

THE EFFECTS OF PENNEBAKER'S WRITING PARADIGM ON PHYSICAL AND
EMOTIONAL DISTRESS: AN EXPLORATION OF NARRATIVE CONTENT AND
MODERATING VARIABLES

by

MEGAN CRAWFORD KEARNS

(Under the Direction of Karen S. Calhoun)

ABSTRACT

Previous research suggests that expressive writing can lead to significant improvements in physical and psychological health. A brief paradigm developed by Pennebaker and colleagues asks participants to narrate stressful or upsetting experiences, with results suggesting that individuals who demonstrate increases in their use of emotional and cognitive processing words and overall narrative organization appear to benefit most from the writing process. The current multi-site study sought to examine the applicability of this paradigm to sexual assault survivors within a college student sample ($N = 71$) and identify whether narrative content predicted changes in physical and emotional distress. Overall, women in the intervention group used more emotion and cognitive processing words in their narratives, which increased from the first to last day of writing. However, in contrast to previous research, results indicated that increases in emotional and cognitive processing words failed to predict improvements in physical health, psychological health, and traumatic stress symptoms, after controlling for baseline health scores. Average global ratings of narrative organization did predict reductions in traumatic stress. In addition, complex trauma appeared to moderate the effects of expressive writing. Specifically,

women with a history of adult revictimization and women with CSA histories appeared to benefit more from the intervention, as evidenced by greater reductions in psychological distress.

Limitations and implications for future research are discussed.

INDEX WORDS: Sexual assault; Emotional Disclosure; Narratives

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MEGAN CRAWFORD KEARNS

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MEGAN CRAWFORD KEARNS

Major Professor: Karen S. Calhoun

Committee: Steven Beach
Joan Jackson

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
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DEDICATION

This project is dedicated to all women who have experienced sexual assault, with the hope that continued research in this area will enable us to stop the cycle of violence and reduce women's risk for revictimization.

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CHAPTER 1

INTRODUCTION

The process of telling one's life story enables individuals to organize and create purpose from life events in the context of their environment and their lives, which makes autobiographical narratives a valuable aspect of self-understanding, memory, and experiences (Bruner, 1987; Sarbin, 1986). Thus, creating personal narratives has often been viewed as an essential aspect of recovery and treatment for traumatic life events. Research has indicated that trauma narratives that show more development (i.e., longer, more structure, organization, and detail) are related to more positive psychological and emotional outcomes (Foa, Molnar, & Cashman, 1995; Amir, Stafford, Freshman, & Foa, 1998). Not surprisingly, encouraging trauma survivors to create a coherent narrative of the event has been a component incorporated into efficacious treatments for PTSD, such as Prolonged Exposure and Cognitive Processing Therapy. However, given the number of people who have been exposed to traumatic events, there is a great need for additional interventions that are brief, cost-effective, and accessible to a greater number of individuals.

Pennebaker and colleagues developed a written disclosure paradigm that asks individuals to write about traumatic experiences over a few short writing sessions. Results of research using this procedure indicate that emotional disclosure leads to a wide range of positive benefits, including changes in behavior (i.e., better grades, reemployment, lower rates of absenteeism) and improvements in psychological and physical health (for a review, see Smyth, 1998). More detailed analysis of narratives produced by this paradigm indicates that individuals who include more positive emotion words and a moderate number of negative emotion words experience the

most health improvement at follow-up assessment (Pennebaker, Mayne, & Francis, 1997). In addition, narratives that demonstrate gradual increases in the use of causal words (e.g., *because*, *reason*) and insight words (e.g., *understand*, *realize*) over the course of writing sessions also experienced the greatest benefit (Pennebaker et al., 1997). Thus, Pennebaker and colleagues have concluded that through repeated writing sessions, individuals are able to build a more coherent narrative that ultimately leads to improved emotional and physical well-being (Pennebaker & Stone, 2004).

Proposed theories for the effect of expressive writing

These findings point to this paradigm as a promising brief and cost-effective intervention for reducing distress. Despite the numerous studies that have examined the written disclosure paradigm, however, the mechanisms which account for these positive changes have yet to be established. Included among the suggested theories are release of emotional inhibition, cognitive adaptation, and emotional processing through repeated exposure to the traumatic memory (for a review, see Sloan & Marx, 2004). The emotional inhibition theory initially received the most attention following Pennebaker's early findings utilizing this paradigm. This theory was based on the concept that the energy and resources required to suppress emotions subsequently places a physical and emotional toll on a person, which can be released by expressing the emotions being inhibited. Thus, Pennebaker and colleagues suggested that the written disclosure paradigm allows for the expression of inhibited emotions which subsequently leads to improvement in physical and emotional health. In their review of research testing this theory, Sloan and Marx (2004) conclude that although increased stress is linked to health problems, Pennebaker's paradigm appears to be beneficial regardless of whether the traumatic event has been previously discussed, which has redirected researchers toward other possible explanations. Another theory

that has been suggested by researchers is the idea that writing facilitates cognitive adaptation to traumatic experiences. Many theorists have suggested that the experience of trauma disrupts an individual's assumptions and schemas about the world and that cognitive changes are needed to assimilate information from a trauma into their worldview. Thus, the writing paradigm developed by Pennebaker has been considered a possible tool for helping individuals organize their beliefs and memories of stressful experiences which leads to reduced distress. Sloan and Marx (2004) suggest that this theory has been difficult to evaluate and that research directly testing this hypothesis has produced mixed results. As previously mentioned, changes in cognitive processing words across writing sessions are related to improved outcomes, but not all studies support a relationship between health and cognitive changes (Batten, Follette, Rasmussen Hall, & Palm, 2002; Sloan, Marx, Epstein, & Lexington, 2007). For example, Park and Blumberg (2002) specifically examined changes in appraisals of a traumatic event as a result of writing, but results indicated that although these changes did occur, they were unrelated to health outcomes. However, a recent study indicated that individuals with a brooding ruminative style showed greater reductions in depressive symptoms as a result of expressive writing whereas individuals with more adaptive and active coping skills did not benefit from writing (Sloan, Marx, Epstein, & Dobbs, 2008). The authors suggested that writing may facilitate more active problem-solving for individuals who do not already possess these coping skills. In this way, these findings point to the importance of changing the way people think about stressful events in producing positive health benefits, which lends support to the cognitive adaptation theory.

Sloan and Marx (2004) also highlight the possibility that cognitive changes are better explained as a result of exposure to the traumatic memory. Therefore, one of the other leading theories is the possible role of expressive writing in reducing avoidance of stressful memories

and allowing for reductions in negative affect and opportunities for learning corrective information about feared aspects of the traumatic event. This theory would suggest that Pennebaker's paradigm produces an effect similar to that found in exposure therapy techniques. Again, results examining this theory have been mixed with some studies documenting changes in PTSD symptoms related to intrusion and avoidance (Bernard, Jackson, & Jones, 2006; Sloan, et al., 2007), while others show no relationship (Brown & Heimberg, 2001; Lepore, 1997). In addition, studies examining activation of negative affect immediately postwriting, which would be instrumental in producing habituation, have produced inconsistent findings (Kloss & Lisman, 2002; Sloan & Marx, 2004; Sloan, Marx, & Epstein, 2005). Explanations offered by Sloan and Marx (2004) relate to the variability in research design (e.g., severity of initial PTSD symptomatology, methods used to measure fear elicitation, topic switching by participants, number and length of writing sessions). Also, in a recent study that looked at both affective arousal and PTSD symptomatology, Smyth, Hockemeyer, and Tulloch (2008) found that PTSD symptomatology was not significantly impacted by expressive writing. However, self-reported mood and cortisol reactivity showed evidence of habituation and emotional writing participants also showed evidence of posttraumatic growth. This study highlights the complexity in measuring and understanding how the exposure paradigm might work when using a brief writing intervention for individuals exposed to traumatic events.

In summary, various theories have been proposed, but none have received unequivocal support. Sloan and Marx (2004) suggest that the mechanisms that underlie the effect of expressive writing may not be adequately explained by only one theory and that a more complex explanation may be needed to understand why emotional disclosure leads to improved physical and psychological wellbeing. In addition, they suggest that no study to date has concurrently

tested these theories, although this would represent an ideal way to evaluate their possible role in contributing to the effectiveness of this paradigm. Not only is further research needed to evaluate these theories, Pennebaker (2004) suggests that it is equally important that research should identify “when and with whom writing is most beneficial and, at the same time, evaluate if this (and other) intervention produces economically valuable outcomes” (p. 138).

For example, variations in methodology have increased the difficulty in understanding why written disclosure improves health and under what conditions it is most beneficial. A recent meta-analysis conducted by Frattaroli (2006) highlighted this issue by identifying a significant but small r effect size of .075 when averaged across 146 studies. As discussed by the author, the heterogeneity in study design and procedures led to many of these studies being conducted under less than favorable conditions, which weakened the overall effect size. A number of moderating variables were identified that improved the impact of writing on health outcomes, and in studies that utilized the most advantageous designs, the effect size was much higher at .200. For example, results of this meta-analysis indicated that the emotional writing paradigm is more effective when studies used participants with a history of trauma or physical health problems, included three or more writing sessions of at least 15 minutes, asked participants to write about more recent events or previously undisclosed events, and had follow-up periods of less than one month. Thus, Frattaroli (2006) concluded that further examination of these and other potential moderators are needed in order to clarify the conditions under which written disclosure can be most helpful and effective. Research examining potential moderators may also refine our understanding of theories developed to explain the relationship between emotional disclosure and improved health outcomes.

Many of Pennebaker's original results using this paradigm were documented among college students. Despite being high functioning, many students are still exposed to traumatic life events. In particular, the rates of sexual victimization among college students are especially high, with approximately 1 in 4 women endorsing a history of attempted or completed rape (Koss, Gidycz, & Wisniewski, 1987). These experiences can have severe consequences for victims, including greater psychological distress and poorer physical health (Koss & Kilpatrick, 2001). Thus, there is a need for effective interventions for rape victims that could alleviate distress caused by the event.

Due to the established effectiveness of written disclosure on emotional and behavioral outcomes in a variety of contexts, the purpose of this study will be to apply the written disclosure paradigm specifically to a sample of undergraduate women with a history of attempted or completed rape. Research suggests that disruption of cognitive processing of assault experiences can lead to persistence of PTSD symptoms (Halligan, Michael, Clark, & Ehlers, 2003). In turn, PTSD symptoms have also been linked to poor risk recognition and higher rates of revictimization (Wilson, Calhoun, & Bernat, 1999). Thus the development of interventions that could facilitate cognitive processing of traumatic memories could prove to be extremely helpful in reducing distress experienced by sexual assault survivors. The use of narratives in recovery from sexual assault has already been utilized by effective treatments such as Cognitive Processing Therapy (Resick & Schnicke, 1992). A recent dismantling study of CPT indicated that written accounts alone were effective at reducing distress, although cognitive therapy components increased the effectiveness of the treatment (Resick, Galovski, Uhlmansiek, Scher, Clum, Young-Xu, 2008). Although this study highlights the importance of cognitive reappraisals

with clinical samples, the improvement produced by written accounts alone is encouraging and may be particularly beneficial within a nonclinical sample.

Expressive writing with survivors of interpersonal violence

Some preliminary research using Pennebaker's paradigm has been conducted using participants with a history of exposure to interpersonal violence. Using a community sample of CSA survivors, Batten et al. (2002) found that written disclosure was unrelated to improvements in physical and psychological health at follow-up assessments. In another community sample of individuals with a history of betrayal trauma, Freyd, Klest, and Allard (2005) also found no effect for writing on health outcomes, although participants experiencing few betrayal traumas appeared to benefit more than individuals with many betrayal traumas. Finally, Koopman, Ismailji, Holmes, Classen, Palesh, and Wales (2005) failed to identify any overall relationship between expressive writing and distress levels in a sample of women exposed to intimate partner violence, although there was an interaction suggesting that highly depressed women in the emotional disclosure group showed greater reductions in depression at follow-up. Only one study has specifically examined the use of Pennebaker's writing paradigm with adult rape victims. Brown and Heimberg (2001) found that participants asked to incorporate both emotions and factual information into their narrative did not have better outcomes than participants who only focused on the facts.

Given the number of women exposed to interpersonal violence and the appeal of a brief writing intervention for reducing associated distress, these results are disappointing in that they are inconsistent with other findings using Pennebaker's paradigm. As suggested by Batten et al. (2002), expressive writing may not be sufficient as an intervention for severe interpersonal trauma. Another possibility is that variations in methodology influenced the null findings. As

mentioned previously, Frattaroli (2006) documented that there are optimal conditions and procedures that influence the effectiveness of Pennebaker's paradigm, which may have impacted the findings produced by these four studies. For example, the design in Brown and Heimberg (2001) departed significantly from Pennebaker's original paradigm by requiring only one day of writing and by adding a component where participants would read their narrative aloud to a confederate.

Another possibility is that there is heterogeneity among participants assigned to intervention groups and that a closer examination of narrative content is needed to assess the value of expressive writing. As mentioned previously, Pennebaker and colleagues have identified that writing about stressful events alone does not equal improved outcomes, but specifically it is individuals who show evidence of increased cognitive processing and use of emotion across writing sessions that exhibit improvements in psychological and physical health. In support of this possibility, Brown and Heimberg (2001) found that rape victims who included greater detail and personalization showed significant reductions in distress, although there were no overall group differences. Klest and Freyd (2007) also reexamined narratives produced in the study by Freyd et al. (2005) and developed a coding rubric that provided global ratings of coherence and organization for each essay. Degree of narrative organization was found to be related to symptom reduction six months after the writing intervention, lending further support to the idea that the creation of a coherent and organized story is key to seeing improvements in functioning. However, not all studies that examined narrative content produced consistent findings. In a reanalysis of narratives from the Koopman et al. (2005) study that focused more on narrative content, researchers found that greater use of both negative and positive emotion words was related to *increased* pain, with no relationship detected between cognitive processing words and

pain levels (Holmes, Alpers, Ismailji, Classen, Wales, Cheasty, Miller, & Koopman, 2007). There was also no association found between emotion and cognitive processing words and depression levels. Similarly, Batten et al. (2002) also failed to detect a relationship between narrative content and changes in outcome in individuals who were asked to write about childhood sexual abuse. Given these inconsistent findings, further research is needed to clarify how narrative content influences physical and emotional health outcomes.

Potential Moderators of the Effects of Expressive Writing

Severity of Trauma. In addition to closer examination of narrative content and its influence on health outcomes, this study will attempt to explore several potential moderators of the effect of expressive writing to determine whether changes in physical and psychological health were influenced by additional factors. One factor that has been identified as a possible moderating variable is the severity of the trauma being disclosed. Research has indicated that the severity of a sexual assault and perceived life-threat have been linked to higher levels of PTSD and greater distress (Ullman, Filipas, Townsend, & Starzynski, 2007). Thus, women who experienced an assault involving a greater degree of aggression may have more associated distress and greater need for intervention. Although great variability has been identified by researchers in the types of traumas disclosed, very little research has examined whether the severity of the trauma influences the outcome of Pennebaker's paradigm. However, in one study, Greenberg and Stone (1992) found that after participating in the emotional disclosure paradigm, individuals who rated their trauma as more severe had greater reductions in physical health complaints than individuals with less severe traumas. It is possible that emotional disclosure may be less beneficial or effective for individuals who do not have significant traumas, as they require less effort to inhibit thoughts and feelings associated with these events and tend to have lower

levels of associated distress. Thus, this study attempts to explore whether the severity of the assault, defined by participant ratings of perpetrator aggression, will influence the relationship between expressive writing and physical and psychological health outcomes.

Self-Blame. Given that the writing intervention is intended to reduce distress associated with a traumatic or stressful event, examining variables that influence subsequent PTSD symptoms and other measures of distress may be important in understanding the effect of Pennebaker's paradigm. One variable in particular that has been shown to influence distress following a sexual assault is self-blame by the survivor. Several studies have indicated that greater severity of PTSD symptoms results from higher levels of self-blame (Frazier, 2003; Koss, Figueredo, & Prince, 2002), and the importance of modifying appraisals of the event, including attributions of blame, in alleviating distress has also been emphasized in past research (Resick et al., 2008). Therefore, if the cognitive adaptation theory surrounding Pennebaker's paradigm is true, individuals with higher levels of self-blame associated with their most severe assault have the most potential to benefit from the emotional writing process, as they will be given the opportunity to examine and modify these beliefs through repeated writing about the incident. Subsequently, the writing process for individuals with high levels of self-blame would likely lead to greater improvements in physical and psychological health. In contrast, research would suggest that individuals with lower levels of self-blame would also have less distress associated with their sexual assault and be less likely to benefit from the writing process. Pennebaker's research suggests that individuals who include higher levels of cognitive and emotional processing words from the very beginning of the writing process fail to show the same benefits, which suggests that they have already formed a coherent narrative and demonstrated resilience to the trauma. Therefore, it is possible that women with low levels of self-blame would

fall into this category and be less likely to show improvements in health outcomes following the writing intervention. Further research is needed to examine the role of cognitive appraisals such as self-blame in moderating the effect of Pennebaker's paradigm on changes in physical and psychological distress.

Revictimization History. Another possible factor influencing the benefits of emotional disclosure is the presence of a complex trauma history (i.e., multiple adulthood rapes or additional presence of childhood sexual abuse history). Although writing about a stressful experience may allow for greater emotional and cognitive processing of the event and reduction in distress, one possibility for the inconsistent findings in this regard may be related to the common finding that many women with a history of sexual assault endorse not one but multiple traumas. Longitudinal studies have indicated that women with a history of sexual victimization are at least twice as likely as other women to experience additional sexual assaults (Gidycz, Hanson, & Layman, 1995). In this sense, having women focus on writing about one incident of sexual trauma may be valuable, but not necessarily linked to health improvements due to remaining distress caused by other incidents not disclosed during the intervention. It is possible that in order to experience the improvements in physical and psychological health observed in some individuals following their participation in Pennebaker's paradigm, they would need to repeat the writing process individually for each trauma incident. This idea was supported by Freyd et al. (2005) who found that individuals with few betrayal traumas benefited from expressive writing more than individuals with many betrayal traumas. However, additional research is needed to understand the role of multiple traumas in influencing the effects of Pennebaker's paradigm. Exploring the impact of revictimization history on the benefits of written disclosure could contribute to our understanding of how this intervention works and what

may be necessary for individuals to experience improvements in their physical and psychological well-being (i.e., emotional disclosure regarding each incident of trauma).

For this study, the presence of a complex trauma history was examined in two different ways. Specifically, adult revictimization (i.e., women with a single attempted or completed rape in adolescence or adulthood versus women with multiple attempted or completed rapes) was examined as a potential moderator of the effect of expressive writing on changes in physical and psychological health. In addition, history of childhood sexual abuse was also explored as a potential moderator, as women with this type of victimization may respond differently to the writing intervention.

Emotional self-disclosure. Although the emotional inhibition theory has received inconsistent support in past research, the meta-analysis by Frattaroli (2006) suggested that participants instructed to write about previously undisclosed traumas did show greater psychological benefits than those who were not specifically given these instructions. Thus, further research is needed to evaluate this theory. Issues surrounding disclosure are particularly relevant for sexual trauma survivors, as some studies have indicated that as many as one in three victims never disclose their assault (Hanson, Kievit, Saunders, Smith, Kilpatrick, Resnick, & Ruggiero, 2003; Smith, Letourneau, Saunders, Kilpatrick, Resnick, & Best, 2000). Ullman and Filipas (2001) found that a greater percentage of women (87%) disclose their assault to someone, but noted that approximately 37% of these women wait a year or more after their rape to tell someone. Even fewer women choose to disclose to formal support such as social services and law enforcement (Smith et al., 2000; Ullman & Filipas, 2001). In a review, Ullman (2003) concluded that approximately 28% to 60% of victims never disclose their assault. Given that such a large percentage of sexual trauma survivors do not disclose, or delay their disclosure for

months following their assault, examining the role of past disclosure as a potential moderator of expressive writing seems particularly important within a sample of sexual assault survivors.

There have been multiple studies that have examined the benefits of disclosing a sexual assault to formal and informal support sources and how this may be related to subsequent distress. Ruggiero, Smith, Hanson, Resnick, Saunders, Kilpatrick, and Best (2004) found that women who waited more than one month to disclose a rape that occurred prior to age 18 endorsed higher prevalence rates of Posttraumatic Stress Disorder after controlling for demographics and other rape characteristics. Similar results were found in an adolescent sample of sexual assault survivors who were at greater risk for a major depressive episode or delinquency if they had delayed disclosure of an assault (Broman-Fulks, Ruggiero, Hanson, Smith, Resnick, Kilpatrick, & Saunders, 2007). Thus, delaying disclosure of a sexual trauma may increase risk for subsequent psychological distress, which suggests that one way to prevent mental health problems in assault survivors is to provide opportunities where they can disclose and process their experience. These findings complement the theory of emotional inhibition that has been offered as an explanation for the effects of Pennebaker's paradigm and highlights the importance of examining the role of past disclosure in influencing the benefits of written disclosure about a sexual assault.

However, other studies emphasize the role of social reactions in influencing the relationship between disclosure and mental health outcomes. A review by Ullman (2003) concluded that negative social reactions to sexual trauma disclosures are highly prevalent and harmful to later psychosocial adjustment. Several studies have shown a direct relationship between negative social reactions and PTSD symptom severity, partly through its impact on a victim's level of self-blame and increased use of avoidance coping (Ullman, Filipas, Townsend,

& Starzynski, 2007; Ullman, Townsend, Filipas, & Starzynski, 2007). There is less evidence that positive social reactions influence the impact of disclosure of outcomes. Ullman (1996) did find that the experience of being listened to was related to more positive subjective ratings of recovery and less psychological symptoms. However, other forms of positive social reactions were unrelated to subsequent outcomes. Thus, while social reactions, particularly negative ones, appear important to victim adjustment, it is unclear whether they explain the relationship between disclosure processes and outcomes. If these reactions are ultimately more important than the disclosure itself, writing privately about a sexual assault experience may not be beneficial, as there is no opportunity to receive positive feedback and support as a result.

In this study, disclosure will be included as a potential moderating variable of the effect of expressive writing on changes in physical and psychological health, and disclosure will be defined in multiple ways. First, participants' indication of whether they have disclosed their most severe unwanted experience prior to the experiment will be considered for its influence on expressive writing benefits. Based on the emotional inhibition theory, as well as evidence that delayed disclosure is related to poorer adjustment, we predict that individuals who have already disclosed their trauma will evidence less improvement from the writing process. In addition, a person's general tendency to disclose or discuss emotional topics with others will be considered for its relationship to expressive writing, as well as consideration of whether women already own and write in diaries on a general basis. Currently no studies using Pennebaker's paradigm have examined whether these variables influence the effect of the intervention. It is possible that individuals who already employ diary-writing or who have a greater tendency to discuss emotional topics with others will benefit more from the writing process, as the intervention fits with their preexisting coping style and approach. However, it is also possible that these

individuals will benefit less from the writing process as they may have already reaped the benefits of disclosure and additional writing about a sexual assault would not lead to significant benefits. Due to the lack of previous research on these variables in particular, no specific predictions were made about the relationship of diary-writing and general self-disclosure tendencies on the effect of expressive writing on physical and mental health.

Topic of Writing. In addition to exploring the potential moderating effects of the aforementioned variables, examination of the specific topic of writing chosen by participants was also assessed for its role in producing health changes at follow-up. Of specific interest, participants' choice to focus on multiple versus single incidents of unwanted sexual experiences could be influential in producing different outcomes. Given that most proposed theories for the effects of expressive writing emphasize the opportunity for emotional and cognitive changes as a result of repeated writing about a specific traumatic memory (Sloan & Marx, 2004), participants who choose to focus on multiple memories may fail to experience the same benefits from processing their experiences. Therefore, the topic of writing was explored in this study to determine whether women who focused on single events would benefit more from the writing intervention than women who wrote about multiple sexual traumas.

In addition, the topic of writing may also speak to the type and recency of the traumatic event and likelihood of deriving benefits from processing these memories through expressive writing. Specifically, women were directed to write about their most severe unwanted sexual experience, and although all women were recruited due to their endorsement of victimization in adolescence or adulthood, some women may also have experienced sexual abuse in childhood and may have elected to write about these experiences instead as part of the writing intervention. In her meta-analysis, Frattaroli (2006) found that people who have written about more recent or

ongoing traumas demonstrate greater improvements in psychological health, reported health, and overall effects. Similar findings were documented in another meta-analysis by Smyth (1998) who suggested that current traumas may be more directly linked to a person's present functioning. Thus, discussing a distant or past trauma, such as CSA, may not result in the same types of health benefits seen in research on the writing paradigm. For example, in Batten et al. (2002), which found no benefits for expressive writing, a community sample of women were asked to write about sexual abuse in childhood. Because this event had occurred many years before their participation in the study, writing may have been less beneficial. Another possibility is that writing about CSA experiences will be less beneficial as these events occur during a different developmental period and often involve different levels of frequency and duration than isolated assaults in adolescence or adulthood. As suggested by Batten et al., resolving these types of traumatic events may require more than a few brief writing sessions in order to experience reductions in associated distress. Thus, the current study attempted to explore whether writing about CSA experiences versus sexual traumas occurring in adolescence or adulthood would influence health outcomes following the writing intervention.

Summary and Rationale for Study

In summary, sexual victimization occurs at alarmingly high rates with serious and wide-ranging consequences. Therefore, there is a need for effective interventions that are accessible and cost-effective for a greater number of women. Past research has indicated that trauma narratives that show more development, organization, and emotional content are related to more positive outcomes (Foa et al., 1995; Amir et al., 1998). In addition, a brief writing paradigm developed by Pennebaker and colleagues indicates that expressive writing over the course of a few short writing sessions can produce improvement in physical and psychological well-being.

In particular, those participants who show evidence of emotional and cognitive processing through the development of a more organized trauma narrative seem to benefit the most from the writing process and evidence the most improved functioning. The application of this paradigm to survivors of interpersonal violence has produced inconsistent findings, and meta-analyses have highlighted how variations in study design influence the effectiveness of this intervention. Thus, further research is needed that explores the applicability of Pennebaker's emotional disclosure paradigm with women exposed to interpersonal violence, with particular emphasis on study procedures and designs that optimize the benefit of expressive writing (i.e., multiple writing sessions, use of trauma populations, longer writing sessions, etc.). In addition, studies are needed that examine the narrative content produced by participants to increase understanding of how and when expressive writing about a trauma can lead to reductions in distress. Finally, the additional role of other potential moderating variables should be identified and explored in order to maximize the effects of expressive writing and the benefits it can offer to women exposed to sexual trauma.

Despite the endemic rates of sexual aggression on college campuses, only one study has applied Pennebaker's paradigm to adult rape victims and this study did not follow Pennebaker's traditional format. Specifically, Brown and Heimberg (2001) included only one day of writing instead of multiple writing sessions, and participants also were asked to read their completed narrative aloud to another person. In order to address some of these limitations, Crawford, Edwards, Calhoun, Gidycz, Mondillo, and Desai (2008) conducted a multisite investigation where college female survivors of attempted or completed rape were randomly assigned to either write expressively about their most severe unwanted sexual experience or to write objectively about how they spend their time. In order to enhance the potential benefit of writing, study

design and procedures incorporated multiple factors suggested by Frattaroli (2006) as moderating variables. Thus, women wrote for four sessions that each lasted 30 minutes in length and were provided with directed questions or examples of what to disclose as well as a private setting in which to disclose. Subsequently women were followed for one month and measures of physical and psychological health, including traumatic stress, were reassessed. Results indicated that women asked to write about a sexual trauma showed greater reductions on POMS negative affect scores across writing sessions, lending support to the theory that writing represents a form of exposure allowing gradual extinction of negative affect. However, *both* groups evidenced significant improvements in physical and psychological health at follow-up, suggesting that there was no greater benefit associated with disclosure of a sexual assault.

The results of this study are promising in that women who wrote about a sexual trauma did show evidence of improvement in functioning at follow-up. However, those results do not support the use of Pennebaker's paradigm as an intervention for college-aged adult rape victims, as participants in the control group also demonstrated similar improvements. While this could simply represent a regression to the mean, past research clearly indicates that the content and organization of narratives is an important predictor of benefit from writing. In addition, Frattaroli (2006) identified multiple moderators of the effect of expressive writing, which makes it extremely important that research using this paradigm attempts to examine and evaluate factors that may have influenced the results of a particular study.

Thus, the present study builds on the previous investigation by examining narrative content to assess whether improvements in functioning were related specifically to linguistic characteristics and organization of essays produced by participants in the intervention group. More specifically, this study utilized the LIWC program to assess the use of emotion words,

causal words, and insight words to explore the impact of these linguistic factors on outcome measures of psychological and physical distress. Consistent with past findings by Pennebaker and colleagues, we predicted increased use of positive emotion words, negative emotion words, and an increase over time in causal and insight words, and that these increases would be related to improvement in physical and psychological health. In order to further assess the overall coherence, detail, and organization of the narratives, a global coding scheme (Klest & Freyd, 2007) was also applied to participant's narratives to assess degree of organization and coherence. It was hypothesized that participants with more organized narratives would show greater reductions in psychological distress at follow-up assessment. In addition, the role of several potential moderating variables (i.e., trauma severity, self-blame, revictimization history, and emotional self-disclosure) was examined to further our understanding of when and how written disclosure can lead to the greatest improvements in physical and mental health.

CHAPTER 2

METHOD

Participants

Seventy-one female undergraduates enrolled in introductory psychology courses at the University of Georgia and at Ohio University were recruited through the research participant pool and compensated with course credit. Following an initial screening they were selected for further participation based on the following criteria: 1) Must be at least 18 years or older, 2) Must endorse a history of attempted or completed rape since the age of 14. Average participant age was 18.8 ($sd = 0.83$). The sample was primarily Caucasian (90%), followed by African American (1%), Asian (1%), Pacific Islander (1%), and Other (6%).

Measures

Adolescent or adult sexual victimization. The Sexual Experiences Survey was completed in order to assess for unwanted sexual experiences since the age of 14 (Koss & Oros, 1982). This self-report measure includes ten items that utilize behavioral descriptions of different victimization experiences extending from unwanted kissing to completed rape. In this study, women were asked to participate in the written disclosure paradigm if they endorsed a history of attempted or completed rape (i.e., vaginal or anal intercourse resulting from force, threat of force, or inability to consent due to use of alcohol or drugs). The SES was also modified to incorporate additional items in order to assess frequency of each form of unwanted sexual experiences. This measure possesses strong psychometric properties with internal consistency reported for this instrument as $\alpha = .74$ and two-week test-retest reliability reported as $r = .93$ for women (Koss & Gidycz, 1985). The SES also has established validity as evidenced by

agreement rates of $r = .73$ between interview assessment of victimization history and responses on the SES instrument.

Childhood sexual abuse history. In order to assess for sexual victimization history in childhood (prior to age 14), the Childhood Sexual Victimization Questionnaire (Finkelhor, 1979) was administered. This 8-item measure assesses various types of sexual experiences, ranging from noncontact forms of abuse (e.g., another person showing their sex organs to you) to completed rape CSA (e.g., actual vaginal, oral, or anal penetration of the child). Participants who endorsed experiencing any of these events also provided follow-up information regarding the age difference between the individual and the perpetrator and the main reason the individual participated. Women were identified as CSA victims if they endorsed one or more experiences and indicated that the perpetrator was five or more years older and/or force or threat of force was used. This measure possesses adequate psychometric properties (Risn & Koss, 1987).

Trauma symptoms. The Trauma Symptom Checklist was used to assess for presence of traumatic stress symptoms (Briere & Runtz, 1989). This questionnaire is a 40-item measure of symptoms commonly associated with traumatic experiences and falling into six subscales including Anxiety, Depression, Dissociation, Sexual problems, Sleep disturbance, and a Sexual Abuse Trauma Index. Each participant is asked to rate the frequency at which they have experienced each symptom over the past two months using a four point scale ranging from 0 (*never*) to 3 (*often*). Sample items include “Feelings of guilt,” “Nightmares,” and “Memory problems.” Internal reliability for this instrument has been reported at $\alpha = .90$ and validity was demonstrated by this measure’s ability to strongly discriminate between sexual abuse survivors and women with no history of sexual abuse within a large non-clinical sample (Elliott & Briere, 1992).

Psychological health. The Brief Symptom Inventory (BSI) was utilized in this study as a measure of psychological distress. This self-report measure is a shortened version of the Symptom Checklist-90 (SCL-90; Derogatis, 1977) and consists of 53 items measuring psychological distress in nine different domains, including anxiety, depression, somatization, obsession-compulsion, interpersonal sensitivity, hostility, phobic anxiety, paranoid ideation, and psychoticism. Participants are asked to rate how much each symptom has bothered or distressed them in the previous seven days on a five-point Likert scale ranging from 0 (*Not at all*) to 4 (*Extremely*). Sample items include “Feeling no interest in things,” “Feeling fearful,” and “Feeling easily annoyed or irritated.” In this study, the global severity index was used as a measure of psychological distress, as it represents a sum of the nine different symptom dimensions and represents an indicator of overall distress level. Internal consistency and test-retest reliability has been reported as high, with good evidence of convergent and construct validity (Derogatis & Melisaratos, 1983).

Physical health. Assessment of physical health complaints was achieved by utilizing the Pennebaker Inventory of Limbic Languidness (PILL). This measure originally developed by Pennebaker (1982) is a 54-item checklist of common physical health complaints (e.g., “Headaches,” “Congested nose,” and “Coughing”). Participants are asked to rate on a five point Likert Scale the frequency at which they have experienced each of these symptoms. Internal reliability for this instrument ranges from $\alpha = .88$ to $.91$ and two-month test-retest reliability ranges from $.79$ to $.83$. The mean score within a sample of college students was reported as 112.7 ($SD = 24.7$).

Immediate Mood Postwriting. In order to measure participant’s emotional reactions to the writing process and potential affective arousal, participants were asked to complete the Profile of

Mood States (POMS) immediately following completion of the writing task at each of the four writing sessions. The POMS is a 65-item checklist of emotion words where participants are asked to rate how much each word represents their current mood state (McNair, Lorr, & Droppleman, 1971). Six subscales are included and consist of Vigor (e.g., “lively,” “energetic,” “alert”), Fatigue (e.g., “worn out,” “listless,” “exhausted”), Tension (e.g., “tense,” “shaky,” “anxious”), Depression (e.g., “unhappy,” “sad,” “hopeless”), Anger (e.g., “peevish,” “annoyed,” “furious”), and Confusion (e.g., “confused,” “muddled,” “bewildered”). Participants are asked to rate each emotion word on a scale from 1 (*Not at all*) to 5 (*Extremely*). The POMS possesses strong reliability (McNair et al., 1971) and validity, based on correlations with other established measures of current mood (Terry, Lane, & Fogarty, 2003).

Emotional Self-Disclosure. The Emotional Self-Disclosure scale is a 40-item measure designed to assess a person’s tendency to disclose or discuss a range of emotional topics or situations with other people (Snell, Miller, & Belk, 1988). Participants are asked to rate their responses on a five-point Likert scale ranging from 1 (“*I have not discussed this topic with anyone*”) to 5 (“*I have fully discussed this topic with someone*”). Examples of topics include “times when you felt depressed,” “times when you felt happy,” and “times when you felt worried.” This measure has been shown to possess good psychometric properties (Snell et al., 1988).

Details of the Assault Questionnaire. Participants completed the Details of the Assault Questionnaire immediately following completion of the SES in order to assess more information regarding their victimization history. This 13-item measure instructs participants to refer to their most severe unwanted sexual experience and provide additional information on factors associated with this particular incident, such as relationship to the perpetrator, the use of alcohol

or drugs by either the victim or the perpetrator at the time of the assault, degree of perpetrator violence, degree of self-blame, and degree of perpetrator blame. Each question is multiple-choice including a “no experience” option for those individuals without any history of sexual assault.

Procedure

Initial Assessment. IRB approval was obtained prior to initiating the study. Participants were recruited from two different universities through their respective university research participant pool and were compensated with course credit. A female research assistant administered written informed consent and then provided participants with a confidential survey including measures of sexual victimization, physical health, psychological health, traumatic stress, self-disclosure, and coping style. Participants were also asked to complete a contact information form if they were interested in participating in the second phase of the research study for additional course credit. Participants were then asked to read a debriefing form and given the opportunity to ask questions.

Writing Intervention. Women who met inclusion criteria for victimization status and who expressed interest in participating in additional research were contacted by the researcher to participate in the second phase of the study. They met individually with a female research assistant to complete informed consent. The research assistant then randomly assigned participants to either the intervention or control group, provided writing instructions and administered the writing task. There were no significant differences between groups on demographic variables or baseline health measures, indicating that randomization was effective.

For the intervention group, participants were instructed to write about their deepest thoughts and feelings regarding their most severe victimization experience. The control group was instructed to write as objectively as possible about a neutral topic (how they spend their

time). Participants attended four writing sessions spread out over two weeks, and were asked to write for 30 minutes at each session. Following each day of the writing task, all participants completed the Profile of Mood States (a checklist of subjective mood). On the final day of participation, participants were provided with a referral list.

Follow-up Assessment. Participants were contacted one month following participation and scheduled for an individual appointment where they completed the same questionnaires as in the initial assessment and were specifically asked about their symptoms over the past month since they had last participated in the study. Following their completion of this assessment, participants were debriefed by the research assistant, who explained the purpose of the study in more detail and provided opportunities to ask additional questions. Participants were again provided with a referral list and contact information for the researcher.

Linguistic Analysis. Narratives were analyzed using a computerized text analysis program developed by Pennebaker and colleagues in order to assess linguistic indicators of cognitive and emotional processing. The Linguistic Inquiry Word Count (LIWC) program incorporates an extensive lexicon of over 2000 words in approximately 71 categories (Pennebaker, Francis, & Booth, 2001). In addition to overall word count and average words per sentence, LIWC provides information on the percentage of words per text found in each category. For this study, we were primarily interested in the percentage of words for each narrative that represent the following categories: Positive Emotion Words, Negative Emotion Words, Causal Words, and Insight Words.

Global Coding Scheme. In addition to narrative analysis using a computer word-count program, narratives were also coded using the GREAT code (Klest & Freyd, 2007). This coding scheme involves a scoring rubric that provides global ratings of essay coherence (i.e., overall

plan and structure) and cohesion (i.e., transition and flow of writing and ideas) and was specifically created for trauma narratives. The scheme was developed based on existing rubrics within the field of education across a range of grade levels in order to select scoring components that would not be confounded with educational attainment. Klest and Freyd (2007) confirmed that this coding scheme was not correlated with the Flesch ease-of-reading scale which is a measure of readability and grade level. Cohesion and coherence are each rated on a five-point scale with descriptive scoring criteria provided to increase objectivity in ratings for each essay. In the original application of the GREAT code, a high level of inter-rater reliability was achieved, with alphas ranging from .84 to .93. Predictive validity was also indicated in Klest and Freyd (2007), which found that organization scores were associated with subsequent decreases in physical and mental health problems. Thus, in order to assess overall coherence and cohesion of narratives produced in this study, the GREAT code was applied, and ratings of coherence and cohesion were summed to form a total organization score for each narrative. The primary coder trained two additional independent raters and coded two different subsets of the narratives, each representing one-fourth of the total sample, in order to achieve adequate inter-rater reliability with each additional rater. Both independent raters achieved a 73% agreement with the primary coder, using adjacent coding procedures. All disagreements were resolved through discussion. The remainder of the narratives were then divided among the three raters and coded separately.

Data Analysis Plan

In this study, examination of narrative content focused on LIWC categories identified in previous research as significant predictors of symptom reduction, including positive emotion words, negative emotion words, insight words, and causal words. Consistent with previous research suggesting that increase in word usage across writing sessions produces health benefits,

change scores from the first to last day of writing were utilized as predictor variables. Thus, positive change scores indicated an increase in the use of each type of word across writing sessions and negative change scores indicated decreases in the use of each type of word across writing sessions. A similar approach was used with global essay ratings of organization produced by the GREAT code.

In order to test the hypothesis that narrative content would predict changes in physical and psychological health, multiple regression analyses were utilized. Predictor variables included change scores for positive emotion words, negative emotion words, insight words, and causal words. In addition, PILL, TSC, and BSI scores from the initial screening assessment were included as a predictor in order to co-vary out baseline health scores. Three separate analyses were conducted with these predictor variables using each of the three symptom measures as dependent variables: follow-up PILL scores, TSC scores, and BSI scores. Multiple regression was also used to test the second hypothesis that greater narrative organization would predict improved health outcomes. Total organization scores from the GREAT code, along with baseline health scores, were the predictor variables, with follow-up PILL, TSC, and BSI scores as the dependent variables. These analyses clarified whether narrative organization or the use of emotion, insight, and causal words would lead to improvements in physical and psychological health.

In addition, moderation techniques were used to test the influence of several variables on the relationship between expressive writing and improvements in physical and psychological health. According to Baron and Kenny (1986), analytic procedures for testing moderation vary depending on the level of measurement of the independent variable and the moderator variable. In this study, we looked at the influence of the writing intervention on follow-up measures of

physical and psychological health, as well as trauma symptoms. Thus, our independent variable was group status (intervention vs. control), which is a categorical variable. We were interested in several moderators that are also categorical, namely history of single vs. multiple sexual assaults, past disclosure of the incident (yes/no), and regular use of a diary (yes/no). When you have independent and moderator variables that are both categorical in nature, Baron and Kenny (1986) suggest the use of a 2 X 2 ANOVA with moderation indicated by a significant interaction effect. Thus a 2 X 2 ANOVA with group status and each of the proposed categorical moderator variables was conducted for changes in PILL, TSC, and BSI scores at follow-up.

In contrast, other moderator variables of interest in this study were measured as a continuous variable (e.g., degree of self-rated trauma severity, degree of self-blame, and score on the Emotional Self-Disclosure Scale). Frazier, Tix, and Barron (2004) suggest the use of hierarchical multiple regression for testing moderator effects after categorical variables have been represented with code variables (i.e., control group = 0, intervention group = 1) and continuous variables have been standardized to reduce multicollinearity and to increase ease of interpretation. Thus, each of the proposed moderator variables was standardized prior to testing for moderation. These scores and the codes for group status were multiplied to form a product term to test for significant interaction. Hierarchical regression techniques were then utilized by entering group status and standardized scores for each moderator in the first step, followed by the interaction term in the second step. Significant moderation was indicated by a significant interaction term. These procedures were again conducted for each of the three follow-up measures assessing physical and psychological symptom changes.

CHAPTER 3

RESULTS

Descriptive Analyses. The LIWC program was utilized to calculate usage of positive emotion, negative emotion, insight, and causal words in each individual narrative written by both the intervention and control group participants. Of primary interest to this study, change in word usage from the first to the last day of writing was subsequently calculated, such that positive change scores indicated an increase in the use of each type of word across writing sessions. A similar approach was utilized with global ratings of organization, as assessed using the GREAT code. Means and standard deviations are depicted in Table 1 as a function of group assignment.

Using a mixed between-within subjects analysis of variance (ANOVA), results indicated that for word counts provided by the LIWC program, a significant interaction was detected between group assignment and word usage across time for Negative Emotion words ($F(1, 69) = 21.23, p < .001, \text{Wilks' Lambda} = .77, \eta^2 = .24$), Insight words ($F(1, 69) = 40.97, p < .001, \text{Wilks' Lambda} = .63, \eta^2 = .37$), and Causal words ($F(1, 69) = 15.36, p < .001, \text{Wilks' Lambda} = .82, \eta^2 = .18$). Specifically, the intervention group showed an increase in their use of negative emotion, insight, and causal words from Day 1 to Day 4 of the writing intervention, whereas the control group decreased in their use of these types of words. With Positive Emotion words, significant main effects were detected for both Time ($F(1, 69) = 9.98, p < .01, \text{Wilks' Lambda} = .87, \eta^2 = .13$) and Group ($F(1, 69) = 80.63, p < .001, \eta^2 = .54$). Although the intervention group used more positive emotion in their writing than the control group overall, both groups

Table 1

Means and Standard Deviations for Narrative Content Variables for Intervention and Control Group

	Day 1	Day 2	Day 3	Day 4	Average	Change
Intervention Group (<i>n</i> = 38)						
Positive Emotion	3.20 (1.07)	2.82 (0.66)	3.96 (1.18)	3.63 (1.22)	3.40 (0.74)	0.42 (1.49)
Negative Emotion	2.70 (1.02)	2.86 (1.46)	3.23 (1.09)	3.30 (1.12)	3.02 (0.79)	0.60 (1.16)
Insight	3.14 (0.96)	3.46 (1.09)	4.02 (0.89)	3.98 (0.99)	3.65 (0.61)	0.84 (1.10)
Causal	1.80 (0.63)	2.01 (0.75)	2.50 (0.83)	2.31 (0.80)	2.15 (0.44)	0.51 (0.91)
Organization	9.26 (1.03)	8.47 (1.22)	8.21 (1.51)	7.89 (1.80)	8.46 (1.05)	-1.37 (1.84)
Control Group (<i>n</i> = 33)						
Positive Emotion	1.50 (0.65)	1.36 (0.61)	1.27 (0.69)	2.03 (0.93)	1.54 (0.49)	0.54 (0.97)
Negative Emotion	0.70 (0.45)	0.74 (0.51)	0.47 (0.44)	0.28 (0.40)	0.55 (0.27)	-0.41 (0.53)
Insight	0.91 (0.51)	1.01 (0.57)	0.64 (0.48)	0.39 (0.36)	0.74 (0.34)	-0.52 (0.59)
Causal	0.95 (0.48)	1.31 (0.60)	1.21 (0.59)	0.71 (0.42)	1.04 (0.29)	-0.24 (0.65)
Organization	9.15 (0.97)	9.06 (1.39)	9.03 (1.21)	9.12 (1.29)	9.09 (0.73)	-0.03 (1.57)

Note. Change column indicates change scores from Day 1 to Day 4, with positive scores indicating an increase from Day 1 to Day 4 in word usage or organization rating.

demonstrated an increase in positive emotion words from the first to the last day of writing.

Figure 1 depicts pattern of change for word count categories as a function of group assignment.

In contrast to the word counts provided by LIWC, a different pattern emerged for global ratings of organization, as measured using the GREAT coding scheme. A significant interaction was also detected ($F(1, 69) = 10.71, p < .01, \text{Wilks' Lambda} = .87, \eta^2 = .13$), but in this case, the intervention group demonstrated decreases in overall organization across writing sessions.

Ratings of organization in the control group remained stable from first to last writing sessions.

Significant main effects for both group and time were detected but should be interpreted in the context of the above interaction.

Narrative Content

Following the writing intervention, results indicated that both groups evidenced significant reductions in physical health complaints, psychological distress, and traumatic stress symptom at a one-month follow-up assessment (Crawford et al., 2008). Means and standard deviations are depicted in Table 2. In order to test the hypothesis that narrative content would predict these observed changes in physical and psychological health, hierarchical multiple regression analyses were utilized. Given that both groups reported significant health improvements following the writing intervention and no differences in health outcomes were detected between groups, participants from both groups ($N = 71$) were included in regression analyses. In the first step, PILL, TSC, and BSI scores from the initial screening assessment were included as a predictor in order to co-vary out baseline health scores. In the second step, predictor variables included change scores for positive emotion words, negative emotion words, insight words, and causal words. Three separate analyses were conducted with these predictor

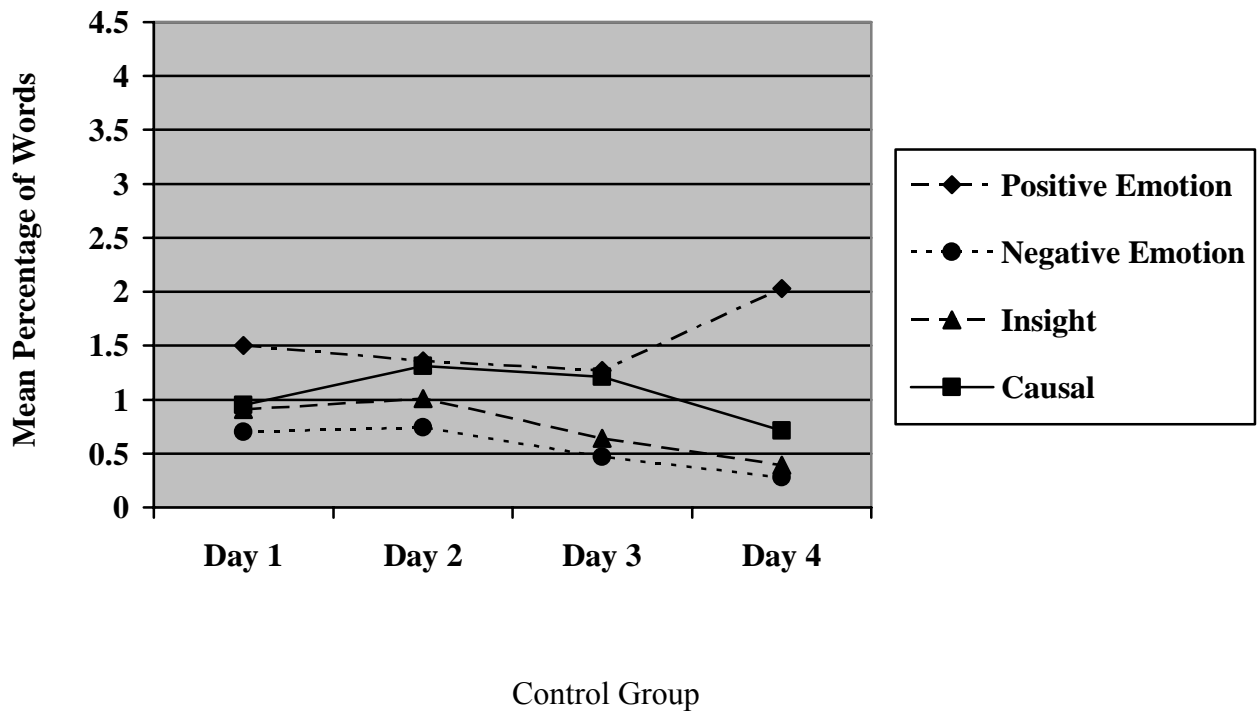
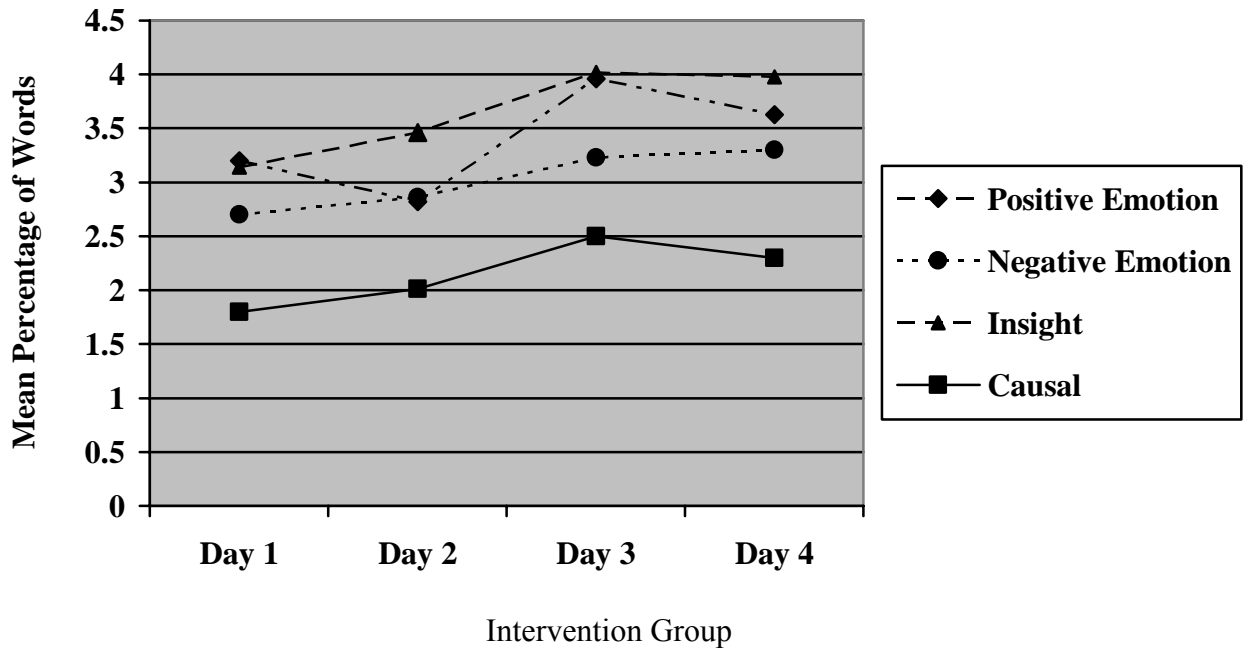


Figure 1. Mean LIWC word counts across four days of writing for intervention and control group.

Table 2

Means and Standard Deviations for Intervention and Control Group on Outcome Health

Measures

Outcome Measures	Pre-Assessment		Follow-up Assessment	
	Intervention	Control	Intervention	Control
Physical Health	39.82 (27.28)	40.12 (23.16)	16.05 (16.73)	15.88 (11.33)
Psychological Health	1.02 (0.62)	1.11 (0.62)	0.71 (0.53)	0.69 (0.56)
Traumatic Stress	34.61 (15.80)	36.42 (19.11)	24.01 (14.83)	22.17 (11.60)

Note. Overall both groups decreased significantly from pre-assessment to follow-up on all three outcome measures, but no group differences or interaction effects were detected.

variables using each of the three symptom measures as dependent variables: follow-up PILL scores, TSC scores, and BSI scores.

For all three outcome measures, results indicated that after controlling for baseline health scores, none of the LIWC word categories (i.e., changes in positive emotion, negative emotion, insight, and causal words) predicted levels of physical or psychological distress at the one-month follow-up assessment (See Table 3). The same analysis plan was also conducted utilizing average scores across writing sessions as the predictor variables with each of the three outcome measures. Again, results suggested that LIWC word categories, as measured by average scores, also failed to predict physical and psychological distress after controlling for baseline health scores (See Table 4).

A similar data analysis plan was also conducted to test the second hypothesis, namely that ratings of narrative coherence and cohesion would also predict changes in physical health, psychological health, and traumatic stress following the writing intervention. Consistent with Klest and Freyd (2007) who developed the GREAT code, coherence and cohesion ratings were summed to form an overall rating of narrative organization for each day of writing. Change in organization ratings from the first to the last day of writing were then entered into the regression model in the second step, after controlling for baseline health scores. Results indicated that narrative organization failed to predict changes in physical health, psychological health, or traumatic stress, after controlling for baseline health scores (See Table 5).

Previous research utilizing the GREAT code indicated that average organization ratings significantly predicted health outcomes whereas change scores did not (Klest & Freyd, 2007). In addition, significant change was not detected generally within in the control group and in the intervention group, organization ratings changed in the opposite direction (i.e., decreased from

Table 3

Summary of Hierarchical Regression Analysis Using Change Score Word Counts to Predict PostIntervention Health Outcome Scores

(N=71)

Variable	BSI			PILL			TSC		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Step 1									
Baseline Health	0.524	0.084	0.599*	0.389	0.050	0.684*	0.503	0.070	0.651*
Step 2									
Baseline Health	0.519	0.091	0.594*	0.409	0.054	0.719*	0.496	0.073	0.643*
Positive Emotion	0.013	0.045	0.031	-1.394	1.069	-0.123	0.165	1.017	0.016
Negative Emotion	0.011	0.057	0.021	-0.851	1.351	-0.062	-0.187	1.323	-0.015
Insight	-0.001	0.056	-0.003	0.358	1.361	0.028	1.288	1.310	0.108
Causal	0.007	0.072	0.011	0.704	1.722	0.043	0.100	1.664	0.007

Note. For BSI, $R^2 = .359$ for Step 1, $R^2 = .360$ for Step 2; For PILL, $R^2 = .468$ for Step 1, $R^2 = .488$ for Step 2; For TSC, $R^2 = .424$ for Step 1, $R^2 = .435$ for Step 2.

* $p < .01$

Table 4

Summary of Hierarchical Regression Analysis Using Average Word Counts to Predict Postintervention Health Outcome Scores

(N=71)

Variable	BSI			PILL			TSC		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Step 1									
Baseline Health	0.524	0.084	0.599*	0.389	0.050	0.684*	0.503	0.070	0.651*
Step 2									
Baseline Health	0.522	0.091	0.597*	0.357	0.052	0.628*	0.498	0.074	0.645*
Positive Emotion	-0.040	0.094	-0.085	-3.379	2.165	-0.265	-1.831	2.161	-0.155
Negative Emotion	0.029	0.088	0.075	3.211	2.102	0.309	2.488	2.038	0.257
Insight	0.047	0.085	0.136	-2.135	2.023	-0.229	0.498	1.970	0.058
Causal	-0.060	0.147	-0.074	3.509	3.462	0.164	-2.134	3.403	-0.107

Note. For BSI, $R^2 = .359$ for Step 1, $R^2 = .368$ for Step 2; For PILL, $R^2 = .468$ for Step 1, $R^2 = .469$ for Step 2; For TSC, $R^2 = .424$ for Step 1, $R^2 = .445$ for Step 2.

* $p < .01$

Table 5

Summary of Hierarchical Regression Analysis Using Change Scores for Organization Ratings to Predict Postintervention Health Outcome Scores (N=71)

Variable	BSI			PILL			TSC		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Step 1									
Baseline Health	0.524	0.084	0.599*	0.389	0.050	0.684*	0.503	0.070	0.651*
Step 2									
Baseline Health	0.545	0.087	0.624*	0.409	0.054	0.719*	0.522	0.073	0.677*
Organization	-0.028	0.029	-0.096	-0.686	0.749	-0.087	-0.746	0.686	-0.102

Note. For BSI, adjusted $R^2 = .350$ for Step 1, adjusted $R^2 = .349$ for Step 2; For PILL, adjusted $R^2 = .461$ for Step 1, adjusted $R^2 = .459$ for Step 2; For TSC, adjusted $R^2 = .416$ for Step 1, adjusted $R^2 = .418$ for Step 2.

* $p < .01$

Day 1 to Day 4 of writing intervention). Thus, after determining that change in organization ratings did not predict subsequent health outcomes, the same analysis plan was also conducted using average organization ratings across all four days of writing. Results indicated that average narrative organization did not predict follow-up physical and psychological health (as measured by the PILL and BSI), after controlling for baseline health measures. However, average narrative organization did significantly predict traumatic stress scores at follow-up, as indicated by a significant F change, $F(1, 68) = 4.93, p < .05$ (see Table 6). Specifically, greater levels of narrative organization, averaged across all four days of writing, predicted lower levels of traumatic stress at follow-up, after controlling for baseline traumatic stress scores.

Moderation

In this study, several variables were identified as potential moderators of the relationship between expressive writing and health outcomes. The independent variable in all analyses was group status (intervention vs. control), and dependent measures were change scores on the PILL, BSI, and TSC. Categorical moderators were tested using a between-subjects 2 X 2 ANOVA and continuous moderators were tested using hierarchical multiple regression, with a significant interaction indicating moderation for both approaches.

Revictimization History. Results of comparing women with a history of multiple attempted and completed rapes versus women with only one rape indicated that revictimization history had no relationship or interaction with group status to influence psychological health outcomes (e.g., change in TSC and BSI scores). However, adult victimization history did moderate the effect of group status on changes in physical health, as indicated by a significant interaction effect ($F(1, 67) = 5.39, p < .05, \eta^2 = .074$), see Figure 2. Among participants in the intervention group, reduction in physical health complaints was greater for revictims than single-

Table 6

Summary of Hierarchical Regression Analysis Using Average Organization Ratings to Predict Postintervention Health Outcome Scores (N=71).

Variable	BSI			PILL			TSC		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Step 1									
Baseline Health	0.524	0.084	0.599**	0.389	0.050	0.684**	0.503	0.070	0.651**
Step 2									
Baseline Health	0.523	0.085	0.599**	0.389	0.050	0.684**	0.499	0.069	0.647**
Organization	-0.008	0.054	-0.015	0.004	1.324	0.000	-2.739	1.234	-0.197*

Note. For BSI, adjusted $R^2 = .350$ for Step 1, adjusted $R^2 = .340$ for Step 2; For PILL, adjusted $R^2 = .461$ for Step 1, adjusted $R^2 = .453$ for Step 2; For TSC, adjusted $R^2 = .416$ for Step 1, adjusted $R^2 = .447$ for Step 2.

* $p < .05$

** $p < .01$

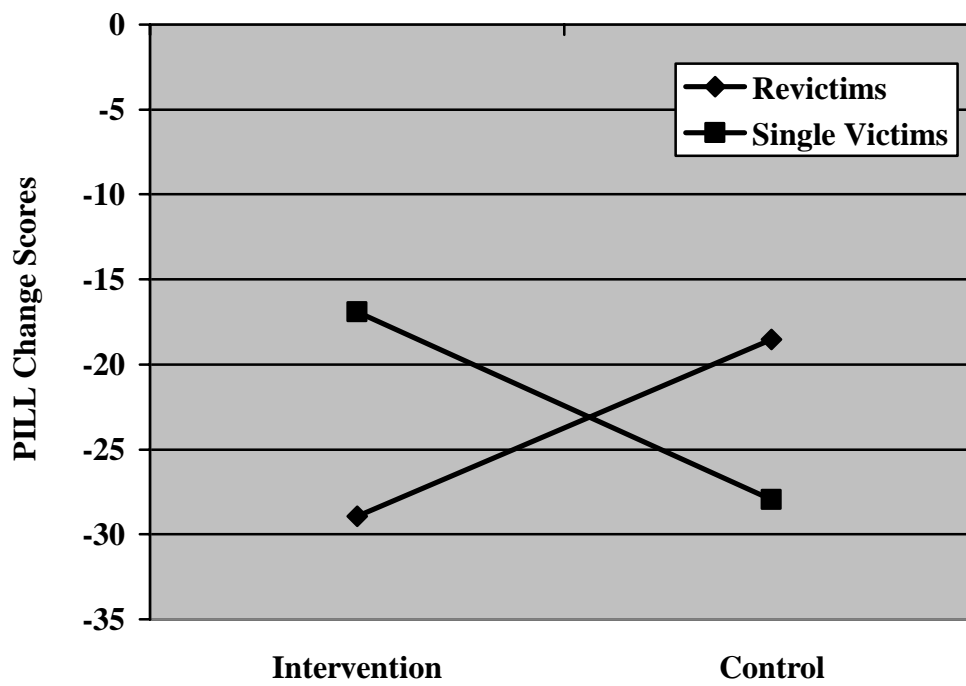


Figure 2. Interaction between revictimization status and group assignment on changes in physical health scores.

assault victims, but in the control group, single-assault victims experienced greater reductions in physical health complaints. There was no main effect for group status or revictimization history on changes in physical health scores.

Moderation analyses were also used to examine the impact of childhood sexual abuse history on the relationship between expressive writing and health outcomes. Of the 71 participants in this study, 14.1% ($n = 10$) endorsed a history of childhood sexual abuse. Results indicated that CSA history did not moderate the effect of expressive writing on changes in physical health, as measured by the PILL. However, a significant interaction between CSA history and group status was detected for changes in psychological health ($F(1, 67) = 4.51, p < .05, \eta^2 = .063$) and traumatic stress ($F(1, 67) = 4.10, p < .05, \eta^2 = .058$), suggesting that CSA history does moderate the relationship between expressive writing and psychological health outcomes. Specifically, in the intervention group, women with a history of CSA reported greater reductions in psychological health problems (see Figure 3) and traumatic stress (See Figure 4) than women without a history of CSA.

Previous Disclosure. The relationship between group status and changes in physical and psychological distress was not impacted by whether or not the participant had previously disclosed their most severe unwanted sexual experience prior to participating in the study.

Regular Diary Use. Participants' use of a diary on a regular basis was also found to be unrelated to the relationship between expressive writing and changes in physical or psychological distress, as well as traumatic stress.

Trauma Severity. Results indicated that the severity of the assault, as indicated by participants' ratings of perpetrator aggression, also had no impact on the relationship between expressive writing and health outcomes.

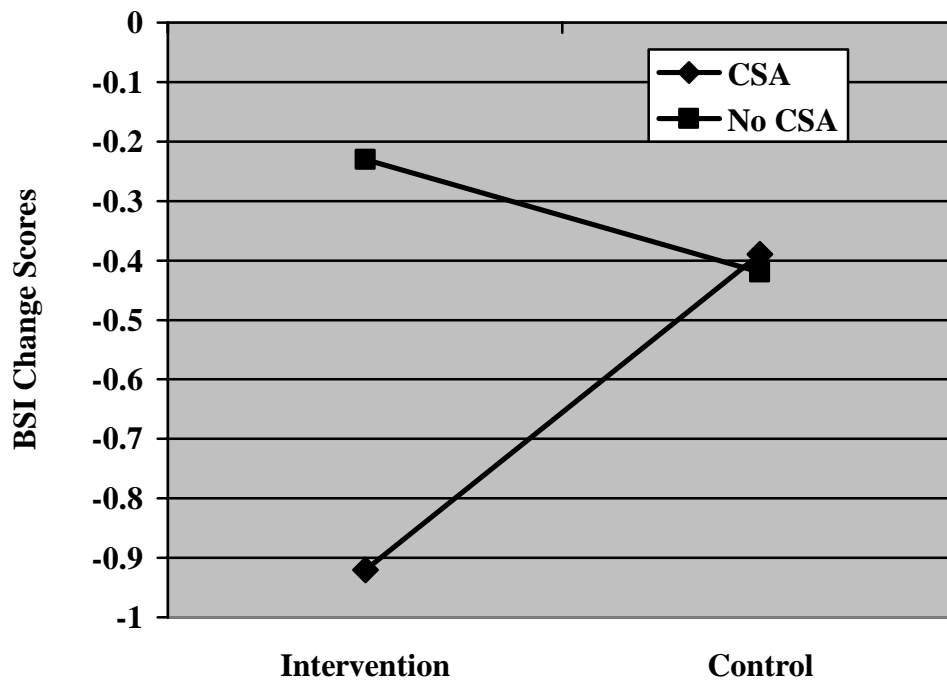


Figure 3. Interaction between child sexual abuse history and group assignment on changes in psychological health scores.

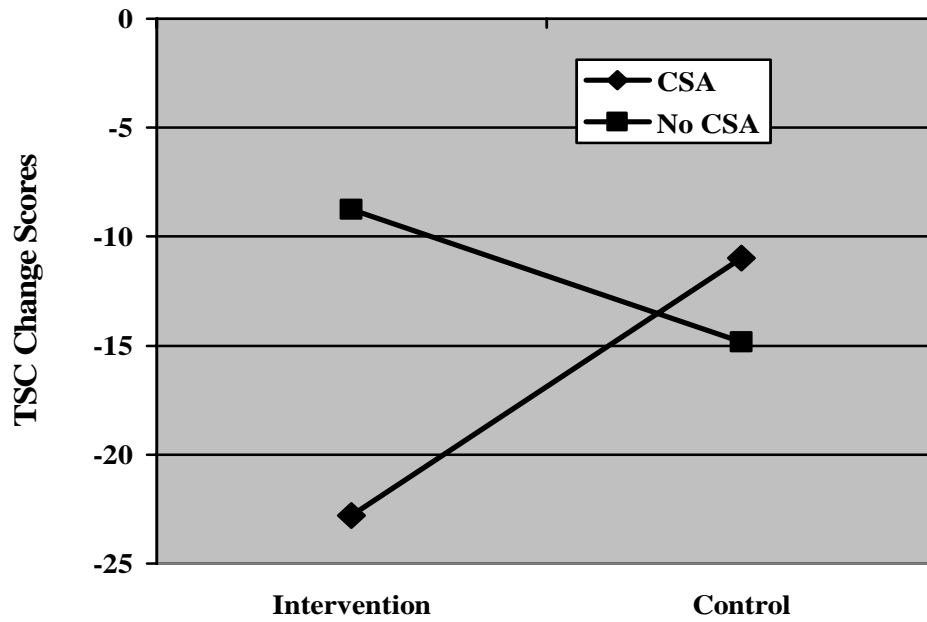


Figure 4. Interaction between child sexual abuse history and group assignment on changes in traumatic stress scores.

Self-blame. The degree of participants' self-blame prior to participating in the writing intervention did not appear to impact the relationship between group status and health benefits from the writing process.

Emotional Self-disclosure Tendency. Individuals' tendencies to engage in emotional self-disclosure were examined for their potential impact on the relationship between expressive writing about a sexual assault and changes in physical and psychological distress. Results indicated that general disclosure tendencies did not interact with group status in its impact on health improvement.

Topic of Writing. Given the effect of CSA history on responses to the writing intervention, the writing topic of women in the intervention group was examined to assess whether women chose to focus on unwanted sexual experiences in childhood versus adulthood and whether this choice impacted their response to the intervention. In addition, the choice to focus writing on one specific event versus writing about multiple unwanted sexual experiences was also examined for its effect on intervention outcomes. Because these specific issues are only relevant for the intervention group (i.e., participants asked to write about a severe unwanted sexual experience), moderation analyses could not be conducted. However, comparisons within the intervention group were made between individuals who wrote about single versus multiple traumas and between individuals who wrote about CSA versus sexual victimization in adolescence or adulthood in order to determine whether the topic of writing influenced changes in physical health, psychological health, or traumatic stress. Of the 38 women in the intervention group, 15.8% ($n = 6$) wrote about an incident that occurred in childhood, 73.7% ($n = 28$) wrote about an incident that occurred in adolescence or adulthood, and 10.5% ($n = 4$) wrote about an incident where age at time of the assault was unclear. After excluding women in the latter

category, independent sample *t*-tests were conducted to compare women who wrote about childhood sexual abuse versus women who focused on sexual assaults occurring in adolescence or adulthood on changes in physical health, psychological health, and traumatic stress. Results indicated that there were no differences in physical or psychological health change scores (as measured by the PILL and BSI) between women who wrote about CSA versus sexual assaults occurring in adulthood. However, there was a significant difference detected for changes in traumatic stress, $t(32) = -2.29, p < .05$. Specifically, women who wrote about a CSA experience reported greater reductions in traumatic stress ($M = -21.17, SD = 17.72$) than women who wrote about a sexual assault in adolescence or adulthood ($M = -7.88, SD = 11.81$).

Regarding the choice to write about one incident of sexual assault versus multiple incidents, 68.42% ($n = 26$) focused on one unwanted sexual experience, 28.95% ($n = 11$) wrote about multiple incidents, and 2.63% ($n = 1$) were unclear. Again, after excluding the one participant whose essay topic was unclear, independent sample *t*-tests were conducted to determine whether focusing on one assault versus multiple assaults impacted change in health scores. Results indicated that writing about one versus multiple incidents of sexual assault had no impact on changes in physical health, psychological health, or traumatic stress following the intervention.

Post Hoc Power Analysis

In previous research examining the relationship between narrative content and improvements in health outcomes, particularly in a sample of female trauma survivors, results indicated adjusted R^2 values ranging between 0.16 and 0.22. Using these values as a guide, an a priori power analysis suggested that a sample size of 54 participants would be needed to detect a similar effect size. Since our current sample included 71 participants, a priori power estimates for

this study appeared to be adequate. Given the lack of significant findings detected in the present study, the G*Power 3 program was utilized to conduct a post hoc power analysis (Faul, Erdfelder, Lang, & Buchner, 2007). This program allows input of desired alpha level ($\alpha = .05$), sample size ($N = 71$), number of predictors, and observed effect sizes to estimate power ($1 - \beta$) for a particular study. After first entering in baseline health measures as predictors of follow-up health scores, power estimates in the current study were obtained specifically for detecting a significant increase in R^2 after including narrative content variables in the regression model. Results of post hoc power analyses indicated that power ranged from 0.05 to 0.61, which is significantly lower than the typical desired power level of 0.80. Similar low power estimates were also detected for the moderation analyses, ranging from 0.05 to 0.63. Thus, the effect sizes observed in the present study were significantly smaller than those identified in previous research (Klest & Freyd) and low power should be recognized as a limitation in interpreting the results.

CHAPTER 4

DISCUSSION

The primary purpose of the current study was to explore the content of written narratives produced by a sample of female undergraduate sexual assault survivors in order to determine whether changes in linguistic factors or narrative organization might predict improvements in physical and psychological health at a one month follow-up. Contrary to the study's predictions, percentage of words used to express emotion, insight, or causation failed to predict health outcomes after controlling for baseline health scores. In addition, change in global ratings of organization also failed to predict improvements in physical or psychological health, although average ratings across writing sessions did appear to predict improvements in traumatic stress. Thus, in the present study, narrative content was generally unrelated to observed improvements in physical health, psychological health, and traumatic stress from initial screening to one month postintervention, with the exception of average narrative organization.

These findings were somewhat unexpected as previous research by Pennebaker and colleagues has documented the importance of emotional and cognitive processing through expressive writing in producing subsequent improvements in physical and psychological health. Specifically, participants who demonstrate increased use of words expressing emotion, insight, and causation over the course of several writing sessions report greater health benefits from expressive writing (Pennebaker et al., 2007). In the current study, women in the intervention group who wrote about a sexual trauma showed general increases from the first to the last day of writing in their use of emotion, insight, and causal words. Results also indicated that the percentage of these types of words was significantly higher in the intervention group than the

control group, who generally demonstrated decreases in their use of emotion, insight, and causation across writing sessions. However, despite this evidence suggesting greater emotional and cognitive processing in narratives produced by the intervention group, narrative content did not subsequently predict follow-up scores measuring physical and emotional distress, after controlling for baseline health measures.

The fact that emotional and cognitive processing was evident in narratives about sexual trauma but demonstrated no relationship to subsequent health improvements calls into question existing theories about how Pennebaker's paradigm actually works. Batten et al. (2002) also examined narrative content in their study with CSA survivors and found that observed use of words expressing insight and causation was typical for studies examining this paradigm, but that greater insight and causal words were actually correlated with increased physical and psychological distress. The authors suggested that CSA survivors may be utilizing these words in relation to feelings of guilt, shame, and anger that are more strongly associated with sexual trauma and which might interfere with potential health benefits observed in other studies utilizing this paradigm. Although narrative content variables in the present study were not associated with *increased* physical and psychological distress, it is possible that the lack of a predictive relationship between emotional and cognitive processing words and subsequent health benefits may also have been due to greater emphasis on themes of guilt, shame, and anger. If this were the case, it would require refinement of theories suggesting that emotional and cognitive processing is the mechanism responsible for the relationship between expressive writing and health benefits. Specifically, it could indicate that expressing specific types of emotions (e.g., guilt, shame) and cognitions (e.g., self-blame) is counterproductive. Alternatively, it may mean that other mechanisms altogether are responsible for the observed relationship between

expressive writing and health changes or that this paradigm is simply not effective for individuals with sexual trauma histories.

Although word counts represent one way of examining narrative content, previous research examining trauma narratives has also suggested the importance of more global assessments of narrative organization and coherence. More organized narratives immediately following a sexual assault have been found to predict less severe subsequent PTSD symptomatology (Amir et al., 1998), and narratives that increase in organization across treatment sessions have also been linked to reductions in symptoms of depression and traumatic stress (Foa et al., 1995). In a study specifically examining the applicability of Pennebaker's paradigm to individuals with a history of betrayal trauma, Klest and Freyd (2007) also found that global ratings of narrative organization predicted improvements in physical health, traumatic stress, and dissociation in a community sample. Interestingly, average narrative organization across all writing sessions was predictive in that study, whereas change in narrative organization from the first to last writing session did not produce health benefits. Although Klest and Freyd (2007) did not describe the general pattern of change, the findings of the present study are consistent in that change scores for organization ratings failed to predict health outcomes, whereas greater average organization ratings did predict reductions in traumatic stress, after controlling for baseline. Thus, individuals who generally wrote more coherent and cohesive narratives across writing sessions appeared to experience subsequent reductions in traumatic stress.

However, it is surprising to note that within the intervention group, repeated writing sessions actually led to decreases in organization overall, which may explain the lack of significant findings using change scores as predictors. Although most theories behind expressive writing emphasize the importance of multiple writing sessions in providing ample opportunity

for emotional and cognitive processing, the results of this study suggest that later narratives were characterized by greater digressions, weaker structure, and less effective sentence transitioning and general progression of ideas. Despite suggestions by other researchers that a few short writing sessions may not be sufficient to process traumatic memories (Batten et al., 2002), the current sample did not appear to benefit from additional opportunities to refine their story and further organize their thoughts. It is possible that women succeeded in producing relatively coherent and cohesive essays early in the writing process and that in an effort to not repeat ideas, their thoughts became more tangential as their writing progressed, producing lower global ratings of organization. However, it appears that success at creating organized narratives still was beneficial, as evidenced by the findings using an average organization rating across all four days of writing. Future studies might consider altering the writing prompts in order to provide more instruction in creating organized trauma narratives on each day of writing in order to further test the role of narrative organization in producing health benefits.

The second purpose of this study was to examine whether several potential variables, including the presence of complex trauma history, trauma severity, self-blame, and disclosure variables, might moderate the relationship between expressive writing and changes in physical and psychological health. Previous meta-analyses have highlighted the importance of identifying moderating variables, as studies have varied widely in their conclusions regarding the effectiveness of expressive writing as an intervention for individuals experiencing stressful or traumatic events. Results of the current study indicated that complex trauma histories did moderate the effect of expressive writing on changes in various health outcome measures. However, in contrast to predictions, a history of multiple assaults in adulthood or a history of childhood sexual abuse actually led to greater reductions in distress. Specifically, after

participating in the writing intervention, women with a history of adult revictimization reported greater improvements in physical health than women with only one attempted or completed rape, whereas the opposite effect was observed in the control group. In addition, within the intervention group only, women with a CSA history reported greater reductions in psychological distress and traumatic stress after participating in the intervention.

These findings contradict the prediction that women with complex trauma histories would actually benefit *less* from the intervention. Previous research has indicated that individuals with fewer betrayal traumas benefit more from expressive writing than individuals with multiple betrayal traumas (Freyd et al., 2005). Due to the brief nature of this intervention and emphasis on one specific trauma, it was expected that women with complex trauma might benefit from expressive writing, but that observed health benefits would be less evident due to continuing distress associated with other sexual traumas not disclosed during the writing process. Thus, the finding that women with a history of multiple traumas (including both multiple adult sexual assaults and CSA experiences), experienced greater reductions in distress than women with single victimization experiences is surprising. There is evidence suggesting that Pennebaker's paradigm is more effective for people who report higher levels of distress prior to the intervention (Frattaroli, 2006). However, post hoc tests indicate that distress levels at the initial screening were not significantly different between women with a history of revictimization versus women with single victimization experiences. Thus, despite the fact that complex trauma is often associated with greater severity of psychological distress, preexisting distress levels failed to account for the moderation effects observed in this study. Nevertheless, perhaps experiencing multiple unwanted sexual experiences makes these events more emotionally significant for revictims than women who have experienced a single isolated event, and as a

result, the opportunity to process their feelings through expressive writing was subsequently more beneficial to their overall wellbeing. Although only a small number of women actually chose to write about a CSA experience ($n = 6$), results did indicate that these participants experienced greater reductions in traumatic stress compared to other women in the intervention group, which lends support to the idea that there may be a greater need and potential benefit to processing certain types of sexual traumas than others. However, further research is needed to replicate this finding and identify additional explanations for why individuals with complex trauma histories might benefit more from expressive writing.

In contrast, other potential variables failed to moderate the effects of expressive writing on changes in physical and emotional distress. Although very little research has examined the moderating role of trauma severity, one study did identify that individuals who had experienced more severe traumas benefitted more from the writing process (Greenberg & Stone, 1992). However, in the present study, trauma severity, as defined by degree of perpetrator aggression, failed to influence the relationship between expressive writing and health outcomes. In addition, degree of self-blame also had no influence on response to the intervention, despite research suggesting the significant impact of self-blame on emotional distress and cognitive adaptation theories surrounding the effect of expressive writing. Finally, variables related to emotional disclosure (i.e., previous disclosure of specific sexual trauma, general emotional self-disclosure tendencies, regular use of written diaries) also showed no moderating effect on outcomes of the writing intervention. These findings are interesting given that emotional inhibition was the original explanation provided by Pennebaker for why his brief writing paradigm produced health benefits (Pennebaker & Beall, 1986), and meta-analyses have supported the idea that writing about previously undisclosed topics produces greater psychological benefits (Frattaroli, 2006).

Previous research has pointed to the importance of social reactions to disclosure in predicting psychosocial adjustment and self-blame following a sexual trauma (for a review, see Ullman, 2003). Thus, one reason disclosure processes and self-blame may have failed to impact the relationship between expressive writing and subsequent distress is that disclosure in the current study occurred in the context of an anonymous writing intervention. Thus, disclosure did not directly elicit positive social support and assistance from others in modifying negative appraisals surrounding the trauma, such as those related to self-blame, and as a result, these variables failed to play an influential role in altering subsequent health outcomes. In support of this possible explanation, Resick et al. (2008) conducted a dismantling study of Cognitive Processing Therapy, and found that the cognitive therapy component produced faster treatment gains than traditional CPT or written accounts alone. This finding highlights the importance of receiving corrective feedback on cognitive appraisals associated with a trauma in order to decrease associated distress, and since the current study did not directly incorporate any corrective feedback or social support, these variables failed to significantly influence observed outcomes as a result.

Another explanation for these findings may be due to the way in which these variables were assessed. With the exception of general emotional self-disclosure tendencies, which was assessed using the ESDS questionnaire, these variables were created based on single-item assessments of perpetrator aggression, self-blame, previous disclosure, and regular diary use. It may be that other methods that include multiple item scales would create more detailed and meaningful assessments of these variables (e.g., utilizing more comprehensive definition of trauma severity). Another possibility is that these variables may in fact moderate the relationship between expressive writing and health outcomes, but that the current study's observed power

was too low to detect significant effects. Thus, future research should incorporate more comprehensive assessment of these potential moderating variables and should include larger samples in order to evaluate their role in influencing the conditions under which expressive writing can be most beneficial.

Limitations and Future Directions

Although the present findings provide information about the applicability of Pennebaker's writing paradigm to sexual trauma survivors and the role of narrative content in producing health benefits, there are several limitations of note. First, this study relied exclusively on self-report measures of health, which may have biased results. Future studies should incorporate more objective measurements of functioning (e.g., health center visits). In addition, it would also be beneficial to assess other areas of functioning that may have changed as a result of expressive writing, such as social and occupational functioning, as well as changes in cognitive appraisals (e.g., self-blame). Other limitations included reliance on a sample of predominantly White female college students, and as a result, findings may not generalize to more diverse samples. Frattaroli's (2006) meta-analysis also points to the importance of screening for initial distress levels, as individuals reporting greater initial distress appear to experience greater benefits from this paradigm. Although distress levels identified in this study were higher than normative data for nonclinical samples (Derogatis, 1993; Elliot & Briere, 1992), variability in scores was present, and this may have impacted observed results. In addition, although the sample size of the current study is relatively large compared to other research examining this paradigm, the observed power was still low and thus, meaningful relationships between narrative content and health outcomes may have gone undetected. Future research should incorporate samples that are larger, more diverse, and possibly screened for initial distress levels in order to

better understand the utility of this paradigm with survivors of sexual trauma and the importance of narrative content in predicting resulting health benefits.

In conclusion, the results of the current study build on a previous investigation examining the applicability of Pennebaker's writing paradigm with college women survivors of attempted or completed rape. Specifically, the current study sought to determine whether observed health improvements in *both* the intervention and control group might be further understood through examination of narrative content. Findings suggest that although greater emotional and cognitive processing was identified in narratives produced by the intervention group (as evidenced by greater use of emotion, insight, and causal words), content of the narratives did not play a role in predicting changes in physical or psychological health after controlling for baseline health measures, with the exception of average organization ratings across writing sessions. Overall, more research is needed to evaluate this paradigm with sexual trauma survivors, as present evidence suggests that Pennebaker's findings may not be replicable with this population. However, there was evidence that women with complex trauma histories (i.e., CSA histories and/or multiple sexual assaults in adulthood) experienced greater benefit from expressive writing, which informs our understanding of conditions where expressive writing can be most beneficial. Although the current study does not support the effectiveness of this paradigm as an intervention for sexual assault survivors, it does inform research in this area by highlighting the need to refine existing theories on expressive writing and to produce additional research that can more effectively answer the questions raised by the present findings.

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