1-1-2010

The Effects Of Web-Based Interactive Emotional Disclosure On Stress And Health: A Randomized, Controlled Study

Jonathan Beyer
Wayne State University

Follow this and additional works at: http://digitalcommons.wayne.edu/oa_dissertations

THE EFFECTS OF WEB-BASED INTERACTIVE EMOTIONAL DISCLOSURE ON STRESS AND HEALTH: A RANDOMIZED, CONTROLLED STUDY

by

JONATHAN A. BEYER

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2010

MAJOR: PSYCHOLOGY (Clinical)

Approved by:

_____
Advisor   Date

_____

_____

_____

ACKNOWLEDGMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Study Overview

Written emotional disclosure is an intervention that is designed to improve adjustment to stressful experiences and reduce their negative physical and psychological impact. This technique, pioneered by Pennebaker (1985), involves written disclosure of thoughts and feelings about one's stressful experience. Empirical research on written emotional disclosure typically focuses on the effect of the intervention on psychological outcomes, including reduced stress and improved mood, and other health outcomes, such as reduced physician visits and improved immune functioning (Smyth, 1998). The mechanisms through which written emotional disclosure confers these benefits are not entirely clear (Pennebaker, 1993; Sloan & Marx, 2004b). Several studies have retrospectively identified characteristics of the writings produced by individuals who demonstrated significant reductions in symptoms (Greenberg & Stone, 1992; Pennebaker, 1993; Smyth, 1998), and research has attempted to increase written emotional disclosure's effectiveness by incorporating these structural and content characteristics (Gidron et al., 2002; Lange, van de Ven, Schrieken, & Emmelkamp, 2001; Lange, van de Ven, & Schrieken, 2003).

This study was designed to build on the existing research on written emotional disclosure by the use of feedback and internet technologies. There were four distinct writing conditions in this experimental study. In addition to a control writing condition (time management) and the standard written emotional disclosure condition, this study examined two modified emotional disclosure formats. The first modified format mirrored the structure of the standard written emotional disclosure with the notable distinction

that the participant's writing was read by a guide between each session, and the guide used a standardized set of feedback principles to help the writer engage in more effective writing. This made the writing task more interactive and provided more specific, tailored instructions, with the goal of increasing the benefit from writing.

In the second modified format, participants communicated with a guide in an instant message conversation. This marks a greater departure from traditional disclosure writing toward an interaction that more closely resembles psychotherapy, while maintaining the "written" aspect of the disclosure and the structure of the emotional disclosure intervention. This also made the writing interactive and allowed for immediate individualized feedback and direction in an effort to enhance the effect of the disclosure intervention.

This study focused on a population with subclinical symptoms of posttraumatic stress disorder (PTSD), and tested these novel conditions against standard emotional disclosure and control writing. It was hypothesized that the novel interactive, feedback-enhanced emotional disclosure would be significantly more effective than both standard written emotional disclosure and control writing, demonstrated by greater symptom reductions on measures of stress, psychopathology, and physical health, and improvements on measures of posttraumatic growth. Furthermore, among the various forms of written emotional disclosure, it was hypothesized that the instant message conversation would be the most beneficial experimental condition. Likewise, it was hypothesized that the guided feedback condition would outperform standard written emotional disclosure, and standard written emotional disclosure would be superior to the control condition.

Theories of Written Emotional Disclosure

Written emotional disclosure was initially conceptualized as a method of facilitating the expression and resolution of private, unresolved stressful experiences (Pennebaker & Beall, 1986). Studies of the disclosure paradigm typically utilize random assignment of participants to either a written emotional disclosure group or a control writing group. The standard written emotional disclosure paradigm involves instructing participants to write about the details and deepest feelings concerning the most stressful experience in their life that remains undisclosed or unresolved. The instructions explicitly state that spelling and grammar are not important to the task. There are variations in the number and duration of writing sessions used across different studies, but most studies use three or four sessions with a session length between 15 and 30 minutes. The control writing group is typically instructed to write for the same duration about an emotionally neutral topic such as time management.

Pennebaker and Beall's (1986) first study of written emotional disclosure compared four distinct writing conditions. One group was assigned to write about the facts of a stressful experience, another group was assigned to write about the emotions related to a stressful experience, and a third group was assigned to write about both the facts and the emotions related to their stressful experience. The control writing group was assigned to write about emotionally neutral topics. The participants in each group wrote according to their instructions for 4 consecutive days and were followed up 6 months after completing their writings, at which time the group that was assigned to write about both facts and emotions related to their stressful experience reported fewer physical symptoms and health center visits relative to the other writing groups. This

study inspired further work with written emotional disclosure as an intervention for improving health symptoms.

It is believed that written emotional disclosure can be effective by facilitating emotional processing and cognitive change, which then contribute to a beneficial decrease in stress and fewer health problems (Frattaroli, 2006; Pennebaker, Kiecolt-Glaser, & Glaser, 1988; Smyth, 1998). Sloan and Marx (2004b) identified three separate models for how written emotional disclosure works: 1) emotion inhibition, 2) cognitive adaptation, and 3) exposure/emotional processing.

Emotion inhibition theory was originally outlined by Pennebaker and Beall (1986) when they suggested that experiences that are either not disclosed or not processed cause physiological arousal. The persistent state of physiological arousal resulting from inhibition then leads to physical symptoms and somatic illness. Possible reasons for inhibiting emotions include ambivalence or fear of emotional experience or associated social consequences. Regardless of the reasons, emotional inhibition strains physiological resources and leads to a persistent state of stress (Pennebaker, 1997). In this model, written emotional disclosure serves to facilitate disclosure and processing of emotions in order to decrease stress and reduce symptoms through disinhibition. This theory has been contradicted by studies that found that the outcome of written emotional disclosure does not depend on whether or not the stressful experience has been previously disclosed (Greenberg & Stone, 1992) and that some participants benefit from writing about stressful events that they did not personally experience (Greenberg, Wortman, & Stone, 1996).

Cognitive adaptation theory holds that written emotional disclosure is beneficial because it facilitates insight, assimilation, and restructuring of schemas during the course of processing a stressful experience that was previously unresolved or fragmented. The process of writing about a stressful experience helps individuals to develop more insight and assimilate the experience with their existing cognitive schemas, thereby reducing stress associated with the experience and improving health outcomes (Pennebaker, 1997; Smyth, True, & Souto, 2001). Self-regulation theory is a similar idea that suggests that writing about stressful experiences allows individuals to build a sense of self-efficacy about the experience and better understand and regulate their emotions (Lepore, Greenberg, Bruno, & Smyth, 2002). The cognitive adaptation and the self-regulation theory both view the construction of a personal narrative about a stressful experience as a key mechanism through which written emotional disclosure changes fragmented memories into more cohesive and understandable stories that facilitate gains in insight. Smyth et al. (2001) explored this hypothesis with a one session writing intervention used with undergraduate students. The study participants in emotional disclosure groups were assigned to write about their stressful experience in either narrative form or with a bulleted list. Although both the narrative and fragmented writing styles produced similar results for mood, emotional expression, and length of writing, participants in the narrative writing groups reported significantly fewer illness-related restrictions at follow-up, which suggests that construction of a narrative helps to reduce illness.

Another hypothesis related to cognitive adaptation and self-regulation theory is that memories of stressful experiences are initially stored in sensory and affective terms

before individuals begin to form declarative or narrative-based memories. Van der Kolk and Fisler (1995) found that memories of stressful experiences do shift from sensory to narrative over the course of months following the experience. This finding suggests that written emotional disclosure may be the most beneficial when applied soon after the occurrence of the stressful experience, or in instances when individuals have for some reason avoided or been unable to move from the primarily sensory to more narrative-based memory of their experience.

Emotional processing theory, or *exposure*, views written emotional disclosure as a way of confronting painful emotions, thoughts, or other stimuli related to a stressful experience. Many individuals choose to avoid these aspects of their stressful experience long after the threat that was associated with them has been removed (Foa & Kozak, 1986, Sloan & Marx, 2004a). Written emotional disclosure is a form of exposure that leads to emotional arousal when the aversive aspects of a past stressful experience are brought to mind. Across writing sessions, habituation can occur and decrease the stress of the writer, which in turn improves health outcomes. Sloan and Marx (2004a) examined the hypothesis that written emotional disclosure contributes to a habituation response similar to that seen in exposure therapy for processing traumatic experiences. In this study, undergraduate women who reported that they have had a stressful experience were assigned to either three sessions of standard written emotional disclosure or control writing. Salivary cortisol levels and self-reported emotional reactivity were assessed at each writing session. Participants who engaged in written emotional disclosure displayed increased cortisol levels and emotional arousal after their first writing, but were not significantly different from the control group following

the second and third writing sessions. The increased cortisol levels after the first writing were associated with a decrease in psychological symptoms at a follow-up conducted one month after writing. These results provide evidence for similarities between written emotional disclosure and exposure therapy for traumatic experiences.

An extension of this research explored the importance of maintaining focus on one topic over the course of multiple writing sessions as a possible key in achieving the habituation effect. Sloan, Marx, and Epstein (2005) assigned participants to write about the same topic, different topics, or a neutral topic in each of three writing sessions. The participants who kept their focus to the same topic in each session of writing experienced greater reductions in both psychological and physical symptoms relative to the other writing groups, providing further evidence that written emotional disclosure, similar to exposure, is a beneficial technique for reducing trauma symptoms.

A few recent studies have examined the use of written emotional disclosure to address the needs of participants who report at least a moderately severe level of symptoms consistent with PTSD. In these studies, participants assigned to written emotional disclosure showed significant reductions in psychological symptoms compared with those assigned to a control condition (Schoutrop, Lange, Hanewald, Davidovich, & Salomon, 2002; Sloan & Marx, 2004a; Sloan et al., 2005). These findings support the contention that written emotional disclosure is a similar process to exposure therapy, a commonly used psychotherapeutic intervention for PTSD, as both involve exposure to aversive conditioned stimuli and associated cues that have been previously avoided (Bootzin, 1997; Pennebaker, 1997). Consistent with emotional processing theory, the beneficial results of written emotional disclosure may stem from repeated

exposure to aversive memories and subsequent extinguishing of negative emotional associations. These findings suggest that written emotional disclosure is akin to traditional exposure and a potentially useful alternative for dealing with traumatic experiences.

Content and Structure of Written Emotional Disclosure

The competing theories of the mechanisms of written emotional disclosure have received some research support without there being any clear distinctions in the degree of empirical support for a given theory. The mixed findings in support of various theories have contributed to additional investigation into different characteristics of disclosure writings. Aspects of writings such as the relative severity of the selected stressful topic, whether or not the experience has been previously disclosed, the amount of cognitive and emotional processing undertaken in the writing process, development of a future orientation, and the structure of the writing task and instructions are some of the areas that have been explored. In an effort to discover the aspects of written emotional disclosure predictive of the most positive outcomes, researchers have examined the actual writings of participants using computer analysis programs as well as ratings from judges.

One hypothesis about written emotional disclosure is that greater benefit is derived from the disclosure of highly stressful experiences relative to minor stressors. The ways in which stressor severity has been assessed include whether or not the experience has been kept private, is related to feelings of shame or guilt, and the extent to which the experience was intentionally perpetrated against the writer. Research has

shown that writing about a highly stressful experience is associated with greater health-related benefits than writing about less stressful experiences (Schoutrop et al., 2002).

The idea that some stressful experiences remain undisclosed because they are either overwhelming or may elicit feared social consequences accords with Pennebaker and Beall's (1986) emotion inhibition model. Experiences that an individual views as socially unacceptable or related to feelings of shame are likely to be kept secret. Lange et al. (2003) examined the type of experience disclosed by the 10 most improved and least improved participants in a written emotional disclosure sample. They found that the individuals who wrote about an experience that was intentionally perpetrated by or against them benefited more from written emotional disclosure than did individuals who wrote about an accidental stressful experience.

Finkenaur and Rime (1998) explored differences in shared and unshared experiences in a sample of 150 undergraduate students. Although approximately 90% of stressful experiences were shared, almost every individual in the study reported that they had one or more undisclosed stressful experiences. The unshared stressful experiences were rated higher on shame, guilt, and personal responsibility for the experience than shared stressful experiences. Participants reported that they spent more time searching for meaning related to, and more effort concealing their emotions about, the unshared experiences than about the shared experiences. There were no differences in the emotional intensity of shared vs. unshared experiences.

Another hypothesis is that effective written emotional disclosure exhibits a greater amount of cognitive and emotional processing compared with less beneficial disclosure. This idea originated in Pennebaker and Beall's (1986) initial study in which

participants who wrote more about their emotions experienced better outcomes than did participants who tended to focus their writing strictly on factual details about their stressful experience. Most of the studies that have analyzed the cognitive and emotional processing aspects of written emotional disclosure have utilized the Linguistic Inquiry Word Count (LIWC) program, which is a computerized text analysis program that counts various categories of words in writing samples (Pennebaker, Francis, & Mayne, 1997).

The linguistic analysis studies of written emotional disclosure present a mixture of support for cognitive insight and emotional expression as important elements of writing that are related to positive health outcomes. Pennebaker et al. (1997) analyzed the content of written emotional disclosure in a sample of 177 participants and found that causation and insight words were the most strongly related to health outcomes, whereas emotional language use was only weakly correlated with health outcomes. Another study used the LIWC to examine the writings of women who had experienced domestic violence and found that increased emotional processing of both positive and negative emotions was related to improved outcomes, whereas cognitive processing was unrelated to outcome (Holmes et al., 2007).

In an attempt to better understand the disparate findings regarding the relative importance of cognitive and emotional processing in written emotional disclosure, Sloan, Marx, Epstein, and Lexington (2007) altered the instructions for the task with a sample that endorsed PTSD symptoms. One group received instructions that emphasized the importance of emotional expression, a second group received instructions that stressed the importance of cognitive insight, and a third group served as a control. The group that received instructions emphasizing the importance of

emotional expression was the only one to benefit from written emotional disclosure. A similar study created different task instructions for written emotional disclosure in a sample of distressed pet owners who reported recent loss of a pet (Hunt, Schloss, Moonat, Poulos, & Wieland, 2007). One set of instructions encouraged a focus on cognitive processing of the experience and positive reframing, another encouraged focus on emotional experiencing, and the third condition encouraged both cognitive processing and emotional expression. Based on judge's ratings of the writing content, participants who did more emotional processing in their writing displayed decreases in depressive symptoms at follow-up, whereas increased cognitive processing was unrelated to outcome.

Several studies have examined the importance of developing a future orientation as a factor in written emotional disclosure outcomes. Some researchers have hypothesized that envisioning and writing about a future possible self contributes to positive health outcomes by improving self-efficacy and facilitating insight gains, and therefore could be a useful addition to the written emotional disclosure paradigm. King (2001) assigned participants to one of four writing groups, including a standard written emotional disclosure group, a future selves writing group, a combination standard and future selves writing group, and a control group. The participants in the future selves group were asked to think about the best way their life could turn out and to write about it over the course of four sessions. Each of the experimental groups demonstrated reductions in healthcare utilization relative to controls, which suggests that writing about future selves has similar benefits to writing about a stressful experience.

In a related study, self-affirmation, meaning-making, and cognitive processing were examined in relation to health benefits in a sample of breast cancer survivors (Creswell et al., 2007). The results indicated that the use of self-affirming statements fully mediated the relationship between emotional writing and health benefits. This was not true for cognitive processing or meaning-making language. The authors suggested that self-affirmations in writing contribute to development of a positive vision of a future self and to motivation for further growth.

A few additional adjustments to written emotional disclosure have been studied, including the importance of writing about the same topic across the sessions, constructing a coherent narrative of the stressful experience, and whether or not it matters that the writing itself is shared or private. Sloan et al. (2005) experimentally manipulated the continuity of writing topic across three sessions, with one group instructed to write about the same experience each day, another instructed to write about a different experience every day, and a control group that wrote about a neutral topic. The participants who wrote about the same stressful experience for all three of their writing sessions exhibited greater reductions in PTSD and depressive symptoms, as well as the number of sick days and total health impairment relative to participants in the other two writing groups.

Another study examined the role of sharing one's written emotional disclosure versus keeping it private (Radcliffe, Lumley, Kendall, Stevenson, & Beltran, 2007). In this study, the participants were undergraduate students who reported that they had an unresolved stressor. The participants were assigned to a public disclosure writing group in which they were informed that their writings would be read by the researchers, and a

private disclosure writing group in which they were informed that their writings would not be collected or read, as well as a time management writing group and a non-writing control group. The participants in the public disclosure writing group displayed better psychological health at follow-up than did participants in the other groups, suggesting that sharing of written emotional disclosure is important to its potentially beneficial impact.

Improving Written Emotional Disclosure

Over the past 20 years, the written emotional disclosure paradigm has been applied to a variety of different populations, with somewhat inconsistent results (Broderick, Junhaenal, & Schwartz, 2005; Low, Stanton, & Danoff-Burg, 2006; Richards, Beal, Seagal, & Pennebaker, 2000; Sloan et al., 2005; Spera, Buhrfiend, & Pennebaker, 1994). A meta-analysis by Smyth (1998) examined the first 13 published studies on written emotional disclosure and found an overall effect size of $d = .47$ for disclosure writing compared to controls with regard to improvement in psychological and physical well-being. More recent meta-analyses have found smaller or null effects for written emotional disclosure (Frisina, Borod, & Lepore, 2004; Harris, 2006; Meads, Lyons, & Carroll, 2003). A meta-analysis conducted by Frattaroli (2006) included 146 published and unpublished randomized studies that used written emotional disclosure and found a significant, yet small, overall effect size of $r = .075$ ($d = .15$).

A review of the written emotional disclosure literature reveals numerous aspects of writing that are linked to increased benefits for both psychological and physical health outcomes. It has been demonstrated that writing about an experience that was highly stressful and intentional is more helpful than writing about minor stressors or accidents

(Lange et al., 2003; Schoutrop et al., 2002). Writing that takes the form of coherently structured narrative about the same experience over the course of writing sessions seems to be more helpful than writing that is fragmented or changes topic (Sloan et al., 2005; Smyth et al., 2001). Within writing, there is evidence for benefit from gains in cognitive insight, emotional expression, self-affirmation, and development of a future orientation (Creswell et al., 2007; Holmes et al., 2007; Hunt et al., 2007; King, 2001; Pennebaker & Beall, 1986; Pennebaker et al., 1997; Sloan et al., 2007). There is evidence to suggest that detailed instructions including more guidance lead to greater benefits of emotional disclosure (Cameron & Nicholls, 1998; Sloan et al., 2005; Stanton et al., 2002), and receipt of feedback between writing sessions is a way to individualize instruction and guidance in the task. There is also evidence that sharing the disclosure is important to the writing process (Radcliffe et al., 2007).

Gidron et al. (2002) proposed Guided Disclosure Protocol (GDP) to help participants benefit more from their writing. The GDP model involved instructing participants to write about their stressful experience in chronological order (day 1), describe their thoughts and feelings and the impact the experience has in their life (day 2), and writing about their current perspective on the experience and how they plan to cope with it moving forward (day 3). The guidance provided was the same for all participants in the study and not tailored to respond to any specific content in participant writings. Participants who engaged in GDP made fewer visits to a health clinic and reported fewer symptoms at 3 month follow-up relative to participants that engaged in a casual content writing control condition, suggesting that guidance in the disclosure process may be helpful to participants.

The process of providing individualized feedback to a participant's written emotional disclosure makes the intervention more similar to traditional psychotherapy, which typically produces stronger effects than standard written emotional disclosure. Few studies have examined interactive written emotional disclosure that includes individualized feedback. The shortcomings of the study conducted by Gidron et al. (2002) with regard to guided written emotional disclosure include the use of a small sample and the lack of a comparison between the guided condition and standard written emotional disclosure. Additionally, few studies have included guidance for writers that is individualized and responsive to the content generated in a previous writing session. It remains unknown if guidance in the writing process increases the benefits seen in standard written emotional disclosure.

One way to make the presence of an audience more explicit in written emotional disclosure is to add an interactive portion to the task. Although submitting one's writings to a research team differs from writing in a private journal, it is still a one-sided sharing in which the writer does not receive any communication in response. An idea for building an interactive component into written emotional disclosure is to have a "guide" from the research team read and respond in writing to participant disclosures between writing sessions in order to react to what they have shared and suggest directions for future writings (Smyth & Catley, 2002). The purpose of this guided feedback would be to make the participant's writing more effective, focused, and engaged.

Online Interventions

The use of the internet for the delivery of psychological interventions, such as written emotional disclosure, various internet therapies, and other healthcare services is

still relatively new. Some research has been conducted on the efficacy, process, and ethical considerations associated with the use of the internet to provide different forms of treatment. At the present time, research is minimal and lags behind clinical practice that utilizes the internet. The potential benefits of online interventions are myriad. Online therapy is convenient for both clients and therapists and accessible to a wider range of individuals, including those who feel stigmatized by the traditional psychotherapy process (Murphy & Mitchell, 1998). It has also been theorized that online communication generally encourages disinhibition in individuals and therefore may encourage expression and self-reflection that would be less quickly revealed in traditional therapy (Suler, 2002).

A variety of online interventions exist, ranging from those that deliver standard educational information to all recipients that is targeted to a specific presenting problem, to highly tailored feedback unique to each individual consumer of online services. There is also variability in that some online interventions are asynchronous (e.g., email) whereas others are synchronous, that is, provided in "real time" such as a chat session conducted using popular free software (e.g., AOL instant messenger) or video conference via the internet. In the initial stages of online psychotherapy, email was the most commonly utilized format for intervention, although improvements in connection speed and other technological advances have contributed to increased popularity of real time online intervention methods in recent years (Rochlen, Zack, & Speyer; 2004).

There is also variability in the types of presenting problems that are typically addressed with online interventions. Most online interventions are geared toward treatment of some type of health problem, and many have been implemented by

medical professionals. A recent review article of computerized health interventions identified studies that focused on nutrition, eating disorders, smoking, alcoholism, and exercise (Lustria, Cortese, Noar, & Glueckauf, 2009). Many of the interventions included in the review utilized computerized-tailoring in which educational content, goals, and other information provided to consumers were individualized according to baseline assessment data and preferences indicated by the participant. For example, in a study by Block, Block, Wakimoto, and Block (2004), a weight loss intervention was tailored with differing sets of weekly emails based on which stage of change a given participant was categorized within at baseline and the dietary emphasis each participant preferred (e.g., fat intake reduction, increased fruit and vegetable intake, etc.).

There have been comparatively few studies of online psychological interventions. A recent review of internet-administered cognitive behavioral therapy (CBT) for health problems (e.g., pain and headaches) discovered only 12 randomized controlled or comparative trials (Cuijpers, van Straten, & Andersson, 2008). A meta-analysis of both prevention and treatment studies utilizing internet CBT for the treatment of anxiety and depression also examined 12 studies and found that in general, internet CBT is an effective treatment option (Spek et al., 2007). This review found a moderate effect size for internet-based CBT (fixed effects analysis Cohen's d = 0.40, mixed effects analysis Cohen's d = 0.60). Post hoc analyses revealed a small effect size for symptoms of depression and a large mean effect size for anxiety. Further analyses also revealed differences between internet CBT with and without therapist support, finding a large mean effect size with therapist support and a small mean effect size without therapist support.

Lange et al. (2003) studied the effects of an internet-based therapy for individuals with subclinical symptoms of PTSD. The intervention required participants to write about their experience for 45 minutes on 10 occasions over the span of 5 weeks. On 7 of the 10 occasions throughout the process, a therapist provided participants with feedback about their writing and further instruction for how to proceed. The participants involved in the treatment group displayed reduced trauma-related symptoms and lower general psychopathology relative to individuals in the waitlist control condition.

Another internet-based approach to treating subclinical symptoms of posttraumatic stress is an 8-week self-help program for traumatic event-related consequences (Hirai & Clum, 2005). The treatment condition consisted of cognitive-behavioral modules similar to a systematic desensitization form of exposure and was compared with a wait-list control condition. The treatment modules included a mixture of educational and skill-building materials in addition to a written exposure module in which participants were asked to write in the present tense about their traumatic event and emotional response to it, and then to repeatedly read their account. The treatment was interactive in the sense that modules included skill practice and automated feedback, although no contact with a therapist or expert was included in the intervention. Relative to the control group, the treatment group participants decreased avoidance behavior, frequency of intrusive symptoms, state anxiety, and depressive symptoms, and increased coping skills and coping self-efficacy.

Knaevelsrud and Maercker (2007) conducted a study of internet-based treatment for PTSD. The participants were randomly assigned to 10 sessions of internet CBT that took place over the course of 5 weeks or to a wait-list control group. At various points

during the treatment, the participants received additional instruction and individualized feedback written by their anonymous therapist. PTSD severity and psychological symptoms significantly improved for participants in the treatment condition relative to those in the wait-list group. Effects were maintained at 3-month follow-up, and further analyses revealed strong correlations between ratings of the online working alliance and treatment outcome.

Summary and Study Design

These internet therapies and what has been referred to as distance writing (L'Abate & Kern, 2002) share commonalities with traditional written emotional disclosure. Although there are mechanical differences between handwriting and typing on a computer keyboard, the written emotional disclosure paradigm can be easily transported to the digital from the handwritten realm. Sharp and Hargrove (2004) compared handwritten with typed emotional disclosure in a sample of college students and found that the modality of disclosure did not impact the degree of emotional arousal or the content of the essays. These findings suggest that it is possible to marry the principles of written emotional disclosure and internet-based psychotherapy in a way designed to elicit the elements of effective writing and improve the effects of the intervention.

This study contributed to the existing written emotional disclosure literature by examining two novel forms of the intervention that utilized both tailored guidance and the internet, in addition to standard written emotional disclosure and a neutral control writing condition. The participants were sampled from a population of undergraduate college students who endorsed subclinical symptoms of PTSD. All participants

completed a baseline assessment and were randomized to one of four writing conditions, each of which wrote for three, 30-minute sessions over a week and a half. Participants returned to the laboratory for a follow-up assessment 6 weeks after the first writing session, at which time they again completed the outcome measures. The outcomes of interest in this study were the general severity of psychological symptoms, subjective distress regarding a stressful experience, physical health problems, and personal growth following a stressful experience.

The novel writing conditions included guidance in both a written feedback and an instant message format. The feedback in both conditions was provided by a therapist-guide and was tailored to address the specific content generated by participants. Feedback was structured to provide reflection and communicate understanding of participants' experiences and also to encourage focus on aspects of writing that have been beneficial in previous studies (Cameron & Nicholls, 1998; Creswell et al., 2007; Holmes et al., 2007; Hunt et al., 2007; King, 2001; Lange et al., 2003; Pennebaker & Beall, 1986; Pennebaker et al., 1997; Radcliffe et al., 2007; Schoutrop et al., 2002; Sloan et al., 2007; Stanton et al., 2002).

In the instant message condition, guidance occurred in real-time. That is, guides responded to participant writings immediately throughout the 30-minute writing session. This was accomplished through the use of instant messaging software that allows the guide and participant to hold a private conversation online from separate computers. The feedback writing group included guidance that was entered by guides between participant writing sessions. After the participants typed their disclosure session and submitted their writing into an online system, a guide read the writing and typed a

response that was also submitted online. The guided feedback was visible to the participants when they returned for their next writing session. This process was repeated following participants' second writing session, with the end result being that participants received instructions prior to their first session and feedback after the first and second sessions.

Goals and Hypotheses

This study attempted to extend the range of possibilities for written emotional disclosure by adding both individualized guidance for writers and using an internet-based approach to intervention and comparing these conditions with traditional written emotional disclosure as well as a writing control group.

Hypothesis 1:

The first goal of this study was to determine whether written emotional disclosure, regardless of format, outperforms a neutral writing control condition in reducing psychological and physical symptoms in a sample of participants with subclinical PTSD. It was hypothesized that all written emotional disclosure groups would exhibit significantly greater reductions in symptom levels, and increases in posttraumatic growth, relative to the control group.

Hypothesis 2:

The second goal of this study was to evaluate different levels of effectiveness across written emotional disclosure groups. It was hypothesized that participants who received guidance and feedback about their writings would benefit more than participants in the standard written emotional disclosure group. Furthermore, it was expected that participants in the instant message feedback writing group would exhibit

the largest reductions in symptoms and the most posttraumatic growth, and that there would be a significant difference in these improvements relative to participants in the asynchronous guided feedback writing condition.

Additional goals:

The other goals of this study were to examine differences among the experimental conditions with regard to perceived credibility, emotional arousal, and content generated within the writings. In the development of the novel feedback writing conditions, it was important to assess whether or not participants viewed their assigned writing tasks as logical for addressing unresolved stressors and to compare their perceived credibility relative to the standard written emotional disclosure paradigm as well as the control writing condition. Additionally, examination of the feedback and instant message writing groups' effect on mood was important to compare level of emotional reactivity related to the writing tasks. Finally, we hoped to gain a better understanding of how the guided feedback would potentially alter the quantity and type of content generated within the writings produced relative to the standard disclosure and control conditions. An examination of these process variables would permit a better understanding of the main effects of each condition.

CHAPTER 2

METHOD

Participants

One hundred seventy-three undergraduate participants were recruited using the Wayne State University Department of Psychology Research Pool and provided their consent to participate; 10 of these chose not to continue and were not randomized, leaving a final sample was 163 randomized participants. This randomized sample had a mean age of 21.9 years ($SD = 6.6$, range: 17 - 61); 136 (83.4%) were women, and 27 (16.6%) were men. The sample was diverse ethnically, and included Caucasian ($n = 59$; 36.2%), African American ($n = 49$; 30.1%), Middle Eastern ($n = 25$; 15.3%), Asian ($n = 12$; 7.4%), and other ethnicities ($n = 18$; 11.0%).

The participants were considered eligible for participation in the study if they indicated in a pre-screening form that they had experienced a stressful or traumatic event that currently causes them to have symptoms of post-traumatic stress disorder, and that they would like to address. Inclusion criteria were set to recruit participants who answered "Yes" to the question "Have you ever had a traumatic or very stressful experience? (Do not include common stressful events related to school or work problems or to not having enough time to do things.)" The participants who indicated that they had a traumatic or very stressful experience were further screened with the following set of questions:

1) How much do you TRY TO AVOID thinking about, remembering, or being reminded of the experience?

2) How often does the experience enter your mind, even when you do not want it to?

3) How often do you have feelings of tenseness, anxiety, or emotional upset when you are reminded about or think of this experience?

4) How much do you want to address or try to get over or resolve this stressful experience?

The possible responses to the questions were "Not at all", "A little", "Somewhat", "Very much", and "Does not apply – I have not had a traumatic experience." Only participants who responded with either "Somewhat" or "Very much" to each of the screening questions were eligible to participate in the study. A total of 4,055 undergraduate students completed the screening questionnaire during the course of the study, most of whom did not meet the inclusion criteria (n = 3430; 84.6%). Of the 625 individuals who were eligible and were invited to participate in the study, 452 (72.3%) declined (almost always simply by not responding to the email invitation), and 173 (27.7%) were enrolled. See Figure 1 for the summary of participant flow in the study.

Procedure

Eligible participants were contacted by email and invited to participate in the study. Those who were interested were directed to sign-up for an initial appointment using the Department of Psychology's online scheduling system. Participants reviewed the study consent form upon arrival to the laboratory and prior to beginning the study (see Appendix A for the complete consent form). The lead investigator and an undergraduate research assistant addressed participant concerns and emphasized the importance of completing the entire research project. Those who consented to participate then completed a set of online questionnaires about their personality, social skills, stress, and health. Upon completion of the questionnaires, each participant was

Figure 1.

SOLD Study Flow of Participants

```
                        ┌──────────────────┐
                        │   Subject Pool   │
                        │    N = 4055      │
                        └────────┬─────────┘          ┌────────────────────────────────────────┐
                                 │                    │ Excluded (n= 3882)                     │
                                 │                    │   • Declined to participate (n=452)    │
                                 │                    │   • Did not meet inclusion criteria    │
                        ┌────────┴─────────┐          │     (n= 3430)                          │
                        │     Enrolled     │          └────────────────────────────────────────┘
                        │    N = 173       │
                        └────────┬─────────┘
                                 │                    ┌────────────────────────┐
                                 │                    │  Withdrawals (n=10)    │
                        ┌────────┴─────────┐          └────────────────────────┘
                        │   Randomized     │
                        │    N = 163       │
                        └────────┬─────────┘
```

| Instant Message Emotional Disclosure n = 41 | Emotional Disclosure Writing with Feedback n = 41 | Standard Emotional Disclosure Writing n = 41 | Control Writing Time Management n = 40 |

| Withdrawals = 5 | Withdrawals = 2 | Withdrawals = 1 | Withdrawals = 4 |

| 6 weeks Post-tx n = 36 (87.8%) | 6 weeks Post-tx n = 39 (95.1%) | 6 weeks Post-tx n = 40 (97.6%) | 6 weeks Post-tx n = 36 (90.0%) |

scheduled for a series of three sessions, each approximately 40 minutes in duration, which were scheduled within a span of one week to 10 days. The additional step of having participants return for randomization, rather than be randomized and begin writing during their initial visit to the laboratory allowed participants who were disinterested or unreliable to drop out prior to randomization in an attempt to minimize attrition from the trial. Indeed, 10 of the 173 originally enrolled participants did that.

Each participant was randomly assigned to one of four unique computer-based writing conditions once they arrived for their first writing session. The randomized group

assignment sequence was set up in advance and generated using an online resource provided by http://www.randomization.com/. Separate sequences were generated for men and women (i.e., there was stratification by gender), and used randomized blocks of four and eight participants assigned to the four experimental conditions. Group assignments were given a unique numeric code to keep research assistants blind to the participant's experimental condition. Participants learned of their group assignment at their first writing session when they read their task instructions.

Participants logged onto the study website with their unique username and password combination. Prior to receiving the unique (randomized) writing instructions, each participant completed a modified version of the PANAS-X (Watson & Clark, 1994) regarding their current mood. Then participants read their group-specific rationale and instructions. After reading the instructions, but before beginning writing, participants completed a short credibility scale (Borkovec & Nau, 1972) about the assigned intervention. In each of the four conditions, the participant was allowed precisely 30 minutes in a private room to engage in their assigned writing task using a Dell desktop computer. Writing occurred over the course of three separate writing sessions, scheduled within a period of 7 to 10 days. All writing sessions took place in the laboratory and were coordinated by undergraduate research assistants.

Participants who missed a scheduled session were contacted by phone and email in an attempt to reschedule their appointment. For participants who were unable or unwilling to attend all three writing sessions, attempts were made to solicit their completion of a follow-up session.

Following completion of all three writing sessions, participants were scheduled

for a final follow-up visit to the laboratory to occur 6 weeks after their first writing session. The 30-minute follow-up visit consisted of the completion of the same outcome measures that were completed at baseline as well as the intervention credibility scale completed following randomization. Participants who were eligible to receive class credit for their research participation were awarded one credit for each of the laboratory visits required in the study. Individuals who were either not eligible for class credit or not able to take advantage of all five possible credits toward their classes were compensated for their time at a rate of $10 per session paid in a lump sum upon completion of the follow-up session. Participants enrolled in psychology undergraduate courses were granted credit electronically through the SONA online research participation system.

Web-based Writing and Assessment System

A web-based interface with a back-end database hosted on Wayne State University's server was used to log all participant writings and guide responses. Each participant and guide had a unique ID and password to log in at the study website. Participants were only able to access their own writings and feedback (when applicable). The website was accessible through a Wayne State University website address. Guides had access to any participant writings that they needed to view and respond to.

The same web-based interface was used to log all questionnaire data in this study. When participants logged in, each individual questionnaire was available via a clickable link. Once completed, participants submitted each questionnaire and returned to a menu of remaining unfinished questionnaires. Participants were able to respond to the questionnaires via a combination of open response format text boxes and multiple-

choice Likert scale pull-down tabs. The web-based application allowed for data responses for each question to be stored and downloaded into an SPSS data file. The SPSS data file stored participant ID, questionnaire/writing session ID, and all responses. Participants accessed questionnaire and writing sessions while using a computer in the laboratory. If necessary to collect follow-up data, participants were allowed to access the website from any computer with internet access when a laboratory visit was not feasible. When questionnaires were completed, they were downloaded from the study website.

Experimental Writing Groups

There were four experimental writing groups in this study: one control group and three forms of emotional disclosure writing (see Appendix B for the specific instructions for all four conditions).

The "Writing Control Group" was assigned to write about some aspect of their future plans for each of their three writing sessions. The rationale provided in the instructions for this task suggests that planning and organizing activities ahead of time in writing will decrease stress and contribute to positive mood and health. Participants in this group were instructed to write about their plans for the next 24 hours in their first session, their plans for the next week in their second session, and their plans for the rest of the semester in their third session.

The "Standard Written Emotional Disclosure Group" was assigned to write about a personal stressful experience and disclose their deepest thoughts and feelings in their writing, based on a standard set of writing instructions provided before they began their first writing. The instructions in this condition are based on those of Pennebaker and

Beall (1986). Participants in this group were instructed to write about the experience that is most stressful to them and that they may not have shared with others. The instructions also encourage participants to write in detail about their experience and how it affects them. Participants in this group were encouraged to write about the same topic for each of their writing sessions. In this condition, the participants received no feedback or acknowledgement of their writing.

The "Feedback Writing Group" was assigned to write about a personal stressful experience and received written feedback and guidance from a doctoral student in clinical psychology following their first two writing sessions. The initial instructions for this group were the same as those provided to the "Standard Written Emotional Disclosure Group" but were also enhanced to include example topics that others have written about, a list of signs that an experience continues to be bothersome, and notification that a guide will be reading the writing and providing feedback and suggestions between writing sessions. Participants were encouraged to implement the guide's suggestions into their subsequent writings. Guides read and responded to these writings between participant visits to the laboratory. The feedback was individually tailored for each participant following a set of principles based on the characteristics of effective written emotional disclosure (See Appendix C for the complete set of guiding principles to be used for providing written feedback).

- Feedback after the first day of writing was designed to provide empathy, encourage focus on a specific stressor, solicit additional clarifying details as necessary, and provoke deeper reflection on emotions relevant to the participant experience as well as processing of related thoughts. Additionally, participants were asked to write about the ways in which they perceive themselves as having been affected by their experience across the spectrum of cognitive, emotional, and behavioral impacts in areas of functioning

such as academic, work, and social performance.

- Feedback after the second writing guided participants to explain their coping strategies and evaluate their degree of success, generate new ideas and goals for coping with the stressful experience, and reflect upon what they have learned as a result of their experience.

The "Instant Message Writing Group" was assigned to engage in an instant message conversation about a personal stressful experience with a doctoral student in clinical psychology who provided immediate feedback and guidance to the participant. In addition to the web-based interface used to complete questionnaires and writings in each of the other groups, this group utilized Pidgin, a graphical modular messaging client with the capability to connect with a variety of instant messaging programs simultaneously. Pidgin is available as a free download, available at http://pidgin.im/. Several generic AOL Instant Messenger (AIM) accounts were created for both guides and participants in the study. Participants were provided with the option of using their own pre-existing account or the generic account created solely for use in the study. The participants who elected to use the generic study account were signed in to Pidgin by an undergraduate research assistant in order to keep the password for the account confidential and only allow participants access to the account when in the laboratory participating in the study. At the conclusion of each instant message conversation, the session guide copied the text of the conversation and pasted it into the web-based interface in the space that is reserved for participant writings in the other experimental conditions. After the conversation was submitted into the web-based interface, participants were instructed to log out of Pidgin and prompted to return to the web-based interference to complete post-session questionnaires.

The instructions for this task were almost exactly the same as the standard instructions for the "Standard Written Emotional Disclosure Group" with the only exception being language adjustments indicating that the participant would be instant messaging with a guide rather than writing without interaction (Refer to Appendix B for the specific instructions). The outline of the sessions was as follows:

- During the first session, guides initially provided an opportunity for participants to seek clarification about the task if necessary. As the participants communicated their experience, the guide attempted to respond empathically and provide questions designed to elicit further details. Before the close of the session, the guide provided a summary and asked for any adjustments or additions that the participant wished to include in the summary.

- During the second session, the guide briefly restated the topic(s) of the first session and provided the participant with an opportunity to include any additional relevant information that was not communicated in the first session. Then the guide requested that the participant write about the ways in which they have been affected by their experience, with a focus on relevant thoughts, feelings, and actions related to the stressor. Throughout this process the guide attempted to respond with empathic reflections and questions to clarify and better understand how the participant experiences their stressor.

- During the third session, the guide restated the themes from the previous session and provided an opportunity for the participant to share any additional thoughts or reactions as desired. Then the guide requested that the participant share the ways in which they have attempted to cope with their stressful experience and to assess the helpfulness or lack thereof of each strategy. Following this, the guide encouraged the participant to brainstorm about additional coping strategies they may try in place of or in addition to their existing coping strategies. To close the final session, the guide encouraged the participant to consider what change(s) they would most like to make and to reflect upon what they have learned as a result of their experience.

The participants in two of the four writing groups received feedback from one of four clinical psychology graduate students between or during their writing sessions,

depending on their group assignment. These participants were assigned to the next available doctoral student guide at the first writing session. The doctoral students who provided the guidance to writers in the feedback writing group and the instant message writing group utilized a manualized set of guidelines to provide feedback to the participants in the study. An experienced licensed clinical psychologist was available for consultation regarding the guided writings and instant messaging sessions. An advanced graduate student in clinical psychology provided training, orientation, supervision, and consultation as needed for guides in the study with the goal of maintaining adherence to the feedback principles and resolving difficult issues that arose during the course of the emotional disclosure writings. A total of 82 participants in the feedback ($n = 41$) and instant message ($n = 41$) conditions received feedback from five different guides.

The participants who received feedback from a guide were not introduced to their guide in order to avoid unwanted influence of demographic characteristics. Additional details about the nature of the feedback follow under the "Experimental Writing Groups" sub-heading.

Manipulation Check and Process Measures

Intervention Credibility. Participants completed a 5-item Credibility Scale (Borkovec & Nau, 1972) immediately after reading their unique task instructions (before writing) at their first writing session, and then again at follow-up after completing all writing sessions. Items inquired about the participants' opinions on how logical the intervention seemed for reducing stress, as well as their confidence that their assigned writing task would help them or others to actually experience a reduction in problems

related to stress. This measure utilized a Likert-type scale that ranged from 0 = "Not logical at all" to 6 = "Very logical."

Immediate Mood Reactions. Randomized participants completed a brief 11-item mood rating measure immediately before and after each of their 3 writing sessions. Each item combined 3 similar emotion word descriptors and was rated on a Likert-type scale that ranged from 1 = "Not at all" to 7 = "A great deal" with regard to how the participant felt at that time. These were used as a manipulation check because it was expected that participants in the active disclosure conditions would exhibit intensified negative emotional responses and reduced positive emotions after writing, in comparison with participants who wrote about the control time management topic. Five of the items that were expected to differ by group were selected to assess the success of the experimental manipulation. The selected items included: "calm, relaxed, or at ease"; "enthusiastic, happy, or joyful"; "sad, blue, or lonely"; "afraid, scared, or jittery"; and "angry, irritable, or disgusted."

Post-writing Questionnaire. Following each writing session, the participants completed a brief questionnaire composed of items in reference to their experience and reaction to writing that day. The participants in each group rated the degree of difficulty of sharing their experience in writing on a Likert-type scale that ranged from 1 = "Not at all" to 7 = "Very." Participants in the standard, feedback, and instant message groups also rated items on the same scale with regard to how much they had shared their experience with other people before today. Additionally, participants in the active experimental conditions provided a yes/no answer in response to a question about

whether or not there were details about their experience that they were not comfortable sharing in their writing.

Linguistic Inquiry Word Count. The Linguistic Inquiry Word Count (LIWC; Pennebaker, Francis, & Booth, 2001) is a text analysis computer program used to evaluate verbal and written language. LIWC assesses emotional, cognitive, structural and process aspects of language samples. The computer program provides frequency data on words used that fit into a variety of categories. The LIWC program contains its own dictionary and words that belong to each category are predetermined. This study examined the total word count of the writing samples, and the proportion of affect words used, including both positive and negative emotions. This text analysis program was applied to all three writing sessions for each experimental condition.

Outcome Measures

Brief Symptom Inventory. The participants completed the 53-item Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983), which is an abbreviated version of the Symptom Checklist-90 (SCL-90) and is used to assess a person's general emotional, behavioral, and interpersonal functioning. Participants are asked to rate how much discomfort each item has caused over the last two weeks. The items are rated on a 5-point scale (0 = not at all and 4 = extremely). The BSI assesses nine dimensions: Somatization (SOM), Obsessive-Compulsive (OC), Interpersonal Sensitivity (INT), Depression (DEP), Anxiety (ANX), Hostility (HOS), Phobic Anxiety (PHOB), Paranoid Ideation (PAR), and Psychoticism (PSY). These dimensions can also be summarized in three global indexes: General Severity Index (GSI), Positive Symptom Total (PST), and the Positive Symptom Distress Index (PSDI). Research has found that the internal

consistencies range from 0.75 on the PSY dimension to 0.89 on the DEP (Piersma, Boes & Reaume, 1994). This study used the GSI scale as the primary outcome to assess changes in symptom severity, and specific BSI subscales were explored as secondary outcomes.

Physical Health Symptoms. The participants completed the Physical Health Symptoms (PHS; Greenberg et al., 1996) measure to assess physical signs and symptoms. The PHS lists 36 different health issues that range from a runny nose to abdominal pain. Participants endorse the severity of each item over the last two weeks on a scale of 0 to 4 (0 = Not at all, 4 = Extremely severe). The questionnaire yields a mean global score. In a study by Greenberg and colleagues (1996) women who were asked to disclose a personal trauma showed an overall improvement on this measure of physical symptoms.

The following two measures were preceded by this instruction:

"Before you answer the following two questionnaires, please spend a few moments to identify one particularly stressful experience. Some stressors happen only once to a person, whereas other stressors happen repeatedly or continue for a long time, and may even be happening right now. Please try to identify a stressful experience that continues to bother you. This may be a stressful experience that you have not talked about or shared much with other people, or it may be one that you don't like to be reminded of. Once you have identified that stressor, you should answer the following two questionnaires with respect to that stressor."

Impact of Event Scale - Revised. The participants completed the Impact of Event Scale – Revised (IES-R), a self-report 22-item scale assessing subjective distress after a stressful life event (Weiss & Marmar, 1997). Individuals are asked to identify a stressful event that they experienced and then rate the degree of distress of each symptom in the past week. The measure contains three subscales of intrusion,

avoidance, and hyperarousal. Responses are rated on a 5-point scale (0 = Not at all; 4 = Extremely). The IES-R has demonstrated high internal consistency, with coefficient alphas ranging from 0.87 to 0.92 for intrusion, 0.84 to 0.85 for avoidance, and 0.79 to 0.90 for hyperarousal (Weiss & Marmar, 1997). This study focused on the total scale score for the IES-R as the primary outcome and the subscales were explored as secondary outcomes.

Posttraumatic Growth Inventory. The participants completed the Posttraumatic Growth Inventory (PTGI), a 21-item scale that assesses positive outcomes, rather than symptoms, following the experience of a traumatic event (Tedeschi & Calhoun, 1996). The scale contains five subscales: New Possibilities, Relating to Others, Personal Strength, Spiritual Change, and Appreciation of Life. This instrument purports to measure an individual's degree of success in strengthening their perceptions of self, others, and the meaning of events in the aftermath of a traumatic experience. The scale uses a 6-point Likert response format (0 = I did not experience this change as a result of my crisis; 5 = I experienced this change to a very great degree as a result of my crisis). The internal consistency of the full scale is high with a coefficient alpha of 0.90. This study focused on PTGI total score as a primary outcome and the subscales were explored as secondary outcomes.

Data Analyses

All collected data were screened and analyzed for the presence of outliers and irregularities in distribution. Preliminary analyses first examined several issues. The four groups were compared on demographics and baseline levels of the outcomes to determine the success of randomization in generating equivalent groups. A chi-square

analysis of categorical demographic variables and analysis of variance of continuous dependent variables were conducted to examine any group differences at baseline. For these analyses, the ethnicity category was collapsed from the original six options down to three groups of Caucasian (n = 59), African American (n = 49), and Other (n = 55). Next, attrition analyses were used to compare individuals who completed the study to those who did not in order to determine the influence of attrition. For the purpose of the manipulation check, mood rating change scores were created by subtracting the pre-writing ratings from the post-writing ratings. The change scores for the mood ratings were calculated for each of the 3 writing sessions, and were then averaged to create a mean change score for mood ratings across sessions. ANOVA was used to examine differences in the mean mood change scores among the experimental groups. Additionally, credibility ratings completed by randomized participants immediately after they first read their task instructions at their first writing session and again at follow-up were analyzed. The scale score was generating by calculating the average of the credibility ratings.

The primary statistical analyses were conducted using participants who provided follow-up data, regardless of the degree that they completed the writing tasks. An analysis of covariance was conducted for each dependent variable and compared across all 4 experimental conditions. Secondary analyses utilized analysis of covariance comparing groups two at a time to assess differences on dependent variables and each of their subscales.

Additional exploratory analyses were conducted to examine differences in response to the various writing tasks with regard to the amount of writing and the

frequency of affective expression in the writings, including both positive and negative emotion. ANOVA was used to examine group differences on the mean word count and emotional content data across all three writing days, with Fisher's post-hoc LSD tests to determine which groups differed significantly from one another. Responses to the post-writing questionnaire were also analyzed using ANOVA to examine group differences with regard to difficulty sharing, previous disclosure, and details that were not shared in the writing because of personal discomfort. Mean ratings of difficulty sharing and previous disclosure across the three days were examined. The "yes" responses with regard to details and feelings about the experience that were not shared were summed across the writing sessions and used as a continuous variable. Fisher's LSD post-hoc analyses examined which groups differed significantly from one another.

CHAPTER 3

RESULTS

Randomization

To assess the success of randomization in the study, analyses were performed to compare the four groups on demographic variables (age, gender, ethnicity), and each of the four primary dependent variables, as measured at baseline. The experimental groups did not significantly differ at baseline with regard to age ($F(3, 159) = 0.60$, $p = .62$), gender ($X^2(3, N = 163) = 0.35$, $p = .95$, or ethnicity ($X^2(6, N = 163) = 2.93$, $p = .82$). There were no significant group differences in baseline measures of the BSI Global Severity Index ($F(3, 159) = 0.82$, $p = .48$), IES-R ($F(3, 159) = 1.11$, $p = .35$), PHS ($F(3, 159) = 1.17$, $p = .32$), or PTGI ($F(3, 159) = 0.23$, $p = .88$). Thus, the randomization process was successful in generating experimental groups that were equivalent with regard to both demographic variables and baseline levels of the variables of interest, including severity of psychiatric symptoms, impact of negative event, physical health symptoms, and posttraumatic growth.

Attrition Analyses

Of the 163 participants who were randomized to one of the experimental groups, 12 dropped out of the study and did not complete the 6-week follow-up. There were possibly some differential attrition from the control (n = 4), standard (n = 1), feedback (n = 2), and instant message (n = 5) conditions, although the very small sample sizes precluded statistical analysis. A *t*-test showed that the 151 completers did not significantly differ from the 12 non-completers with regard to age ($t(161) = 0.11$, $p = .91$). A 2 x 2 chi-square test indicated that the relationship between gender and completion of the study was not significant, $X^2 (1, N = 163) = 0.00$, $p = .99$. Additionally,

completers and non-completers did not differ in ethnicity, X^2 (2, N = 163) = 1.85, p = .40.
Similarly, t-tests compared completers and non-completers on the baseline levels of
each outcome variable, and no significant differences were found on the BSI Global
Severity Index, $t(161)$ = -0.41, p = .69, IES-R, $t(161)$ = -0.42, p = .68, PHS, $t(161)$ = -0.32, p = .75, or PTGI, $t(161)$ = 0.74, p = .46.

Manipulation Checks

    Immediate Mood Reactions

Table 1. Change scores (post-session minus pre-session, averaged across three writing
days) for mood ratings for each experimental group

Variable	Standard M (SD)	Feedback M (SD)	Instant Message M (SD)	Control M (SD)
Calm, relaxed, at ease	-1.11 (1.33)	-0.94 (1.59)	-0.17 (1.42)	0.27 (1.11)
Enthusiastic, happy, joyful	-0.98 (1.01)	-0.91 (0.92)	-0.72 (1.38)	0.00 (0.71)
Sad, blue, lonely	1.09 (1.61)	0.85 (1.13)	0.57 (1.51)	-0.15 (0.69)
Afraid, scared, jittery	0.46 (1.33)	0.46 (0.81)	0.08 (1.05)	-0.20 (0.71)
Angry, irritable, disgusted	1.09 (1.37)	1.15 (1.48)	0.20 (1.20)	-0.27 (0.80)

Analysis of variance revealed significant differences among the four experimental
conditions with regard to mood rating changes for several of the mood items. Significant
differences were observed in the change in feelings of "calm, relaxed, or at ease"
across the experimental groups ($F(3, 158)$ = 8.88, p < .001). Post-hoc analyses showed
that the participants in the standard emotional disclosure and the feedback writing group
conditions reported greater reductions in feelings of calm than did participants in the
control writing condition or the instant message writing group condition. The standard
disclosure and feedback groups did not differ from each other, nor did the instant
messaging and control groups.

Significant between group differences were found for the change in ratings of feeling "enthusiastic, happy, or joyful" ($F(3, 158) = 7.31$, $p < .001$). Participants in the standard emotional disclosure, feedback, and instant message conditions exhibited significant decreases in their ratings of this positive emotion compared with the lack of change seen among the control writing group participants. The standard, feedback, and instant message groups did not differ from each other.

Significant between group differences were found for the change in ratings of feeling "sad, blue, or lonely" ($F(3, 158) = 6.79$, $p < .001$). Ratings of sadness significantly increased in each of the active writing conditions of standard, feedback, and instant message relative to the change in sadness for the control writing group participants. The three disclosure conditions did not differ among themselves.

There were significant between group differences for changes in ratings of feeling "afraid, scared, or jittery" ($F(3, 158) = 4.01$, $p = .009$). The standard emotional disclosure and the feedback disclosure groups displayed significant increases in fear emotions relative to the degree of change exhibited in the control writing condition. The instant message condition did not differ from any of the other conditions, nor did the standard and feedback conditions differ from each other.

There were significant differences among the experimental groups with regard to changes in mood ratings for feeling "angry, irritable, or disgusted" ($F(3, 158) = 12.46$, $p < .001$). The standard emotional disclosure and feedback conditions exhibited a significant increase in angry feelings relative to both the instant message and the control writing condition. The standard and feedback did not differ from each other, nor did the instant message and control conditions differ. See Table 1 for a summary of the

change scores in for the mood items across each of the experimental conditions.

Intervention Credibility

With regard to the credibility ratings completed by participants, there were no significant differences among the experimental groups at the first writing session ($F(3, 159) = 0.64$, $p = .59$). However, participants did distinguish among the conditions at follow-up ($F(3, 147) = 3.10$, $p = .03$). The feedback and instant message conditions received significantly higher credibility ratings at follow-up than did the time management control writing condition. The feedback and instant message conditions did not differ from each other or the standard writing condition. The standard writing condition did not differ from any of the other conditions with regard to credibility ratings at follow-up. See Table 2 for mean credibility scores at both baseline and follow-up.

Table 2. Credibility Scale ratings for experimental groups at baseline and follow-up

	Standard	Feedback	Instant Message	Control
	M (SD)	M (SD)	M (SD)	M (SD)
Baseline	3.84 (1.09)	3.95 (1.08)	4.12 (0.92)	3.88 (0.80)
Follow-up	4.19 (0.99)	4.44 (0.94)	4.33 (1.29)	3.70 (1.24)

Linguistic Inquiry Word Count

Among the participants who completed their writings, analysis of variance revealed significant group differences for the mean number of words written, as well as the proportion of overall affect, positive emotion, and negative emotion words used over the course of the three writing sessions. Significant group differences were observed with regard to the mean word count of the writing sessions ($F(3, 154) = 7.13$, $p < .001$). Post-hoc analyses showed that the participants in the feedback and standard writing conditions wrote significantly more than did those in the control and instant message

writing conditions. The feedback and standard conditions did not significantly differ with regard to mean word count, nor did the instant message and control writing conditions differ.

There were also significant differences among the writing conditions with regard to the average frequency of affect words used in the writings (F(3, 154) = 45.46, $p <$ .001). In this instance, post hoc analyses revealed that each of the three active writing conditions (standard, feedback, and instant message) included a proportionally larger amount of affective language in their writing than did participants in the control condition. No significant differences in the frequency of affective language were observed among the three emotional disclosure writing conditions.

The mean frequency of positive emotion words in the writings varied significantly based on the experimental condition (F(3, 154) = 5.95, $p =$ .001). Post hoc analyses uncovered a pattern in which the instant message condition used the highest frequency of positive emotion words, which was significantly more than was used by participants in the standard and control conditions. The instant message condition did not differ from the feedback condition with regard to positive emotion language use, and the feedback condition participants used significantly more positive emotion words as a proportion of their writings than did those in the control writing condition. The standard writing condition did not differ from either the feedback or control writing conditions for positive emotion word use.

The mean frequency of negative emotion language use also revealed significant differences among the various writing conditions (F(3, 154) = 58.19, $p <$ .001). Similar to the analysis of affect language use, post-hoc tests showed that the standard, feedback,

and instant message writing conditions all utilized a significantly higher proportion of negative emotion words than did the participants in the control writing condition. No differences were observed among the active writing conditions with regard to the mean frequency of negative emotions words. The word count and emotional language use data are available in Table 3.

Table 3. Linguistic analysis: Word count and emotional language used in the writings of each experimental group

	Standard	Feedback	Instant Message	Control
	M (SD)	M (SD)	M (SD)	M (SD)
Word Count	803.0 (262.4)	806.4 (372.6)	542.3 (171.2)	662.9 (343.3)
Affect	4.56 (0.92)	4.87 (0.95)	4.97 (0.87)	2.73 (1.11)
Positive Emotion	1.90 (0.54)	2.13 (0.65)	2.36 (0.53)	1.84 (0.69)
Negative Emotion	2.62 (0.70)	2.66 (0.81)	2.54 (0.68)	0.87 (0.62)

Post-writing questionnaire

There were statistically significant group differences in participant ratings of how hard it was for them to share their experience in writing ($F(3, 154) = 9.75$, $p < .001$). Post hoc analyses showed that the participants in each of the three emotional disclosure writing conditions provided higher ratings of difficulty sharing their experience in writing than did participants in the control condition. There were no significant differences among the emotional disclosure groups related to difficulty sharing.

The three emotional disclosure groups were also compared on their ratings of how much they had previously shared the experience they wrote about, and no differences among the groups were found ($F(2, 119) = 0.54$, $p = .58$). Post-hoc analyses showed no significant between group differences related to previous disclosure. Similarly, there were no differences among the groups in their answer to a question

about details of feelings related to their experience that they had been too uncomfortable to share in their writing ($F(2, 119) = 1.62$, $p = .20$). Post-hoc analyses revealed a marginally significant difference that indicated that participants in the standard writing condition were more likely to have chosen not to share some uncomfortable details or feelings related to their experience than were participants in the instant message condition. The feedback group did not differ from either the standard or instant message conditions with regard to not sharing uncomfortable details or feelings in their writings.

Table 4. Post-writing responses (averaged across writing sessions) for each experimental group

	Standard	Feedback	Instant Message	Control
Variable	M (SD)	M (SD)	M (SD)	M (SD)
How hard to share experience in writing?*	3.72 (1.45)	3.94 (1.43)	3.50 (1.48)	2.33 (1.38)
How much have you previously shared your experience?*	3.41 (1.28)	3.15 (1.45)	3.21 (1.36)	-
Were there details/feelings that you were not comfortable sharing?**	1.63 (1.17)	1.22 (1.15)	1.13 (1.66)	-

Note: *Items were rated on Likert-type scale ranging from 1 = "Not at all" to 7 = "Very".
**Values reflect sum of "Yes" responses across 3 writing sessions, with possible range from 0-3.

Primary Hypotheses

The original hypotheses of this study were that: a) each emotional disclosure group would exhibit significantly greater reductions in symptom levels (including psychiatric, physical, and specific PTSD symptoms) and an increase in posttraumatic growth relative to the control group; and b) the greatest symptom reduction and posttraumatic growth would be observed in the instant message disclosure group, followed by the feedback writing group, and with the standard emotional disclosure

group showing relatively less benefit in comparison with the disclosure groups that received feedback. What follows is a variable-by-variable test of these hypotheses.

Four ANCOVA tests were run to examine the main effect of group assignment on the BSI Global Severity Index, PHS Total score, IES-R total score, and PTGI Total score, covarying the baseline value for each score. The results failed to support the study hypotheses, as there was not a significant main effect of group assignment on the BSI Global Severity Index ($F(3, 146) = 0.76$, $p = .52$). Subsequently, additional ANCOVA analyses were completed comparing groups on each of the individual BSI subscales; these tests revealed statistically significant differences between two of the experimental groups on two of the subscales. A significant difference between standard emotional disclosure and instant message groups was observed in the BSI Somatization scale ($F(1, 73) = 4.79$, $p = .03$), with a notable decrease in somatic symptoms exhibited by the standard emotional disclosure group compared with an increase in somatic symptoms endorsed by participants in the instant message feedback group. The control writing and feedback writing groups did not significantly differ from any of the other experimental conditions.

There was also a significant group difference observed in the BSI Obsessive-Compulsive scale ($F(1, 73) = 6.58$, $p = .01$). Once again, the standard emotional disclosure group was observed to display the greatest reduction of obsessive-compulsive symptoms, which was a statistically significant difference relative to participants in the instant message disclosure condition. Participants in the control and feedback writing groups did not significantly differ from any of the other groups. See Table 5 for a comparison of group mean data on the BSI.

Table 5. Scores for the BSI Global Severity Index and BSI subscales at baseline and

follow-up for each experimental group

	Standard	Feedback	Instant Message	Control
	M (SD)	M (SD)	M (SD)	M (SD)
GSI				
Baseline	1.04 (0.48)	0.94 (0.58)	1.05 (0.56)	0.92 (0.46)
Follow-up	0.83 (0.65)	0.82 (0.58)	0.98 (0.60)	0.83 (0.52)
Change	-0.21 (0.42)	-0.12 (0.39)	-0.07 (0.46)	-0.09 (0.45)
Anxiety				
Baseline	1.10 (0.68)	0.90 (0.73)	0.93 (0.73)	0.88 (0.63)
Follow-up	0.88 (0.94)	0.68 (0.63)	0.83 (0.69)	0.71 (0.64)
Change	-0.22 (0.76)	-0.22 (0.59)	-0.10 (0.57)	-0.16 (0.65)
Somatization				
Baseline	0.88 (0.79)	0.52 (0.54)	0.60 (0.56)	0.59 (0.57)
Follow-up	0.70 (0.81)	0.56 (0.56)	0.70 (0.70)	0.60 (0.73)
Change	-0.18 (0.43)	0.04 (0.53)	0.10 (0.51)	0.00 (0.49)
Psychoticism				
Baseline	0.78 (0.80)	0.89 (0.72)	0.93 (0.69)	0.81 (0.56)
Follow-up	0.70 (0.81)	0.73 (0.70)	0.81 (0.69)	0.69 (0.66)
Change	-0.09 (0.57)	-0.16 (0.59)	-0.12 (0.68)	-0.12 (0.49)
Paranoid Ideation				
Baseline	1.21 (0.74)	1.27 (0.98)	1.26 (0.85)	1.02 (0.80)
Follow-up	1.03 (0.81)	1.12 (0.88)	1.06 (0.76)	0.97 (0.73)
Change	-0.19 (0.62)	-0.15 (0.59)	-0.20 (0.85)	-0.05 (0.78)
Obsessive-Compulsive				
Baseline	1.78 (0.96)	1.44 (0.86)	1.65 (0.76)	1.61 (0.72)
Follow-up	1.30 (0.96)	1.27 (0.96)	1.58 (0.93)	1.38 (0.76)
Change	-0.48 (0.61)	-0.17 (0.78)	-0.07 (0.74)	-0.22 (0.70)
Hostility				
Baseline	1.01 (0.64)	0.93 (0.74)	0.96 (0.75)	0.81 (0.66)
Follow-up	0.83 (0.80)	0.95 (0.86)	1.01 (0.82)	0.86 (0.77)
Change	-0.19 (0.68)	0.03 (0.62)	0.05 (0.65)	0.05 (0.65)
Phobic Anxiety				
Baseline	0.39 (0.44)	0.48 (0.56)	0.65 (0.59)	0.46 (0.76)
Follow-up	0.36 (0.50)	0.39 (0.53)	0.51 (0.71)	0.32 (0.44)
Change	-0.03 (0.48)	-0.09 (0.48)	-0.13 (0.51)	-0.13 (0.70)
Depression				
Baseline	1.03 (0.68)	0.92 (0.73)	1.27 (0.86)	1.03 (0.67)
Follow-up	0.80 (0.83)	0.77 (0.79)	1.17 (0.92)	0.94 (0.67)
Change	-0.23 (0.74)	-0.15 (0.66)	-0.10 (0.85)	-0.08 (0.72)
Interpersonal Sensitivity				

Baseline	1.13 (0.80)	1.08 (0.97)	1.29 (0.82)	1.08 (0.76)
Follow-up	0.87 (0.90)	0.93 (0.92)	1.22 (0.91)	0.94 (0.85)
Change	-0.26 (0.87)	-0.16 (0.78)	-0.07 (0.93)	-0.15 (0.71)

Results of ANCOVA also showed no significant main effect of experimental condition on the IES-R total score ($F(3, 146) = 0.51$, $p = .68$). Subsequent ANCOVA analyses also failed to show significant group differences for the IES scales measuring Avoidance and Intrusion symptoms of PTSD. However, ANCOVA analyses revealed a statistically significant difference between the feedback and instant message conditions with regard to hyperarousal symptoms ($F(1, 72) = 4.73$, $p = .03$). Estimated marginal means showed that participants in the feedback condition exhibited a significant reduction in hyperarousal relative to the participants in the instant message condition. No other group differences were observed for any of the IES-R scales. A summary of IES-R data is available in Table 6.

Table 6. Scores in IES-R and subscales for each experimental group

	Standard	Feedback	Instant Message	Control
Variable	M (SD)	M (SD)	M (SD)	M (SD)
IES-R Total				
Baseline	5.74 (2.80)	4.81 (2.14)	5.15 (2.07)	5.40 (2.09)
Follow-up	4.15 (2.64)	3.60 (2.29)	4.23 (2.75)	3.91 (2.41)
Change	-1.59 (2.00)	-1.21 (1.62)	-0.92 (2.39)	-1.49 (2.32)
Avoidance				
Baseline	2.00 (0.84)	1.94 (0.83)	1.91 (0.71)	2.01 (0.78)
Follow-up	1.60 (0.92)	1.44 (0.86)	1.55 (0.97)	1.46 (0.81)
Change	-0.40 (0.61)	-0.50 (0.68)	-0.35 (0.92)	-0.55 (0.80)
Intrusions				
Baseline	2.20 (1.11)	1.60 (0.85)	1.86 (0.89)	2.04 (0.94)
Follow-up	1.47 (1.06)	1.31 (0.95)	1.41 (1.05)	1.51 (0.98)
Change	-0.73 (0.92)	-0.29 (0.75)	-0.44 (1.02)	-0.53 (0.98)
Hyperarousal				
Baseline	1.55 (1.11)	1.27 (0.97)	1.38 (0.83)	1.35 (0.85)
Follow-up	1.09 (0.93)	0.85 (0.84)	1.26 (0.95)	0.94 (0.93)

Change	-0.46 (0.91)	-0.42 (0.65)	-0.12 (0.84)	-0.41 (0.97)

Similarly, no main effect of writing group was found for change in physical symptoms ($F(3, 146) = 0.57$, $p = .63$). However, the control and instant message groups differed significantly with regard to symptoms of upper respiratory infection ($F(1, 69) = 6.50$, $p = .01$). Participants in the control condition exhibited a reduction in respiratory symptoms, whereas symptoms increased on average for participants in the instant message condition. A similar pattern of differences in upper respiratory symptoms was observed between the control and feedback writing conditions, although it falls short of statistical significance ($F(1, 72) = 3.56$, $p = .06$). No other significant between-group differences were found for PHS scales measuring upper respiratory infection, gastrointestinal, or muscular symptoms in ANCOVA analyses. See Table 7 for a summary of physical health symptom data.

Table 7. Scores in PHS and subscales for each experimental group

Variable	Standard M (SD)	Feedback M (SD)	Instant Message M (SD)	Control M (SD)
PHS Total				
Baseline	27.48 (15.08)	21.93 (12.20)	23.34 (13.09)	21.94 (15.05)
Follow-up	23.35 (17.30)	20.72 (14.05)	23.64 (15.21)	20.03 (15.27)
Change	-4.13 (14.74)	-1.21 (12.33)	0.31 (10.23)	-1.92 (10.10)
Upper Respiratory				
Baseline	5.00 (4.16)	4.03 (3.28)	4.00 (3.70)	4.69 (5.52)
Follow-up	3.95 (4.76)	4.15 (4.08)	4.67 (4.10)	2.92 (3.71)
Change	-1.05 (5.97)	0.13 (4.43)	0.67 (4.45)	-1.78 (4.23)
Muscular				
Baseline	6.88 (3.72)	6.08 (4.01)	5.60 (3.73)	5.36 (3.04)
Follow-up	6.30 (3.91)	5.26 (3.76)	4.97 (3.27)	4.97 (3.44)
Change	-0.58 (3.24)	-0.82 (3.51)	-0.63 (2.68)	-0.39 (3.15)
Gastrointestinal				
Baseline	5.03 (4.20)	3.50 (3.65)	4.31 (3.78)	3.06 (3.62)
Follow-up	4.50 (4.77)	3.21 (3.33)	4.11 (3.72)	3.75 (4.65)

| Change | -0.53 (2.89) | -0.29 (2.51) | -0.19 (2.96) | 0.69 (4.51) |

Table 8. Scores in PTGI and subscales for each experimental group

	Standard	Feedback	Instant Message	Control
Variable	M (SD)	M (SD)	M (SD)	M (SD)
PTGI Total				
Baseline	3.53 (1.06)	3.61 (1.06)	3.57 (1.03)	3.43 (1.03)
Follow-up	3.32 (1.12)	3.54 (0.97)	3.46 (1.06)	3.16 (1.08)
Change	-0.21 (0.79)	-0.07 (0.99)	-0.10 (0.96)	-0.27 (1.08)
New Possibilities				
Baseline	3.42 (1.41)	3.44 (1.52)	3.69 (1.24)	3.31 (1.33)
Follow-up	3.04 (1.25)	3.28 (1.34)	3.26 (1.29)	2.99 (1.33)
Change	-0.38 (1.18)	-0.16 (1.33)	-0.42 (1.11)	-0.33 (1.08)
Relating to Others				
Baseline	3.13 (1.30)	3.15 (1.26)	3.09 (1.16)	3.18 (1.28)
Follow-up	3.03 (1.28)	3.15 (1.22)	3.12 (1.21)	2.84 (1.32)
Change	-0.09 (1.07)	0.01 (1.18)	0.03 (0.97)	-0.35 (1.43)
Personal Strength				
Baseline	3.77 (1.24)	3.99 (1.30)	3.63 (1.30)	3.72 (1.21)
Follow-up	3.78 (1.33)	4.15 (1.22)	3.93 (1.24)	3.51 (1.33)
Change	0.01 (0.95)	0.15 (1.38)	0.30 (1.30)	-0.20 (1.31)
Appreciation of Life				
Baseline	4.03 (1.37)	4.20 (1.25)	4.24 (1.17)	3.99 (1.17)
Follow-up	3.76 (1.37)	3.94 (1.38)	3.90 (1.27)	3.77 (1.39)
Change	-0.27 (0.96)	-0.26 (1.15)	-0.34 (1.50)	-0.22 (1.41)
Spiritual Change				
Baseline	3.66 (1.83)	3.59 (1.75)	3.51 (1.84)	2.86 (1.84)
Follow-up	3.08 (1.81)	3.36 (1.90)	3.28 (1.82)	2.74 (1.79)
Change	-0.59 (1.34)	-0.23 (1.45)	-0.24 (1.63)	-0.13 (1.07)

Hypotheses about group differences with regard to posttraumatic growth were also not supported ($F(3, 146) = 0.74$, $p = .53$). Refer to Table 8 for descriptive data about the PTGI and its subscales. Additional ANCOVA analyses examined PTGI scales measuring relating to others, new possibilities, personal strength, appreciation of life, and spiritual change, and revealed no significant differences among the experimental groups for any of these scales. There were two marginally significant findings with

regard to the Personal Strength subscale of the PTGI. The feedback writing group participants exhibited a modest increase in personal strength, which provided a contrast to the modest decrease in personal strength observed in the control group ($F(1, 72) = 3.61$, $p = .06$). Another marginally significant difference was observed between the instant message and control conditions ($F(1, 69) = 2.88$, $p = .09$), with a decrease in personal strength in the control group relative to the instant message condition.

CHAPTER 4

DISCUSSION

The purpose of this study was to examine the relative effectiveness of different writing techniques for resolving distress in a sample of college students who reported having experienced a traumatic or stressful event. In an attempt to expand and improve upon the existing written emotional disclosure paradigm, two novel writing conditions that utilized individualized feedback provided to participants via the internet were included in a randomized controlled trial. It was hypothesized that individually tailored feedback designed to elicit the most effective elements of the standard emotional disclosure paradigm, whether provided between or during writing sessions, would benefit participants and drive greater symptom reduction on measures of posttraumatic stress, global psychiatric, and physical health symptoms, as well as increases in posttraumatic growth. A standard written emotional disclosure condition was included in the study, and it was expected that both of the feedback writing groups would outperform the standard condition on the outcome variables. Observations of improvement for the standard writing group relative to the control were also anticipated. In addition, this study examined differences in perceptions of intervention credibility, emotional arousal, and the content produced by the various writing interventions in order to better understand the findings.

The original hypothesis of this study—that each emotional disclosure group would exhibit significantly greater reductions in symptom levels and an increase in posttraumatic growth relative to the control group—was not supported. Similarly, the other primary hypothesis—that the greatest symptom reduction and posttraumatic

growth would be observed in the instant message disclosure group, followed by the feedback writing group, with the standard emotional disclosure group showing relatively less benefit relative to the feedback writing groups—was also not supported. Generally, modest decreases in general psychiatric, specific PTSD, and physical health symptoms were observed regardless of experimental condition, and without any significant differences in symptom reduction among the groups. In contrast to expectations, a modest decrease—rather than the expected increase—in ratings of posttraumatic growth was also observed across each of the experimental conditions, with no significant differences among the groups. In this study, psychiatric and physical health symptoms, in addition to posttraumatic growth ratings, decreased on average regardless of whether participants wrote about time management or a traumatic experience, and receipt of feedback did not have a significant impact on symptoms or growth.

Although analyses comparing the four groups did not reveal group differences, post-hoc comparisons of two groups at a time revealed some generally consistent differences. There were mixed results for improvement in symptoms between the standard, feedback, and time management writing groups – with the instant message condition consistently showing the least improvement or in some cases exhibiting mild increases in symptoms. When the groups differed on mental health symptoms, the instant message condition consistently displayed the smallest amount of symptom reduction. Measures of somatic complaints and obsessive-compulsive symptoms were most improved for the standard written emotional disclosure group. Hyperarousal symptoms, such as exaggerated startle response, sleep disturbance, feeling on guard,

and excessive vigilance, decreased the most in the feedback writing group. Changes in mental health symptom changes in the control writing condition were generally equivalent with the other groups. Symptoms of upper respiratory illness were the only physical symptoms that differed among the groups. The instant message writing group again displayed the poorest performance with an increase in upper respiratory symptoms, although in this case, the time management control showed the greatest reduction in upper respiratory illness. Measures of posttraumatic growth were comparable among the groups, although there was a trend toward a difference with regard to personal strength, which was maintained at baseline levels for the instant message and feedback writing groups, and showed a mild decline in the control condition.

Although there were these scattered group differences, overall, the study findings do not support the contention that feedback would improve upon standard written emotional disclosure, or even that emotional disclosure writing in general would be related to more positive outcomes than writing about time management. The only finding in the analyses of the subscales of the main outcome measures that remotely fit with the hypotheses was the finding of the slight improvement in personal strength ratings on the PTGI compared with reductions in personal strength seen in the control condition, but even these findings were just marginally significant. Given that randomization was successful and there were no apparent differences among groups with regard to age, gender, ethnicity, or baseline values of the outcome measures, it is analyses of intervention credibility, intervention-related emotional activation and engagement with the assigned task, as well as content that may provide potential clues

to unraveling this unexpected absence of group differences, and the surprising finding that the instant message condition tended to exhibit the poorest outcomes of all of the groups, rather than the best, as hypothesized.

The experimental groups were equivalent with regard to perceived intervention credibility after having read task instructions and prior to engaging in writing. Following randomization and reading the writing task instructions, participants generally rated their assigned writing task as more logical and credible than not. This finding suggests that the time management condition was not an obviously neutral control group and that the positive expectation and optimism related to the intervention was similar regardless of group assignment. The similarity in credibility ratings may be one reason for the widespread symptom improvement observed across all groups.

Another reason why writing about time management was perceived as an equally credible intervention for coping with stress at baseline is because there is a precedent in the literature for an unexpectedly positive outcome resulting from an intended control group that wrote about future planning (Frayne & Wade, 2006). Similar to the present study, those participants were assigned to write about plans for the next day, next week, and next month in successive writing sessions over the course of one week. That writing task was also compared with standard written emotional disclosure, and although both interventions were found to decrease distress, writing about future plans—the so-called control group—outperformed the standard emotional disclosure in this regard at a 10-week follow-up assessment.

Additionally, as was noted in the introduction of this paper, writing about future possible selves has also previously demonstrated similar beneficial effects when

compared with emotional disclosure writing (King, 2001). Although not the same as writing about plans, perhaps planning and envisioning a best possible future self share in common an optimism and thought process that may explain the observed reduction in stress equivalent to the intended intervention writing groups in this study.

Participants also rated the credibility of their assigned writing intervention at follow-up, at which time significant differences between the control and both feedback conditions were observed. The participants who received feedback about their writing, either between sessions or via instant message, rated the intervention as more credible for dealing with their traumatic experience than did participants who wrote about time management. This suggests that after having completed writing about their experience and receiving feedback about it from a guide, participants subjectively thought that the intervention had been helpful to them. Although this idea was consistent with the study hypotheses, it was not borne out by the symptom or growth outcomes. Following completion of the writing sessions, it seems possible that the personal connection with a guide who made the effort to understand and respond to their writing may have contributed to the perception of enhanced credibility relative to the groups that received no feedback.

Mood ratings that were completed by participants immediately before and after each writing session were also analyzed as a measure of emotional activation generated during the 30-minute writing task. Attention was focused on positive emotions of calm and happiness as well as negative emotions of sadness, fear, and irritability, each of which were expected to change during the writing with sufficient task engagement. With regard to the positive emotions, the standard and feedback writing

conditions were associated with significant reductions in ratings of calm during writing relative to emotional change reported by the control and instant message groups. Each of the emotional disclosure groups reported significant decreases in feelings of happiness following writing relative to the control group. It is unsurprising that the participants who wrote about traumatic experiences in the standard and feedback conditions were less calm and/or happy immediately following writing, or that those who wrote about time management did not exhibit a similar reduction in calm or happiness. The relatively less apparent reduction in ratings of calm observed in the instant message condition suggests that something about this condition generated less emotional reactivity in response to the task than the disclosure conditions that it was expected to resemble.

Examination of change in negative emotions rated before and after writing revealed the expected pattern that feelings of sadness increased to a similar extent for each of the disclosure groups relative to the control condition. However, just as it was for the physical and psychological symptoms measures, the instant message condition appears to have unexpectedly been less impactful than the other disclosure conditions according to the relative lack of change in ratings of calm, fearful, and angry emotions. Despite the similarities in instructions for sharing about traumatic experiences and processing emotions amongst the disclosure conditions, some aspect of disclosure in the instant message format was apparently not as intense as in the standard and feedback conditions. One possibility is that the more conversational nature of the instant message conversations actually served to interrupt and distract from the intended task of gaining exposure to and processing emotions related to the participants' stressful

experiences.

Participants completed post-writing questionnaires after each writing session and included questions assessing the difficulty experienced in sharing in writing. Additional questions about the amount of previous disclosure of the information and exclusion of details or feelings that were too uncomfortable to share were asked of participants in the disclosure writing conditions. As expected, the participants in the disclosure conditions indicated more difficulty with sharing their experience than those who wrote about time management. There were no differences among the disclosure groups with difficulty sharing, or previous disclosure of the traumatic experience details. A marginally significant difference was observed between the standard and instant message conditions, with participants in the standard condition more likely to indicate that there were details about their experience that they were too uncomfortable to disclose in writing. It is possible that having an empathic guide interacting with participants in real-time facilitated disclosure of details and feeling related to trauma. If this were the case, the guide's presence during the instant message sessions may have served as a calming factor, or lessened the degree of emotional upset related to the disclosure. Alternatively, expression of traumatic experiences without holding back could arguably be expected to produce greater emotional reactions rather than tempering them, so it is unclear how or if this marginal finding about disclosure of uncomfortable details had a substantial impact on the main study outcomes.

The LIWC data showed that proportionally more affective language was used in the disclosure conditions, and positive emotions were more frequently elicited in the feedback conditions, whereas the disclosure groups did not differ in frequency of

negative emotion word use. Most interestingly, the instant message condition elicited far less total writing content despite being matched with the other groups with regard to time in session. It seems probable that this disparity in the amount of content generated is a product of the real-time interaction with a guide - which may have had important unintended consequences that limited the amount of time that participants in the instant message condition were able to spend actually writing about their experiences. Engagement in an instant message conversation differs from uninterrupted writing in the demand characteristics of formulating communications to another person, and receiving and interpreting responses in turn that were not present in the other disclosure conditions. The potential additional self-monitoring and social processing involved may have made writing less efficient and partially accounted for the difference in content produced. Additionally, the amount of time specifically spent writing was likely considerably less for the instant message condition relative to the other writing groups despite having a standard 30-minute session for all conditions. Given that the feedback was provided in real-time for the instant message condition, whatever time was used by the guide to type (and for the participant to wait for and then read) subtracted from the total amount of time for participants to engage in writing about their experience. The unique combination of guide interruption of participant writing, and guide use of participant writing time may have unexpectedly contributed to both less time to write, and also decreased processing and emotional engagement in the writing task. This may partially explain why an apparently more credible intervention failed to outperform the other writing groups in symptom reduction and posttraumatic growth.

It is also possible that the act of typing on the computer, which was consistent

across each of the experimental conditions, may have had an unwanted influence on the desired impact of the disclosure writing intervention. Many of the previous studies of effective internet-based interventions have been structured as longer-term and also borne greater resemblance to a traditional cognitive-behavioral treatment format in comparison with the emotional disclosure paradigm examined in the present study (Cuijpers, van Straten, & Andersson, 2008; Spek et al., 2007; Lange et al., 2003; Hirai & Clum, 2005; Knaevelsrud & Maercker; 2007). It has been theorized that the act of physically writing with pen and paper may allow one to write more freely and thus come into greater connection with the associated feelings and reactions to exposure to painful memories. Previous research has studied the difference between handwriting and typing and found no significant differences in emotional arousal or content of the writing across the different modalities, although health outcomes were not examined (Sharp & Hargrove, 2004). Few studies have examined typed and/or web-based written emotional disclosure, and it is not well understood in what ways typing and submitting writings over the internet rather than handwriting influences the effect of the writing intervention.

Limitations

Several important limitations of this study must be recognized. The sample used was one of convenience, and thus the findings are not necessarily generalizable to the population at large. In addition to being composed of college students taking psychology courses, this was not a clinical sample with a verified PTSD diagnosis. Despite attempts to screen for more significant and unresolved traumatic experiences, it is possible that greater symptom improvement or group differences would be observed in a sample with

greater symptom severity. Indeed, many of the stressful experiences that the participants chose to write about would not meet the initial criteria for PTSD of being an event in which their life or physical integrity was under threat (or they observed another person in a similar type of situation) (American Psychiatric Association, 2000). Anecdotally, common themes in the disclosure writings across experimental conditions were of relationship difficulties. These varied between dating or marriage relationships, romantic affairs, and conflict with siblings or parents. There were occasionally disclosures focused on previous history of sexual abuse or other traumatic events such as being the victim of armed robbery, although these appeared much less frequently. It also did not appear to be consistently true that the stressful experiences were unresolved—as was intended in the screening process. Many participants wrote about events that were likely very stressful at the time they occurred, but may have been in the distant past and by the participants' own account were no longer particularly problematic. As such, tighter screening of both the type of trauma and current symptoms may yield different results, and the subset of participants who met criteria for the most severe trauma and symptom presentations may be particularly interesting for further future analysis.

It also unclear what effect the selected follow-up time had on obtained outcome measurements. It is possible that having multiple follow-up points would have resulted in different outcomes. For instance, in addition to the 6-week follow-up used in this study, symptom measurement immediately following completion of writing and/or at a more distant follow-up point would provide an alternative time frame with unknown ramifications for the outcomes of interest. A study by Smyth, Stone, Hurewitz, and Kaell

(1999) found significant effects for emotional disclosure writing in a sample of patients with asthma or rheumatoid arthritis with a longer follow-up period of 4 months. Another study of the effects of emotional disclosure writing in a sample of rheumatoid arthritis patients found no differences on health measures at a 2-week follow-up, but did find differences at a second follow-up completed 3 months after baseline (Kelley, Lumley, & Leisen, 1997).

It is also unknown to what extent a 3-session dose of the writing intervention is sufficient to stimulate meaningful change. A grand total of 90 minutes of disclosure writing alone may not be enough for participants to achieve exposure to avoided painful memories, sufficiently process their emotions, and find new meaning in their lives. It would be interesting to observe the effects on participants if they were to continue exposure, processing, and making meaning in writing or some other form to assess whether or not they exhibited enhanced outcomes. Although the length of exposure conducted over three writing sessions is far less than would be undergone in an exposure-based psychotherapy, positive effects on physical and psychological functioning have been observed in other studies of the emotional disclosure paradigm under conditions similar to those in this study (Sloan & Marx, 2004a; Sloan, Marx, & Epstein, 2005). These previous findings lend further credence to the idea that something about writing on the computer may be responsible for the lack of significant findings in this study, as the most substantial difference in this study was the modality of the writing. Specifically, the instant message writing condition was not as efficient at stimulating emotional arousal as standard emotional disclosure writing and this may explain why it consistently underperformed with regard to symptom reduction. Perhaps

the instant message interface, conversational nature, and immediate guided feedback combined to dilute the intervention's potential to stimulate arousal and processing of emotions necessary to see benefits to emotional and physical functioning.

The guides in this study reported mixed reactions to the challenge of providing guidance to the participants in the feedback and instant message writing groups. The feedback writing group seemed less interactive and less controlled in the sense that the writings to which guides had to respond varied greatly in terms of organization and structure. At times there were very clear narratives along the lines of what was hoped for based on the task instructions, and these lent themselves well to the guidelines for feedback. Other times, participants wrote either so much, or so little, with varying degrees of a more chaotic, disorganized presentation, that it was more difficult to focus the participant on a specific aspect of writing for further attention and direct them toward further exploration of emotions or meaning of the event. It was also variable to what extent participants appeared to respond to or ignore the feedback and suggestions/questions provided, and on occasions in which feedback was ignored it became difficult to know how to structure feedback differently in the subsequent response to the participants' second writing.

In contrast, the instant message format afforded guides a greater sense of control in structuring the conversation by providing reflections and questions as they arose. Even so, this format was not without its own frustrations. For a variety of possible reasons, the latency of responding was not as "instant" as the group title would indicate. Participants varied greatly in the amount of content that they would type and include in a given communication, and the length of the response time to read and respond to the

guide was also variable. It is unclear what role, if any, factors such as lack of familiarity with typing and instant message software, discomfort or hesitancy directly sharing with a guide, or lack of engagement with the task may have contributed to this problem when it occurred. Despite these difficulties, there were participants who seemed to immediately take to this medium, share freely and quickly, engage in the task and report that the interaction with the guide was helpful and meaningful.

Conclusion and Future Directions

Although the addition of feedback and guidance to the standard written emotional disclosure paradigm did not provide the expected enhancements to the intervention, and none of the disclosure groups outperformed the control condition, this study was important in that it sheds light on some potential improvements for instant message disclosure and the time management control conditions. With regard to the instant message condition, it is apparent that despite equal session-time, participants did not generate similar amounts of written content about their traumatic experiences. This could be remedied by extending the length of these sessions to account for the inherent differences between instant message and the other writing conditions. It is possible that with extended time, the instant message participants would generate a similar amount of content, and in turn exhibit more emotional engagement/reactivity and deeper processing of their experience, which may lead to improved outcomes. One idea would be to create an instant message condition with additionally modified instructions that more closely resemble conduction of an imaginal exposure as in prolonged exposure treatment (Foa & Kozak, 1986). This could involve instructions to type continuously for a period of time (typically 30-45 minutes) about the sensory details, including thoughts

and emotions, as vividly as possible in the first person and present tense, and repeating the account as permitted within the given time frame. This could be done with minimal feedback from the guide, prompting only to provide brief empathic statements and encouragement, and for details of sights, sounds, smells, physical sensations, cognitions, or emotions that appeared to be missing from the account. Following completion of this imaginal exposure, an additional 10-15 minutes of processing of the experience and reaction with the guide in a more conversational and open-ended format would mimic the interaction between therapist and client in a prolonged exposure treatment session. This change may reduce the possible interference of therapist comments in the exposure process, and with the extended time for processing add the intended benefit of providing guidance to the writing process. It remains unclear the effect of conducting such an imaginal exposure via instant message, but this may be an interesting direction for future research.

It is also apparent that writing about time management is not an entirely neutral control condition as it was intended to be. Making plans in writing about how to manage time in the future was perceived as a beneficial activity and had a positive impact on some outcomes in this study. Although this intended control did not result in as much affective language use as the disclosure conditions, it does appear to have been a productive and perhaps also stress-reducing assignment. The assignment to write about time management in this study differed in an important way from other time management writing controls in that it required consideration of future plans rather than reviewing past activities. Writing about future plans may be a more active and beneficial alternative than a review of ways in which time has been spent in the past.

Development and use of a more neutral writing topic, or alternatively, inclusion of a control group that does not write at all is indicated in future studies.

If possible, implementation of written disclosure approaches with clinical populations diagnosed with PTSD would be ideal in order to assess the possible beneficial impact of the treatment. Writing about the details of traumatic experiences is a component of Cognitive Processing Therapy (CPT), an existing evidence based treatment for PTSD (Resick & Schnicke, 1992). It is not clear how writing would impact symptoms in the absence of the rest of the CPT package, or how an internet-based guided writing condition such as the feedback and instant message conditions in this study might benefit diagnosed PTSD patients who are unwilling or unable to attend weekly face-to-face psychotherapy sessions with a trained clinician. It is certainly possible that expressive writing alone is insufficient to achieve demonstrable benefit in terms of distress and symptom reduction for most people who have experienced relatively severe stressful experiences. Emotional disclosure writing does not contain components such as training in skills like cognitive restructuring or behavioral in vivo exposure experiments in other PTSD treatments, and these may be critical to attaining significant and sustainable benefits in addition to the exposure and emotional processing that is intended to occur during the writing process.

Despite the absence of main effects in this study, it is possible that there are subsets within the sample that exhibited more notable benefits on one or more of the outcome variables. Future analyses examining potential moderators of outcome may reveal the individuals for whom these interventions were helpful, and those for whom it was less beneficial.

Although the hypotheses of this study were not supported, and the novel "enhanced" writing conditions in particular did not perform as anticipated, it is too early to close the book on the possibility of a feedback-enhanced, internet-based emotional disclosure intervention. Given the limitations and problems identified in the course of this study, there appear to be several promising avenues of research in hope of developing a truly effective intervention for posttraumatic stress, which might be of benefit to patients with poor access or other obstacles to traditional in-person treatment.

APPENDIX A

RESEARCH INFORMED CONSENT
Title of Study: Stress Management Through Internet Writing

Principal Investigator (PI):   Mark A. Lumley, Ph.D.
                                         Psychology Department, 313-577-2773

Purpose:

You are being asked to participate in a research study at Wayne State University because you reported that you have had a stressful experience that continues to bother you. The purpose of the study is to understand how writing about different topics and using different internet-based methods of writing will influence people's stress and health. About 200 people will be enrolled in the study. Please read this form and ask any questions you may have before agreeing to be in the study.

Study Procedures:

If you agree to take part in this research, you will be asked to come to the laboratory for 5 sessions. During session 1, you will learn about the study and then complete on a computer a number of questionnaires about your personality, stress, and health. This will take about 1 hour.

At session 2, you will be randomly assigned (like flipping a coin) to one of four computer writing conditions. You will be asked to write about your stressful experience or about how you manage your time and your future plans. Also, you may or may not be given suggestions after each of your writings, or you may or may not receive suggestions while you write using instant messaging. Any suggestions you receive will be from a doctoral student in clinical psychology trained in effective writing about stress. You will also complete brief ratings of your mood before and after each writing. You writings will be recorded by the research team for later analysis. You are expected to write for 30 minutes during each of sessions 2, 3, and 4, and these sessions will take about 40 minutes each. Sessions 2, 3, and 4 should occur during a 1-week period.

Session 5 will occur 7 weeks after you start writing, and you will complete the questionnaires that you completed in session 1. This session will take about an hour. The whole study takes about 4 hours.

Finally, by signing this consent form, you are giving the investigator, Dr. Mark Lumley, permission to obtain your academic transcript from the Wayne State Registrar, so that we can see your grades and classes taken for this semester and for the next year.

Benefits:

We expect that the mood and health of some people will benefit from participating in this study, but you may not benefit. Information from this study may benefit other people now or in the future.

Risks:

By taking part in this study, you may experience the following risks. The writing sessions may be briefly upsetting. Also, you risk the loss of confidentiality under any of the following conditions: If you are thought to be at risk for self-harm or harming another, if there is a concern that child abuse or elder abuse has possibly occurred, or if it is discovered that you have a reportable communicable disease (certain sexually transmitted diseases and/or HIV), then this information must be released to the appropriate authorities or public health department. If you disclose illegal criminal activities, illegal substance abuse, or violence, this information may be released to the appropriate authorities. If the researchers feel that you need mental health treatment, you may be referred to the Wayne State Counseling and Psychological Services (CAPS) program, which is available free of charge to all students. You can also obtain counseling there on your own. Their number is 313-577-3398. There may also be risks involved in taking part in this study that are not known to researchers at this time.

Study Costs:

Participation in this study will be of no cost to you.

Compensation:

For taking part in this study, you will be compensated for your time. You will receive up to 5 hours of course credit for completing this study—1 hour for each session completed. If you do not need some or all of the 5 hours of credit, then you will be paid $10 for each session that you complete for which you do not receive course credit, up to a maximum of $50.

Research Related Injuries:

In the unlikely event that this research-related activity results in an injury; no reimbursement, compensation or free medical care is offered by Wayne State University. If you think that you have suffered a research-related injury, let the investigator know right away.

Confidentiality:

All information collected about you during the course of this study, including your writing, will be kept confidential to the extent permitted by law. You will be identified in the research records by a code number. Information that identifies you personally will not be released without your written permission. However, the Human Investigation Committee (HIC) at Wayne State University or federal agencies with appropriate

regulatory oversight (e.g., Food and Drug Administration [FDA], Office for Human Research Protections [OHRP], Office of Civil Rights [OCR], etc.) may review your records. All data will be kept in your study file until after 5 years or until the study is completed, whichever is longer, and then will be destroyed. When the results of this research are published or discussed in conferences, no information will be included that would reveal your identity.

Voluntary Participation /Withdrawal:

Taking part in this study is voluntary. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer questions or to withdraw at any time. Your decision will not change any present or future relationships with Wayne State University or its affiliates or other services you are entitled to receive. You may elect to participate in other research studies, or in projects unrelated to research to obtain course credit. The investigator may stop your participation in this study without your consent.

Questions:

If you have any questions concerning your participation in this study, now or in the future, or if you think that you need to report a research related injury, Dr. Mark Lumley can be contacted at (313) 577-2773. If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee can be contacted at (313) 577-1628.

Consent to Participate in a Research Study:

To voluntarily agree to take part in this study, you must sign on the line below. If you choose to take part in this study, you may withdraw at any time. You are not giving up any of your legal rights by signing this form. Your signature below indicates that you have read or had read to you this entire consent form, including the risks and benefits, and have had all of your questions answered. You will be given a copy of this consent form.

_____   _____
Signature of Participant/Legally Authorized Representative   Date

_____   _____
Printed Name of Participant/ Authorized Representative   Time

_____   _____
**Signature of Witness (When applicable)   Date

_____   _____
Printed Name of Witness   Time

_____   _____
Signature of Person Obtaining Consent   Date

_____   _____
Printed Name of Person Obtaining Consent   Time

APPENDIX B

Instructions for Writing (Time Management Control)

The goal of this project is to see whether thinking about and writing privately for 3 days about how you manage your time will reduce stress and therefore improve your mood and health. As a college student, how you spend your time can be a source of stress. Some people find that when they plan their time or organize their activities better, they feel less stress.

For this exercise, you should write for 30 minutes on 3 occasions over the next week, starting today. During each of these 3 writing sessions, you should write about how you manage your time. You may wish to write about how you structure your time with regard to your courses, study time, balancing work and school, or some other aspect related to how you manage your time. You are to write for 3 sessions over a 1-week period, for 30 minutes each session. You should write about a different topic on each of the three sessions.

Here are the 3 topics:

- In Session 1: You should write in detail about what you plan to do with your time over the next 24 hours.
- In Session 2: You should write in detail about what you plan to do with your time over the next week.
- In Session 3: You should write in detail about what you plan to with your time for the rest of the current school semester.

    Please try to write for 30 minutes each day. When you write, <u>write freely</u>. Don't worry about trying to write well. <u>Don't worry about grammar, spelling, or sentence structure</u>; these things are not important. At each session after your initial writing, please take some time to reread what you wrote during the previous session and reflect on it before beginning your next writing.

    Before you start writing, please complete the brief "CS" scale that is in a stack next to the computer. This scale asks for your impression of this technique for managing stress. Next, answer the "Before Writing Mood Ratings" questions that are posted on the website and then write for 30 minutes. Then complete the "After Writing Ratings" questions.

Instructions for Writing (Standard Written Emotional Disclosure Group)

The writing exercise that you will do over the next week comes out of research on stress management. Writing about stressful or traumatic events that you have experienced can help you manage stress, and may improve your health.

For this exercise, you should write for 30 minutes on 3 occasions over the next week, starting today. During each of these 3 writing sessions, you should write about a

trauma, upheaval, stressful event, or psychological conflict or issue that you may be experiencing right now, or that you experienced at some other time in your life. The event or conflict that you write about should be <u>the one you consider to be the most stressful that you have experienced and is the most significant to you</u>. Ideally, you should write about an experience or conflict that you have not talked about with others in much detail; that is, it is something that you have kept rather private and which still bothers you, or is uncomfortable to think about. You can write about anything you want, but whatever you choose, it should be <u>something that has affected you very deeply</u>.

When you write about the event, try to <u>make your memories as vivid as possible</u>, including thoughts, emotions, and bodily sensations that you experienced. When you write, <u>try to tell your story</u>, including the <u>facts</u> of what happened and your <u>deepest feelings</u>. It is important that you let yourself go and touch the deepest emotions and thoughts that you have about the experience. You can also write about <u>how the experience has affected you</u>. You might write about how it has affected your self-esteem, your relationships, or your health.

<u>You should try to write about the same event or conflict for all three writing sessions</u>, but this is not a requirement. If you feel like you have resolved the experience and it no longer bothers you, then you can write about a different experience. If there is a more important or stressful event for you to write about, then write about that.

Please try to write for about 30 minutes each session. When you write, <u>write freely</u>. Don't worry about trying to write well. <u>Don't worry about grammar, spelling, or sentence structure</u>; these things are not important. At each session after your initial writing, please take some time to reread what you wrote during the previous session and reflect on it before beginning your next writing.

Before you start writing, please complete the brief "CS" scale that is in a stack next to the computer. This scale asks for your impression of this technique for managing stress. Next, answer the "Before Writing Mood Ratings" questions that are posted on the website and then write for 30 minutes. Then complete the "After Writing Ratings" questions.

Instructions for Writing (Asynchronous Interactive Writing Group)

The writing exercise that you will do over the next week comes out of research on stress management. Writing about stressful or traumatic events that you have experienced can help you manage stress, and may improve your health. Research has suggested that receiving feedback about your writing from a guide who has expertise in writing about stress will make your writings more effective and powerful.

For this exercise, we would like you to write for 30 minutes on 3 occasions over the next week, starting today. During each of these 3 writing sessions, we would like you to write about a trauma, upheaval, stressful event, or psychological conflict or issue that you may be experiencing right now, or that you experienced at some other time in your life. The event that you write about should be <u>the one you consider to be the most stressful</u>

<u>that you have experienced and is the most significant to you</u>. Ideally, you should write about an experience that you have not talked about with others in much detail; that is, an experience that you have kept rather private and which still bothers you, or is uncomfortable to think about. You can write about anything you want, but whatever you choose, it should be <u>something that has affected you very deeply</u>.

Here are some examples of stressful events that others have written about:

- the death or loss of a loved one
- the end of a serious relationship
- having a serious illness or disorder
- family conflict or parents who have problems
- being attacked, hurt, raped, or mugged
- being sexually, physically, or emotionally abused
- getting pregnant, or getting someone else pregnant
- having an abortion
- getting in trouble with the law
- having serious problems with school, work, or other activities
- being abandoned or betrayed
- being trapped in a bad relationship with little or no control

Here are some examples of stressful personal conflicts that others have written about:

- having to keep a family secret
- having sexual problems or concerns, including orientation or performance
- having a drug or alcohol problem
- intense internal conflict over your beliefs, such as moral, ethical or religious conflicts
- conflicts over intimacy or independence in relationships
- conflicts over expressing feelings such as anger

We would like you to write about one of these experiences, or some other stressful experience that is unique to you. Remember, whatever you write about, the experience should be one that continues to bother you. Here are some signs that an experience still bothers you:

- you don't like to think about or remember the experience
- you don't like to talk about it with others
- you prefer to avoid people, places, or things that remind you of the experience
- thoughts or memories of the experience pop into your head when you don't want them to
- you have nightmares or upsetting dreams about it
- when you think about the experience, you feel upset, anxious, mad, sad, or scared
- when you do think about it, your body responds with tension, arousal, or feeling upset, sick, or tired

When you write about the event, try to <u>make your memories as vivid as possible</u>, including thoughts, emotions, and bodily sensations that you experienced. When you write, <u>try to tell your story</u>, including the <u>facts</u> of what happened and your <u>deepest feelings</u>. It is important that you let yourself go and touch the deepest emotions and thoughts that you have about the experience. You can also write about <u>how the experience has affected you</u>. You might write about how it has affected your self-esteem, your relationships, or your health.

<u>You should try to write about the same event for all three writing sessions</u>, but this is not a requirement. If you feel like you have resolved the experience and it no longer bothers you, then you can write about a different experience. If there is a more important or stressful event for you to write about, then write about that.
Please try to write for 30 minutes each day. When you write, <u>write freely</u>. Don't worry about trying to write well. <u>Don't worry about grammar, spelling, or sentence structure</u>; these things are not important.

Important: After each of your first two writing sessions, your guide will read what you have written, and will write you a note with feedback and ideas. Your guide's feedback and suggestions are designed to help make your writing a more effective way to manage your stress. The suggestions that your guide will give are based on research showing what makes writing most effective. We would like you to take some time to read what you wrote in the previous session as well as your guide's feedback and suggestions, and then consider trying them in your writing for your next session. However, you do not have to follow your guide's suggestions, especially if you have a different idea of what might help you. But please consider doing so.

Before you start writing, please complete the brief "CS" scale that is in a stack next to the computer. This scale asks for your impression of this technique for managing stress. Next, answer the "Before Writing Mood Ratings" questions that are posted on the website and then write for 30 minutes. Then complete the "After Writing Ratings" questions.

Instructions for Instant Messaging

The exercise you will participate in over the course of the next week comes out of research on stress management. Communicating about stressful or traumatic events that you have experienced can help you manage stress, and may improve your health. Research has suggested that discussing a stressful experience and interacting with a guide who has expertise in stress management may lead to enhanced positive benefits of disclosing about one's experiences.

For this exercise, we would like you to engage in an instant message conversation with your guide for 30 minutes on 3 occasions over the next week, starting today. During each of these 3 instant messaging sessions, we would like you to converse about a trauma, upheaval, stressful event, or psychological conflict or issue that you may be

experiencing right now, or that you experienced at some other time in your life. The event that you write about should be <u>the one you consider to be the most stressful that you have experienced and is the most significant to you</u>. Ideally, you should write about an experience that you have not talked about with others in much detail; that is, an experience that you have kept rather private and which still bothers you, or is uncomfortable to think about. You can write about anything you want, but whatever you choose, it should be <u>something that has affected you very deeply</u>.

When you write about the event, try to <u>make your memories as vivid as possible</u>, including thoughts, emotions, and bodily sensations that you experienced. When you write, <u>try to tell your story</u>, including the <u>facts</u> of what happened and your <u>deepest feelings</u>. It is important that you let yourself go and touch the deepest emotions and thoughts that you have about the experience. You can also write about <u>how the experience as affected you</u>. You might write about how it has affected your self-esteem, your relationships, or your health.

<u>You should try to converse about the same event for all three instant messaging sessions</u>, but this is not a requirement. If you feel like you have resolved the experience and it no longer bothers you, then you can write about a different experience. If there is a more important or stressful event for you to write about, then write about that.

Please try to message for 30 minutes each day. When you write, <u>write freely</u>. Don't worry about trying to write well. <u>Don't worry about grammar, spelling, or sentence structure</u>; these things are not important. At each session after your initial instant message conversation, please take some time to reread what you discussed in the previous session and reflect on it before beginning your next conversation.

Important: During every one of your three instant messaging sessions, your guide will read what you have written, and will respond with feedback and ideas. Your guide's feedback and suggestions are designed to help make this exercise a more effective way to manage your stress. The suggestions that your guide will give are based on research showing what makes writing most effective. We would like you to read the suggestions, and then consider trying them. However, you do not have to follow the suggestions, especially if you have a different idea of what might help you. But please consider doing so.

Before you start instant messaging, please complete the brief "CS" scale that is in a stack next to the computer. This scale asks for your impression of this technique for managing stress. Next, answer the "Before Writing Mood Ratings" questions that are posted on the website and then write for 30 minutes. Then complete the "After Writing Ratings" questions.

APPENDIX C

PRINCIPLES OF WRITTEN FEEDBACK FOR STRESS WRITINGS

Jon Beyer and Alison Radcliffe (Summer 2007)

Evaluating Day 1 Writing

Evaluate subject's writing.

Identify possible events and emotional responses the writer has discussed that could be a focal point. Try to focus on aspects of the response that seem to trigger emotions in the writer – or that have the potential to do so with more processing.

Identify cues in writing you can use to encourage the subject to explore their emotions related to the event. Include possible core feelings or experiences that can be reflected. Look for indications that the writer has unresolved feelings or is experiencing some internal struggle. Generate some ideas about conflicts the writer may be experiencing and then tailor suggestions to direct them toward dealing with their experience and related feelings.

If the participant has demonstrated difficulty identifying a stressful experience, or has selected a stressful topic but you think there is something likely more stressful, suggest that they identify a more stressful experience. One clue to this is to determine whether their topic is about something private, undisclosed, or avoidant of some affect. You may suggest that the writer disclose another stressor, or continue with the current one while attempting to explore some aspect of it that is hidden, conflicted, or affect-inducing.

Emotional responses:

- Negative Emotion - General expressions - angry, sad, wrong

- Anger - Expression of hostility, rage, opposition angry, fight, rude

- Depression - Expression of sadness, sorrow sad, grief, worthless

- Positive Emotion - General expression of positive feelings or attributions; happy, ecstatic, joy

- Optimism, Expression of self-confidence, hope, pride, certainty

Ideal Content for Day 1:

- Subject has identified a major stressor

- Writing may be a little scattered but mostly clear and progresses from one idea to the next

- Expresses some awareness of emotion

- The flow of the writing indicates chronological order.

Not Ideal Content

- Subject's writing is scattered or lacks detail

- No or very few emotions are expressed

- Off topic completely

Feedback Following Day 1 Writing

Note: During the next writing task, we would like the writer to focus on the emotional aspects of the stressor in greater detail and how it affects them. We want to encourage them to process emotions further. Keep in mind the need to form an alliance and positive relationship with the client.

Once you've identified areas that need to be addressed, (i.e., superficial vs. deeper meaning, focused vs. non-focused writing) use shaping to encourage the writer to move forward in the right direction. Identify something positive in your feedback. For

writers who seem to have a hard time processing emotions it can be useful to direct them to first write more about their thoughts related to the event before moving into emotions. Try to keep their response options open-ended if possible, unless there is a specific detail of the writer's story that they are conflicted about and should process in greater depth.

Possible script:

(Break into short paragraphs.)

Thank you for sharing your experience with me. I see that you've chosen to write about <<something specific>>. (*Briefly reflect their overall topic and emotional content, if present. Praise positive aspects of writing, like openness, sharing something difficult, etc.*)

Before your next writing I would like you to take a few moments to think about some of the emotions you have as a result of your <<stuff>>. Ask yourself how your experience makes you feel, how you feel <<what the person said>>. You said in your writing that you <<felt some way, build in a specific reflection from their writings>>, try to build on those feelings in your next writing. (*Direct them toward emotional content you may be wondering about and uncover unresolved conflicts. Tailor your response toward the writer's level of emotional openness/complexity.*)

Please write about your <<stuff>> in more detail, focusing on related <<thoughts/emotions>>. When writing, be sure to include emotions that you have about your experience. Please write for about 30 minutes. (*Concisely restate your key instruction and where you want them to go with the next writing.*)

Optional addition:

"Although this experience seems quite stressful, if there is a different event or experience or issue that is even more stressful for you that you did not write about, you can feel free to write about that topic in your next writing."

- Do NOT query for specific emotions at this point, instead allow the writer to generate their own expression

A. Identifies Major Stressor, Writing a bit scattered

- Ask the subject to write about how the stressor has affected their feelings.

- Encourage identification of additional emotions attached to the event.

- Ask them to retell the story chronologically (if their initial story is unstructured) and include more elaboration on the emotions they have attached to this event.

- Use shaping and reinforce what they have done well

B. None or Many Stressors Identified, very scattered story

- Suggest an event they have mentioned and ask them to focus on it in their continued writing

- Ask them to tell the story in chronological order if the writer seemed confused or the narrative was unstructured.

- Encourage continuity across days

- Encourage identification of emotions

- Help the subject identify emotions by asking questions or making suggestions.

- Use shaping

****

Evaluating Day 2 Writing

Determine if subject has been able to identify and elaborate on emotional aspects of the stressor.

Ideal Content

- Writer has written about the emotional aspects of the event in more detail

- Continues to focus on same stressor (if not instructed to find more stressful event to write about)

- Elaborates more fully on the emotional effects

- Was able to incorporate the feedback into the focus of the writing

- Identified specific emotional content

- Includes emotional words that seem congruent with experience.

Not Ideal Content

- Does not identify emotions

- Talks about other topics

- Off task

- No identification of stressor, or unclear/absent connection between emotional content and event.

Feedback Following Day 2 Writing

Note: During the next writing task, we would like the subject to reflect on their thoughts and the way that their thinking about the event may have changed after writing for the past several days. Focusing more on what they have learned and what about them or their lives has changed. Also suggest they consider what actions they may wish to take regarding the stressor and changes they still hope to make in the future –

especially if it is unclear what has changed to this point and/or they are still in the midst of struggling with the stressor.

Continue to use shaping to guide the subject's writing – identify positive components in the writing and use that to keep them going in the right direction. Possible script:

"I see that you've included more details about <<so and so>> and it appears that you are working very hard at this writing task. (*Briefly reflect content, and emotions expressed, praise positive aspects of writing.*)

Here is what I'd like to see: << explain, include aspects of changes, both positive and negative>>. Please take a few moments to think about how you might have changed, both in your thoughts and in your daily life, as a result of <<the event/experience>>. Ask yourself what changes, both good and bad, might have come in your life as a result of <<the event/experience>>. (*Direct them toward identifying adaptive coping mechanisms to help resolving their stressor*)

Please write about these issues in more detail. (*Concisely restate the key instruction*) Please write about this for 30 minutes."

A. Identifies emotional aspects of stressor

- Suggests specific emotional content that was missing from original writing.

- Ask them to write about how it has affected their emotions now, and then.

- Ask the subject to think about how they have changed as a result of the stressor.

- Ask them to consider possible actions to improve their situation if stressor is current and how they would like to change/what it would be like to change some aspect related to the stressor.

- Ask them to consider any possible emotional content that they might have avoided.

B. **None or Many Stressors Identified, very scattered story**

- Use shaping to keep the writer on task.

- Ask specific questions to elicit direct answers.

- Provide a more detailed outline suggesting what you would like them to write about in your script.

- **Example:** "I see that you are experiencing some impact <<from these events>>. Please take some time to think about the changes that have occurred in your life due to your <<event>>. Try to reflect upon your feelings regarding these changes. "

****

Guidelines for Instant Messaging: Study of OnLine Disclosure (SOLD)

Jon Beyer (Fall, 2008)

General Tips

1. Briefly introduce each session and make sure the participant knows what they are expected to do. Allow them to type and communicate their story. You will be able to read when they are typing and when they have stopped typing, but their message will not come through until they choose to press "Enter".
2. Provide empathic reflections of key content of their messages as appropriate and include guiding questions to focus them on the desired session content as detailed in the session outlines that follow.
3. If a participant seems hesitant, you may remind them "Remember, you are in control of both what and how much you decide to tell me during our session."
4. Generally, do not flood the participant with multiple messages before they have responded to you. Try to keep your responses between 1-5 sentences (depending on how much you have to respond to) and then allow the participant to respond again. If you notice that they are typing, wait patiently for them to finish. If the participant is taking a long time to submit their message and you are nearing the end of a session, feel free to inform them that your session is almost over and encourage them to submit what they have written so you can wrap up and respond.
5. Keep an eye on the time stamp of the first message and limit the session length to 30 minutes. When the session is over, select "Quit" from the "Buddies" menu.

Session #1 Outline

1. Greet and welcome the participant and explain that you will be their guide during the instant messaging sessions.
2. Ask them if they have any questions about the instructions or what you will be doing and clarify as needed.
3. Meta-communicate about the unusual situation "I realize it might seem strange to talk with me about this since we don't know each other, but please give it a try and do your best to be honest and open."
4. If the participant seems hesitant, remind them that they are in control of what they choose to talk about, and how much they decide to share.
5. If the participant has trouble getting started or deciding what to talk about, provide some examples. You may cut and paste the below list, if necessary:
   a. Loss of a loved one
   b. End of a relationship
   c. Having a serious illness
   d. Family conflict
   e. Being attacked, raped, mugged
   f. Being abused
   g. Pregnancy
   h. Abortion
   i. Legal issues
   j. School/work problems
   k. Abandonment/betrayal
   l. Keeping a secret
   m. Sexual problems
   n. Substance abuse/dependence
   o. Internal conflict about moral/ethical/religious beliefs or values
   p. Concerns about intimacy/independence in relationships
   q. Concerns about expression of emotions (like anger)
6. Once the participant begins providing their story, assess how stressful it is for them. If it seems likely that there could be something more stressful, inquire about whether this is what would be most useful to focus on, or if there is another stressor that bothers them more. "What you've shared so far seems like it has been a difficult experience. I'm wondering if you would like to continue to focus on this or if there is another experience or issue that is even more stressful or difficult to talk or write about that we should focus on instead?" You may cut and paste the below list, if necessary:
   a. You don't like to think about or remember it
   b. You don't like to talk about it with others
   c. You avoid people, places, and things that remind you of the experience
   d. Unwanted thoughts or memories of the experience/conflict pop into mind
   e. You experience nightmares about it
   f. Thinking about the experience makes you upset/mad/sad/scared/anxious

   g. Thinking about the experience makes your body tense/high arousal/tired/sick

7. Help them along to provide a coherent narrative. "Thanks for beginning to share your story with me. Now try to describe it to me in more detail, so that I can begin to better understand what it has been like for you to experience this."

   a. Along the way insert empathic comments and reflections when possible to indicate that you are listening and enhance the interaction

   b. By the end of the first session, hopefully you have a relatively clear idea of what their stressor is.

   c. As the 30 minute session ends, provide some warning "We only have a few minutes left"

   d. Before closing, sum up what you have heard, thank them for participating, and express that you are looking forward to continuing to work with them at their next session.

Session #2 Outline

1. Greet and welcome the participant back and provide continuity by briefly restating the themes from the previous session. Check in to see if there is anything that they held back, or information they still want to share to help you better understand their experience. (As needed, inquire about whether they want to focus on a different stressor – one that currently bothers them more than the one shared in the previous session.)
2. Ask what it has been like for them to converse with you about their stressor so far. What reactions have they had (thoughts, feelings, physical symptoms, activities)?
   a. Some people may respond with reservations about an aspect of the writing task. Respond to this with empathy for their concerns, and then address them as best as possible with the goal of enhancing trust/bond with the participant.
   b. If participant shares some thoughts or feelings, see if they can be used to tie-in with their stressful experience and segue into deeper focus on how they were affected by their experience and how it still bothers them now.
3. Help them to identify ways in which they have been affected by their experience or conflict.
   a. What thoughts do they have related to the stressor?
   b. What feelings do they have related to the stressor (and thoughts)?
   c. How has the experience/conflict impacted their relationships? Social life? Job/School performance?
4. "What part of this experience/conflict is the most difficult for you in your life right now?"
5. Help them verbalize feelings:
   a. If they focus too much on facts – "What were you feeling about this – at the time and what do you feel now?"
   b. If you sense you are not getting the full picture of their emotional experience – "I can see you felt _____, what other feelings do you have about the experience?"
   c. If they do not respond to cues to express feelings – "I suspect you might have felt _____. What do you think?"
   d. If you sense they are holding back, or they seem to be censoring (typing and then not sending their message to you) – "It seems like you might be having a hard time communicating with me about this. It is understandable that you would feel _____ about this experience. Please feel free to express it with me."
6. Hopefully, at the end of this session, you have both a coherent idea of what the participant's stressor is, and they have engaged in some emotional expression about it with you. Warn them when your time is almost up, and at the end of the session thank them for their participation and summarize the content of your session.

Session #3

1. Greet and welcome the participant back and provide continuity by briefly restating the themes from the previous session. Check in to see if there is anything that they held back, or information they still want to share to help you better understand their experience.
2. Remind them that this is their final session with you – ideally, focus on what they have done to cope with their stressor so far, and find out how effective that has been.
3. Once you have discussed their attempts to deal with their stressful experience/conflict, find out what they would still like to change about how their stressor affects them.
   a. What ideas do they have/can they come up with that they haven't tried yet?
   b. What is holding them back from trying them?
   c. What might their life be like if they are able to deal with this effectively and try new thoughts or behaviors out (e.g., not avoidance!) to move past the experience.
   d. Try not to make explicit recommendations, but push them to make specific plans or strategies of something to do to help them resolve their stressor and be supportive and encouraging of what they come up with if it seems helpful.
   e. However, if their plans are to engage in avoidance strategies, suggest to them that avoidance usually prolongs rather than solves the problem.
4. Hopefully, the participant is able to come up with a reasonable plan or goals to help resolve their stressor by the end of this session. Warn them when the session is nearly over, and before closing, summarize the content and themes across sessions, and reinforce adaptive coping strategies that are already in place or that were suggested in this final session. Thank them for having the courage to open up and talk with you and add any final closing you wish as appropriate.
5. Finally, remind them that the research assistant will need to see them one more time, in about 6 weeks, for the final assessment of how they are doing. Encourage them to return.

REFERENCES

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.

Block, G., Block, T., Wakimoto, P., & Block, C. H. (2004). Demonstration of an e-mailed worksite nutrition intervention program. *Preventing Chronic Disease, 1,* A06.

Bootzin, R. R. (1997). Examining the theory and clinical utility of writing about emotional experiences. *Psychological Science, 8,* 167-169.

Borkovec, T. D., & Nau, S. D. (1972). Credibility of analogue therapy rationales. *Journal of Behavior Therapy and Experimental Psychiatry, 3,* 257-260.

Broderick, J. E., Junghaenel, D. U., & Schwartz, J. E. (2005). Written emotional expression produces health benefits in fibromyalgia patients. *Psychosomatic Medicine, 67*, 326-334.

Cameron, L. D., & Nicholls, G. (1998). Expression of stressful experiences through writing: Effects of a self-regulation manipulation for pessimists and optimists. *Health Psychology, 17*, 84-92.

Creamer, M., Bell, R., & Failla, S. (2003). Psychometric properties of the Impact of Event Scale – Revised. *Behaviour Research and Therapy, 41,* 1489-1496.

Creswell, J. D., Lam, S., Stanton, A. L., Taylor, S. E. Bower, J. E., & Sherman, D. K. (2007). Does self-affirmation, cognitive processing, or discovery of meaning, explain cancer-related health benefits of expressive writing? *Personality and Social Psychology Bulletin, 33,* 238-250.

Cuijpers, P., van Straten, A., & Andersson, G. (2008). Internet-administered cognitive behavior therapy for health problems: A systematic review. *Journal of Behavioral Medicine, 31,* 169-177.

Derogatis, L. R., & Melisaratos, N. (1983). The Brief Symptom Inventory: An

introductory report. *Psychological Medicine, 13*, 595-605.

Finkenaur, C., & Rime, B. (1998). Socially shared emotional experiences vs. emotional

experiences kept secret: Differential characteristics and consequences. *Journal

of Social and Clinical Psychology, 17,* 295-318.

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective

information. *Psychological Bulletin, 99,* 20-35.

Frattaroli, J. (2006). Experimental disclosure and its moderators: A meta-analysis.

Psychological Bulletin, 132, 823-865.

Frayne, A., & Wade, T. D. (2006). A comparison of written emotional expression and

planning with respect bulimic symptoms and associated psychopathology.

European Eating Disorders Review, 14, 329-340.

Frisina, P. G., Borod, J. C., & Lepore, S. J. (2004). A meta-analysis of the effects of

written emotional disclosure on the health outcomes of clinical populations.

Journal of Nervous & Mental Disease, 192, 629-634.

Gidron, Y., Duncan, E., Lazar, A., Biderman, A., Tandeter, H., & Shvartzman, P.

(2002). Effects of guided written disclosure of stressful experiences on clinic

visits and symptoms in frequent clinic attenders. *Family Practice, 19*, 161-166.

Greenberg, M. A., & Stone, A. A. (1992). Emotional disclosure about traumas and its

relation to health: Effects of previous disclosure and trauma severity. *Journal of

Personality and Social Psychology, 63,* 75-84.

Greenberg, M. A., Wortman, C. B., & Stone, A. A. (1996). Emotional expression and physical heath: Revising traumatic memories or fostering self-regulation? *Journal of Personality and Social Psychology, 71*, 588-602.

Harris, A. H. S. (2006). Does expressive writing reduce health care utilization? A meta-analysis of randomized trials. *Journal of Consulting and Clinical Psychology, 74,* 243-252.

Hirai, M., & Clum, G. A. (2005). An internet-based self-change program for traumatic event related fear, distress, and maladaptive coping. *Journal of Traumatic Stress, 18,* 631-636.

Holmes, D., Alpers, G. W., Ismailji, T., Classen, C., Wales, T., Cheasty, V., Miller, A., & Koopman, C. (2007). Cognitive and emotional processing in narrative of women abused by intimate partners. *Violence Against Women, 16,* 1192-1205.

Hunt, M., Schloss, H., Moonat, S., Poulos, S., & Wieland, J. (2007). Emotional processing versus cognitive restructuring in response to a depressing life event. *Cognitive Therapy and Research, 31,* 833-851.

Kelley, J. E., Lumley, M. A., & Liesen, J. C. (1997). Health effects of emotional disclosure in rheumatoid arthritis patients. *Health Psychology, 16,* 331-340.

King, L. A. (2001). The health benefits of writing about life goals. *Personality and Social Psychology Bulletin, 27,* 798-807.

Knaevelsrud, C., & Maercker, A. (2007). Internet-based treatment for PTSD reduces distress and facilitates the development of a strong therapeutic alliance: A randomized controlled clinical trial. *BMC Psychiatry, 7*:13.

L'Abate, L., & Kern, R. (2002). Workbooks: Tools for the expressive writing paradigm. In S. J. Lepore & J. M. Smyth (Eds.), *The writing cure: How expressive writing promotes health and emotional well-being* (pp. 239-256): Washington, DC: American Psychological Association.

Lange, A., Rietdijk, D., Hudcovicova, M., van de Ven, J. P., Schrieken, B., & Emmelkamp, P. M. G. (2003). Interapy: A controlled randomized trial of the standardized treatment of posttraumatic stress through the internet. *Journal of Consulting and Clinical Psychology, 71*, 901-909.

Lange, A., van de Ven, J., & Schrieken, B. (2003). Interapy: Treatment of post-traumatic stress via the internet. *Cognitive Behaviour Therapy, 32,* 110-124.

Lange, A., van de Ven, J., Schrieken, B., & Emmelkamp, P. M. G. (2001). Interapy, treatment of posttraumatic stress through the internet: A controlled trial. *Journal of Behavior Therapy and Experimental Psychiatry, 32,* 73-90.

Lepore, S. J., Greenberg, M. A., Bruno, M., & Smyth, J. M. (2002). Expressive writing and health: Self-regulation of emotion-related experience, physiology, and behavior. In S. J. Lepore & J. M. Smyth (Eds.), *The writing cure: How expressive writing promotes health and emotional well-being* (pp. 99-117): Washington, DC: American Psychological Association.

Low, C. A., Stanton, A. L., & Danoff-Burg, S. (2006). Expressive disclosure and benefit finding among breast cancer patients: Mechanisms for positive health effects. *Health Psychology, 25,* 181-189.

Lustria, M. L. A., Cortese, J., Noar, S. M., & Glueckauf, R. L. (2009). Computer-tailored health interventions delivered over the web: Review and analysis of key components. *Patient Education and Counseling, 74,* 156-173.

Meads, C., Lyons, S., & Carroll, D. (2003). The impact of the emotional disclosure intervention on physical and psychological health: A systematic review. (A West Midlands Health Technology Assessment Collaboration Report), Department of Public Health and Epidemiology, The University of Birmingham.

Murphy, L. J., & Mitchell, D. L. (1998). When writing helps to heal: E-mail as therapy. *British Journal of Guidance & Counselling, 26,* 21-32.

Pennebaker, J. W. (1985). Traumatic experience and psychosomatic disease: Exploring the roles of behavioural inhibition, obsession, and confiding. *Canadian Psychology, 26*, 82-105.

Pennebaker, J. W. (1993). Putting stress into words: Health, linguistic, and therapeutic implications. *Behaviour Research and Therapy, 31,* 539-548.

Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science, 8,* 162-166.

Pennebaker, J. W., & Beall, S. K. (1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. *Journal of Abnormal Psychology, 95*, 274-281.

Pennebaker, J.W., Francis, M. E., & Booth, R. J. (2001). Linguistic Inquiry and Word Count. New Jersey: Erlbaum.

Pennebaker, J. W., Francis, M. E., & Mayne, T. J. (1997). Linguistic predictors of adaptive bereavement. *Journal of Personality and Social Psychology, 72,* 863-871.

Pennebaker, J. W., Kiecolt-Glaser, J. K., & Glaser, R. (1988). Disclosure of traumas and immune function: Health implications for psychotherapy. *Journal of Consulting and Clinical Psychology, 56,* 239-245.

Radcliffe, A., Lumley, M. A., Kendall, J., Stevenson, J., & Beltran, J. (2007). Written emotional disclosure: Testing the importance of social sharing. *Journal of Social and Clinical Psychology, 26,* 362-384.

Resick, P. A., & Schnicke, M. K. (1992). Cognitive processing therapy for sexual assault victims. *Journal of Consulting and Clinical Psychology, 60,* 748-756.

Richards, J. M., Beal, W. E., Seagal, J. D., & Pennebaker, J. W. (2000). Effects of disclosure of traumatic events on illness behavior among psychiatric prison inmates. *Journal of Abnormal Psychology, 109,* 156-160.

Rochlen, A. B., Zack, J. S., & Speyer, C. (2004). Online therapy: Review of relevant definitions, debates, and current empirical support. *Journal of Clinical Psychology, 60,* 269-283.

Schoutrop, M. J. A., Lange, A., Hanewald, G., Davidovich, U., & Salomon, H. (2002). Structured writing and processing major stressful events: A controlled trial. *Psychotherapy and Psychosomatics, 71,* 151-157.

Sharp, W. G., & Hargrove, D. S. (2004). Emotional expression and modality: An analysis of affective arousal and linguistic output in a computer vs. paper paradigm. *Computers in Human Behavior, 20,* 461-475.

Sloan, D. M., & Marx, B. P. (2004a). A closer examination of the structured written disclosure procedure. *Journal of Consulting & Clinical Psychology, 72*, 165-175.

Sloan, D. M., & Marx, B. P. (2004b). Taking pen to hand: Evaluating theories underlying the written disclosure paradigm. *Clinical Psychology: Science and Practice, 11*, 121-137.

Sloan, D. M., Marx, B. P., & Epstein, E. M. (2005). Further examination of the exposure model underlying the efficacy of written emotional disclosure. *Journal of Consulting and Clinical Psychology, 73,* 549-554.

Sloan, D. M., Marx, B. P., Epstein, E. M., & Lexington, J. M. (2007). Does altering the writing instructions influence outcome associated with emotional disclosure writing. *Behavior Therapy, 38,* 155-168.

Smyth, J. M. (1998). Written emotional expression: Effect sizes, outcome types, and moderating variables. *Journal of Consulting & Clinical Psychology, 66*, 174-184.

Smyth, J. M., & Catley, D. (2002). Translating research into practice: Potential of expressive writing in the field. In S. J. Lepore & J. M. Smyth (Eds.), *The writing cure: How expressive writing promotes health and emotional well-being* (pp. 199-214): Washington, DC: American Psychological Association.

Smyth, J. M., Stone, A. A., Hurewitz, A., & Kaell, A. (1999). Effects of writing about stressful experiences on symptom reduction in patients with asthma or rheumatoid arthritis. *Journal of the American Medical Association, 281,* 1304-1309.

Smyth, J. M., True, N., & Souto, J. (2001). Effects of writing about traumatic experiences: The necessity for narrative structuring. *Journal of Social and Clinical Psychology, 2,* 161-172.

Spek, V., Cuijpers, P., Nyklicek, I., Riper, H., Keyzer, J., & Pop, V. (2007). Internet-based cognitive behaviour therapy for symptoms of depression and anxiety: A meta-analysis. *Psychological Medicine, 37,* 319-328.

Spera, S. P., Buhrfiend, E. D., & Pennebaker, J. W. (1994). Expressive writing and coping with job loss. *Academy of Management Journal, 37,* 722-733.

Stanton, A. L., Danoff-Burg, S., Sworowski, L. A., Collins, C. A., Branstetter, A. D., Rodriguez-Hanley, A., Kirk, S. B., & Austenfeld, J. L. (2002). Randomized, controlled trial of written emotional expression and benefit finding in breast cancer patients. *Journal of Clinical Oncology, 20,* 4160-4168.

Suler, J. R. (2002). Identity management in cyberspace. *Journal of Applied Psychoanalytic Studies, 4,* 455-459.

Tedeschi, R. G., & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9,* 455-471.

Van der Kolk, B. A., & Fisler, R. (1995). Dissociation and the fragmentary nature of traumatic memories: Overview and exploratory study. *Journal of Traumatic Stress, 8,* 505-525.

Watson, D., & Clark, L. A. (1994). *Manual for the Positive and Negative Affect Schedule-Expanded Form.* Unpublished manuscript, University of Iowa.

Weiss, D. S., & Marmar, C. R. (1997). The Impact of Event Scale – Revised. In J. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 399-411). New York: Guilford.

ABSTRACT

THE EFFECTS OF WEB-BASED INTERACTIVE EMOTIONAL DISCLOSURE ON STRESS AND HEALTH: A RANDOMIZED, CONTROLLED STUDY

by

JONATHAN A. BEYER

August 2010

Advisor: Mark A. Lumley, Ph.D.

Major: Psychology (Clinical)

Degree: Doctor of Philosophy

The purpose of this study was to develop and assess the relative effectiveness of two novel alternatives to standard written emotional disclosure for coping with stressful traumatic experiences. In addition to standard emotional disclosure and time management writing control conditions, two guided feedback conditions were created with a goal of enhancing the disclosure paradigm by eliciting the most effective components of disclosure writing. All of the writing conditions in the study utilized the internet for both completion of the writing and receipt of feedback in the indicated conditions. The guided conditions included a feedback writing condition in which guidance was provided between writing sessions and an instant message condition in which guidance was provided in real-time during the writing session. It was hypothesized that all disclosure groups would exhibit improvements in symptoms as measured by the BSI Global Severity Index, the IES-R total score, the PHS total score, and a concurrent increase in PTGI overall scale ratings relative to the control writing condition. Furthermore, it was anticipated that participants in the instant message condition would exhibit the greatest amount of symptom reduction and posttraumatic

growth on the selected outcome measures, followed by the feedback writing condition, the standard emotional disclosure condition, and that the control condition would exhibit minimal symptom change or growth.

Participants (N = 163) were undergraduate students enrolled in psychology courses. The participants were pre-screened to include only those who reported having experienced a trauma or stressor that continued to bother them and cause intrusive, avoidant, and hyperarousal symptoms. Invited participants who consented to involvement with the study completed baseline questionnaires and were randomized to experimental condition of either time management control, standard emotional disclosure, feedback, or instant message writing at their second laboratory visit. Participants completed three 30-minute writing sessions over the course of one week, and 151 participants returned to complete follow-up questionnaires six weeks after their initial writing session.

The study hypotheses were not supported and the groups were found to be generally equivalent with regard to psychiatric and physical symptom reduction as well as posttraumatic growth. Each group exhibited reduction in symptoms on the BSI, IES-R, and PHS, and unexpected reductions in PTGI scores. Further analyses revealed that the experimental conditions were initially perceived as equally credible interventions, although at follow-up the feedback enhanced conditions were deemed most credible. The instant message condition performed differently than the other disclosure conditions in that it produced a less intense emotional reaction to the writing sessions, which may in part be a product of the relatively brief content produced relative to the to the other disclosure conditions. It was determined that future studies may benefit from

selection of a more neutral control writing condition and possibly also sampling from a clinical population. Despite the lack of support for the study hypotheses, it is too early to dismiss the potential benefits of internet-based feedback-enhanced emotional disclosure interventions for patients who are unable or unwilling to access traditional PTSD treatment.

AUTOBIOGRAPHICAL STATEMENT

Jonathan Albert Beyer received his Bachelor of Arts degree in 2003 from the University of Michigan in Ann Arbor where he majored in Psychology and minored in History. He was admitted to the doctoral program in Clinical Psychology at Wayne State University in 2003, where he specialized in Health Psychology and completed his Master of Arts degree in 2008. His Master's Thesis was "Alexithymia and Verbal Emotional Expression: Evaluating the Criterion Validity of the Toronto Alexithymia Scale – 20 in a Community Sample of Adults." He performed his predoctoral internship training at the Veterans Affairs Ann Arbor Healthcare System, where he completed rotations in the PTSD and Substance Abuse Clinics. He plans to continue his training and professional development following graduation with a postdoctoral fellowship that will focus on a combination of clinical training, supervision, education, and research with a primary focus on PTSD and substance abuse in veteran populations.