 25$), and directed ($N = 26$) writing groups for baseline and post-intervention assessments.

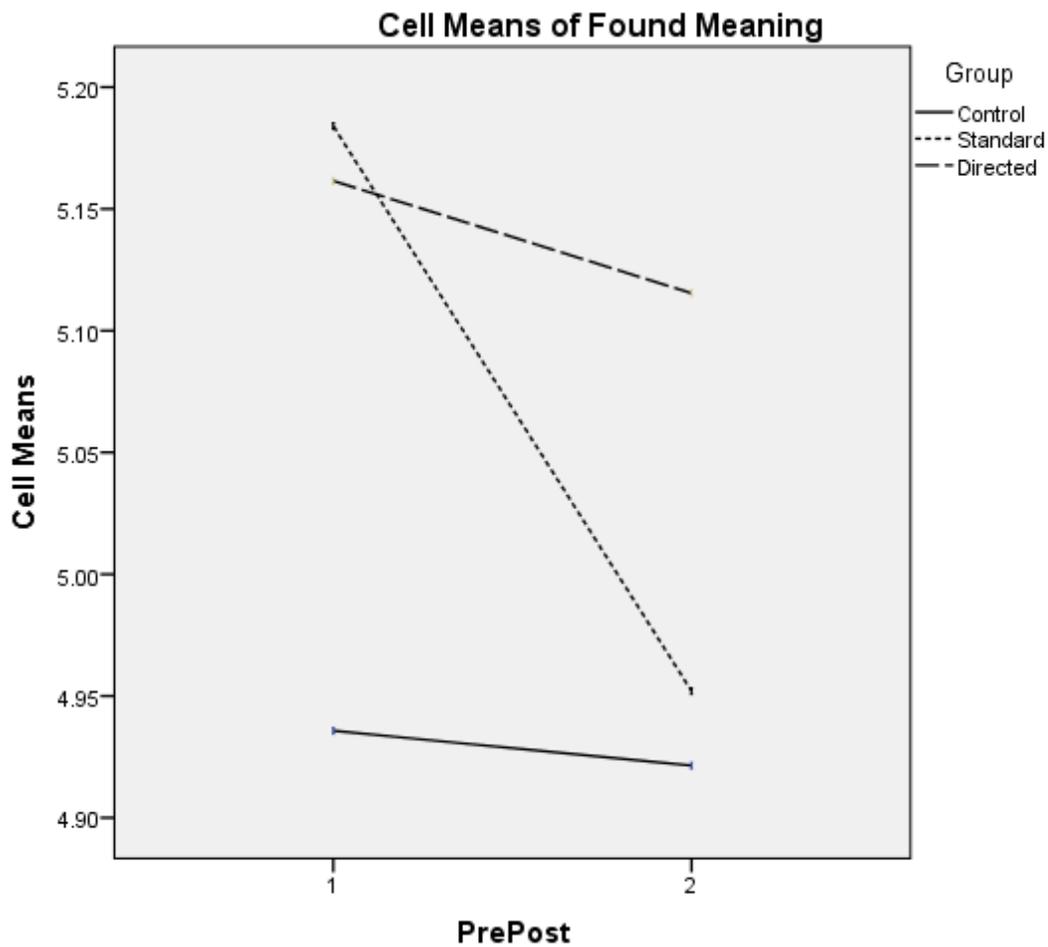


Figure 5: Mean scores on the MILQ-P for control ($N = 28$), standard ($N = 25$), and directed ($N = 26$) writing groups for baseline and post-intervention assessments.