# AN EXERCISE IN STORY REPAIR: A GUIDED WRITTEN DISCLOSURE PROTOCOL FOR FOSTERING NARRATIVE COMPLETENESS OF TRAUMATIC MEMORIES

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The present study sought to build on the large body of past research into written disclosure of traumatic memories. This research has consistently found that participants who write about their traumatic experiences realize long-term physiological and psychological health benefits. More recently, it has been found that those participants who realize the most benefits are those who progressively include more elements of a good narrative, or story, in their writing about a traumatic experience over several sessions. Therefore, research has begun to examine the role of language and the structure of language in the health benefits gained from written disclosure of traumatic memories. A guided written disclosure protocol was designed for the present study, which sought to aid participants in supplying an increasing amount of narrative structure to their written disclosures of a single traumatic experience. Participants ($N$ = 30) completed several measures of psychological and physiological health prior to and one month after completing the guided written disclosure protocol. Analyses revealed that participants who completed all four writing sessions showed statistically significant reductions in symptoms of general psychological distress, obsessive-compulsive symptoms, and intrusive and avoidant symptoms related to the traumatic experience. No significant self-reported physiological health benefits were found. The clinical and research implications of these findings are discussed.

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# CHAPTER 1

## INTRODUCTION

Across most psychotherapy modalities a common element in the treatment of posttraumatic stress disorder (PTSD) or other forms of maladaptive reactions to traumatic experiences has been the encouragement of disclosure of the traumatic experience(s) in a safe, supportive environment (i.e, in the safety of the therapeutic relationship). Although the rationale behind encouraging disclosure may vary depending on the guiding clinical theory (e.g, desensitization to the events of the trauma), interventions that incorporate having clients give a full account of the experience(s) remain the most popular and effective interventions for posttraumatic stress (Wigren, 1994).

In the past fifteen to twenty years, a wide body of research literature has found that written disclosure about traumatic events has many physical and psychological health benefits. This finding has been replicated across age, gender, culture, social class, and personality type (e.g., Pennebaker & Beall, 1986; Pennebaker, Kiecolt-Glaser, & Glaser, 1988; Richards, Beal, Seagal, & Pennebaker, 2000; Smyth, 1998). In the initial stages of this research, the mechanisms by which written disclosure of traumatic events promoted these psychological and physical health benefits were explained by an inhibition-confrontation model. This proposed that actively inhibiting thoughts, feelings, and impulses associated with traumatic memories requires physiological work, which places stress on the body and increases vulnerability to illness (Pennebaker & Beall, 1986). Further, previously inhibited thoughts and feelings were thought to rebound as intrusive memories, which then result in chronic stress and a renewal of inhibition (Wegner, Schneider, Carter, & White, 1987).

More recently, however, research has persuasively demonstrated that writing about a trauma does more than reduce inhibitory processes; the health gains observed appear to be due to cognitive changes that accompany translating traumatic experiences into language and into narrative form (Pennebaker, 1997a). The cognitive change theory posits that writing facilitates the reorganizing of thoughts and feelings about traumatic experiences and the creation of more coherent or meaningful narratives about the events (Pennebaker & Seagal, 1999). This meaning-making and coherence, in turn, may provide a greater sense of control and/or reduce the cognitive work required to process or store disorganized information. Attention has thus turned to the role of story-making in cognitive changes caused by writing about traumatic events, or into the structure of the narratives produced by trauma victims (Smyth, True, & Souto, 2001). It was found that health improvements were associated with participants' construction of meaningful narratives that incorporated elements of a "good story." Wigren (1994) proposed that trauma victims often are unable to form coherent, complete narratives of traumatic experiences and that this incompleteness is a source of posttraumatic distress. Specifically, Wigren (1994) proposed that, first, the creation of narrative representations of experience is crucial to psychological organization; second, narrative activity makes connections between different levels of psychical experience and between self and other; third, narrative structure organizes and contains affect; fourth, the disruption of narrative processing is a cause of psychopathology; and fifth, attention to incomplete narrative processing should be a focus for listening to clients' stories in psychotherapy.

The present literature review will first discuss the research evidence for the positive physical and psychological benefits of written disclosure of traumatic events, focusing on the work of J.W. Pennebaker and his colleagues. Second, the evolution of the theory regarding the

proposed mechanisms by which written disclosure of traumatic events has these positives health benefits will be outlined. Third, the recent rise in popularity of narrative models in psychology will be outlined, including a discussion of how narrative has been theorized as being the primary mode of human thinking, memory, and meaning-making. Next, the differences between narrative memory and traumatic memory will be elucidated, including a discussion of the psychobiology of traumatic memories and the research support for these differences. A guided written disclosure protocol will be described that attempts to facilitate the "storying" of traumatic experience. The protocol guides participants who have experienced trauma in constructing coherent, meaningful narratives out of their traumatic experiences, using the elements of a "complete narrative" that are thought to play a central organizing role in normal, nontraumatic memories and human meaning-making. Finally, a study will be reported that tested the viability of the protocol.

## A Review of the Physical and Psychological Benefits of Writing about Traumatic Experiences

Beginning in 1986 (Pennebaker & Beall, 1986), a series of studies has been published by Pennebaker and his colleagues, and other researchers, documenting the psychological and physical health benefits of writing about traumatic experiences or emotional upheavals. The results have been robust and consistent. As Pennebaker wrote: "Confronting deeply personal issues has been found to promote physical health, subjective well-being, and selected adaptive behaviors" (Pennebaker, 1997b). In this section, the basic paradigm of the writing studies will be described as implemented in Pennebaker and Beall (1986) and continued and expanded on in many subsequent studies, followed by a discussion of the general research findings of written disclosure studies conducted since that time. Finally, a meta-analysis of studies on written

disclosure of traumatic events will be discussed, as it highlights the clinical relevance and robustness of the effects obtained in written disclosure studies.

In the original writing paradigm implemented by Pennebaker and Beall (1986), 46 undergraduate participants (34 women and 12 men) were randomly assigned to one of four writing groups: a control condition, a trauma-emotion condition, a trauma-fact condition, or a trauma-combination condition. Participants wrote on their assigned topic for 15 minutes each session for four consecutive sessions. Before doing the writing, participants completed a battery of measures designed to tap individual differences, including the Cognitive and Social Anxiety Questionnaire (CSAQ; Schwartz, Davidson, & Goleman, 1978); the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964); a general physical symptom inventory that tapped the general frequency of 54 common symptoms and sensations (the PILL; Pennebaker, 1982); and a questionnaire designed for this specific study that explored health-relevant behaviors. There were no significant differences between participants on any of these measures at the beginning of the study.

Those participants assigned to the control group were told to write about a trivial topic each evening (e.g., a description of their living room or the shoes they were wearing) and were told that they should describe the topic as objectively as possible without including information about their emotions. Participants in the trauma-emotion group were instructed to write about the most traumatic event of their lives and to describe only the feelings they had about the experience with no mention of what actually happened (i.e., no facts of the experience). Participants in the trauma-fact condition were instructed to describe only the facts surrounding the most traumatic event of their lives, with no mention of the feelings involved. Finally, participants in the trauma-combination group were instructed to describe the factual details of the

most traumatic experience of their lives and to report any thoughts and feelings they had about the experience as well. Instructions to the trauma-combination group, and instructions to experimental groups assigned to report on facts, thoughts, and feelings regarding a traumatic event in subsequent written expression studies, followed the following format, with variations depending on the focus of the study:

> For the next four days, I would like for you to write about your very deepest thoughts and feelings about the most traumatic experience of your life. In your writing, I'd like you to really let go and explore your very deepest emotions and thoughts. You might tie your topic to your relationships with others, including parents, lovers, friends, or relatives, to your past, your present, or your future, or to who you have been, who you would like to be, or who you are now. You may write about the same general issues or experiences on all days of writing or on different traumas each day. Once you begin writing, please continue to do so without stopping and without regard to spelling, grammar, or sentence structure. All of your writing will be completely confidential (p. 1244; Pennebaker & Seagal, 1999).

Participants completed writing assignments in individual cubicles. Before beginning each writing session, participants completed a short questionnaire that queried the degree to which they were currently experiencing nine physical symptoms (e.g., headache, racing heart) and eight moods (e.g., sad, happy). After this was completed, participants' systolic and diastolic blood pressure and pulse were recorded. When writing was completed, participants' blood pressure and pulse were again recorded and the questionnaires regarding mood and current physical symptoms were again completed. Furthermore, participants completed a questionnaire querying how personal their essays were and the degree to which they had revealed their emotions in their writing. Participants also supplied answers to a question asking how much they had told other people about what they had written. After the final day of writing, participants signed a consent form giving the researchers access to their medical records for the following two years and agreed to complete future questionnaires that would be mailed to them.

The results of the first written expressions study were characterized as "astounding" (Pennebaker & Seagal, 1999, p. 1244), and will be outlined in detail below. These results will be detailed because they serve as the base for subsequent written disclosure studies and are also prototypical of results of later studies in that they have been supported and replicated numerous times. Although later studies sometimes included variations on the original methodology (e.g., fewer writing sessions, longer spacing between writing sessions, slightly different instructions), these variations are negligible and will be addressed in the later discussion of the meta-analysis performed by Smyth (1998).

Despite worries that college students would not take the writing experiment seriously, participants in the experimental condition wrote, on average, 340 words during each writing session and the majority reported that the writing was meaningful and very valuable (Pennebaker & Beall, 1996). Participants in the control condition wrote the fewest words. What surprised the researchers most about the content of the essays was the nature of the traumas that the generally upper middle-class college students chose to write about, including rape, suicide attempts, family violence, and drug problems (Pennebaker & Seagal, 1999).

In regard to how personal the essays were, analyses revealed that all three trauma groups reported writing more personal essays than did the control group, with no differences between the trauma groups. The trauma-emotion and trauma-combination groups indicated that they revealed their emotions to a greater degree than the control group or trauma-fact group. These two analyses served as a manipulation check and indicated that the manipulation (i.e., the differing instructions) was successful.

As a direct test of the inhibition-confrontation model, the researchers compared participants' ratings of how personal each night's writing topic had been with the degree to

which participants had previously disclosed the experience to others. Analyses revealed that, not only did participants in the three trauma conditions write more personal essays, but they also wrote more essays on topics that had not been discussed previously. Although these results appeared to give some preliminary support to the inhibition-confrontation model, subsequent analyses revealed that, on measures of psychological and physical well-being, the trauma-fact and control conditions were remarkably similar, as were the trauma-emotion and trauma-combination groups. Regarding these last two groups, however, some important distinctions emerged that shed doubt on the inhibition-confrontation model.

The impact of writing about traumatic experiences on health and measures of well-being was compelling. Immediately after the writing sessions, participants in the control and trauma-fact conditions showed significantly larger decreases in blood pressure compared to other groups. This result was primarily attributable, however, to the results found in the trauma-combination group: after the first writing session, participants in the trauma-combination group showed very large increases in blood pressure compared to before writing. This result was not found in the trauma-emotion group. In subsequent writing sessions, however, the blood pressure of trauma-combination participants showed only moderate increases from before to after writing. Regarding self-reported mood, participants in all trauma conditions reported significantly higher negative moods after writing and participants in the control condition reported more positive moods. As mentioned previously, participants in the trauma-fact and control conditions were remarkably similar across all of these measures, as were trauma-emotion and trauma-combination participants.

The long-term health effects were the most remarkable results of the study. The number of times that each participant visited the Student Health Center for illness, injury, check-up,

psychiatric, and other reasons was recorded by health center personnel for four months prior to the experiment and four months after the experiment. Participants in the trauma-combination condition visited the health center significantly fewer days for illness than participants in all other conditions. Participants in the control, trauma-emotion, and trauma-fact conditions visited the health center an average of 1.33, 1.58, and 1.45 times, respectively, in the four months following the study, whereas participants in the trauma-combination condition visited the health center an average of .54 times. There were no significant differences between groups in visits to the health center for psychiatric, injury, or other reasons.

Four months after the study, participants were mailed the questionnaire that was completed on the first day of the study that tapped health habits, self-reported health center visits, and number of days their activities had been restricted due to illness. Eight health-related areas were summed to form a health problem index that indicated how much they had experienced each of these health-related problems: ulcers, constipation/diarrhea, colds/flu, high blood pressure, migraine headaches, acne or skin disorders, heart problems, or other major difficulties. Participants in the trauma-emotion and trauma-combination groups reported significantly more reductions in health problems than participants in other groups; there were no differences between any groups in health-related behaviors. Although behaviors that influence health did not change, overall health problems did change for the better for trauma-emotion and trauma-combination participants. Further, participants in the control condition reported that their activity had been restricted due to illness the most of any group, and participants in the trauma-combination group reported the fewest days of activity restriction due to illness. In fact, trauma-combination participants reported significantly fewer days of activity restriction due to illness

than all other groups. Here again, trauma-emotion and trauma-combination participants were similar in many ways, but important differences did emerge between the groups as well.

Taken as a whole, these results showed that "writing about earlier traumatic experiences was associated with both short-term increases in physiological arousal and long-term decreases in health problems" (Pennebaker & Beall, 1986, p. 280). Further, these effects were most pronounced among participants who wrote about both the events surrounding a trauma and their emotions associated with the trauma. Although the researchers interpreted the results as preliminarily supporting the inhibition-confrontation model, other mechanisms were also considered by which written disclosure of thoughts and feelings regarding a traumatic experience might have beneficial effects on long-term health. These included the act of making an event concrete, which results in greater self-knowledge (Jourard, 1971), and Freud and Breuer's (1966) early catharsis theory whereby long-term health was optimally maintained by tying together both the cognitions and affect surrounding a traumatic event. It was not until subsequent research efforts that investigators considered the role of language and story-making in positive long-term health benefits of written disclosure of traumatic experiences.

These initial written disclosure results were seen as tentative and in need of future support. In the 19 years since this study, the results have seen replication after replication and have been generalized and expanded upon. As mentioned previously, subsequent studies used the same basic research design; therefore, a broad review of subsequent results will be presented below.

Long-term and short-term health and behavioral benefits associated with written disclosure of traumatic events have been found across many different populations. Although the first study (Pennebaker & Beall, 1986), and most written disclosure studies after that, used

undergraduate college students as participants, many different populations have been found to benefit psychologically and physically from written disclosure of traumas or emotional upheavals. For example, Spera, Buhrfeind, and Pennebaker (1994) used as participants senior-level engineers who had been laid off from a large corporation in Dallas, Texas. One group wrote for 30 minutes per day for 5 consecutive days about their thoughts and feelings about being laid off, one group wrote for the same amount of time about how they managed their time, and another group did not write at all. Within three months of the study, 27% of those who wrote about their thoughts and feelings regarding being laid off found new jobs; less than 5% of the men in the other groups had found jobs (Spera, Buhrfiend, & Pennebaker, 1994).

Other populations in which positive health and psychological benefits have been found include maximum-security prisoners (Richards, Pennebaker, & Beal, 1995); medical students (Booth, Petrie, & Pennebaker, 1997); arthritis and chronic pain sufferers (Petrie, Booth, Pennebaker, Davison, & Thomas, 1995); women who recently gave birth to their first child (Pennebaker & Seagal, 1999); psychiatric prison inmates (Richards, Beal, Seagal, & Pennebaker, 2000); seminary students (VandeCreek, Janus, Pennebaker, & Binau, 2002); Holocaust survivors (Pennebaker, Barger, & Tiebout, 1989); grade-school children and nursing home residents (Pennebaker, 1997a); and women who experienced an identifiable trauma including physical abuse, sexual molestation, rape, death of a parent, family violence, a life-threatening injury or accident, violent assault, abandonment by a parent, parental divorce, or witnessing a gruesome event (Greenberg, Wortman, & Stone, 1996). The only sample in which written disclosure of traumatic events has not been found to have health benefits is in people who have disordered cognitive processing or very severe depression (Pennebaker & Seagal, 1999). Furthermore, positive health benefits from written disclosure have been found in all social classes and major

racial/ethnic groups in the United States and in samples in New Zealand (Petire, Booth, Pennebaker, Davison, & Thomas, 1995), Belgium (Rime, 1995), Mexico City (Dominguez et al., 1995), and the Netherlands (Pennebaker & Seagal, 1999).

Significant reductions in physician visits after written disclosure experiments have been found in relatively healthy samples measured after 2 months (Greenberg & Stone, 1992; Greenberg, Wortman, & Stone, 1996; Pennebaker & Francis, 1996; Pennebaker, Kiecolt-Glaser, & Glaser, 1988), after 6 months (Francis & Pennebaker, 1992; Pennebaker & Beall, 1986; Pennebaker, Colder, & Sharp, 1990), and, compellingly, after 14 years (Pennebaker, Barger, & Tiebout, 1989). But the positive health benefits of written disclosure go beyond reductions in physician visits. Written disclosure of traumatic events has also been found to have positive long-term effects on blood markers of immune functioning, including positive effects on blastogenesis, specifically t-helper cell growth in response to phytohemagglutinin (Pennebaker, Kiecolt-Glaser, & Glaser, 1988); heightened antibody titer response to Epstein-Barr virus (Esterling, Antoni, Fletcher, Margulies, & Schneiderman, 1994; Lutgendorf, Antoni, Kumar, & Schneiderman, 1994); heightened antibody response to hepatitis B vaccinations (Petrie, Booth, Pennebaker, Davison, & Thomas, 1995); increases in natural killer cell activity (Christensen et al., 1996); increases in CD-4 (t-lymphocyte) levels (Booth, Petrie, & Pennebaker, 1997); and increases in liver enzyme levels (Francis & Pennebaker, 1992). Regarding immediate physiological effects, participants who write about traumas as compared to those who write about trivial topics have shown increases in heart rate and skin conductance levels (e.g., Dominguez et al., 1995; Hughes, Uhlmann, & Pennebaker, 1994; Pennebaker, Hughes, & O'Heeron, 1987; Petrie, Booth, Pennebaker, Davison, & Thomas, 1995) and reduced muscular

activity, specifically, reductions in phasic corrugator activity (Pennebaker, Hughes, & O'Heeron, 1987).

In regard to self-reports of mood and affect in samples writing about a traumatic experience as compared to those writing about superficial topics, those writing about traumas usually show increases in negative mood and distress immediately after writing. Pennebaker and Seagal (1999) state that these effects "can be viewed as appropriate to the topics the individuals are confronting" (p. 1246). However, when participants are assessed two weeks after the writing experiments, those writing about a trauma report positive mood levels that are equal to or greater than those who wrote about superficial topics (Pennebaker & Seagal, 1999). Not all participants writing about traumas show immediate increases in negative mood and distress, however; among samples with very high levels of distress, negative moods show immediate improvements (Spera, Buhrfeind, & Pennebaker, 1994). It seems that there is an inverse relationship between mood levels immediately before and after writing about a trauma: the better participants feel before writing, the worse they feel after writing, and the worse that participants feel before writing, the better they feel after writing (Pennebaker & Seagal, 1999).

Studies of written disclosure looking at long-term effects on self-reports of distress, negative affect, and depression have shown mixed results. Some have shown significant long-term decreases in negative affect (Greenberg & Stone, 1992; Greenberg, Wortman, & Stone, 1996; Murray & Seagal, 1994; Rime, 1995; Spera, Buhrfiend, & Pennebaker, 1994), whereas others have failed to find long-term effects (Pennebaker & Beall, 1986; Pennebaker, Kiecolt-Glaser, & Glaser, 1988; Pennebaker & Francis, 1996). Studies utilizing self-reported levels of physical symptoms among study participants have also shown mixed results. Some have found significantly lower levels of self-reported symptoms among participants who wrote about

traumatic experiences (Greenberg & Stone, 1992; Pennebaker & Beall, 1986); others have found no effects (Petrie, Booth, Pennebaker, Davison, & Thomas, 1995)

Positive changes in behavior have also been found in participants who write about traumatic experiences. In college students, written disclosure of traumatic events has been found to be associated with improvements in grades in the months after the study and in long-term increases in grade point average (Cameron & Nicholls, 1998; Pennebaker, Colder, & Sharp, 1990; Pennebaker & Francis, 1996), and in lower levels of self-reported depression among students taking the Graduate Record Exam (Pennebaker & Seagal, 1999). In addition to being related to senior-level engineers who had been laid off finding jobs faster as outlined above, written disclosure has also been found to result in fewer days absent from work among university staff members (Francis & Pennebaker, 1992).

In summary, when participants in research studies are instructed to write about past or current traumas or emotional upheavals, the results show significant positive effects of written disclosure of those events upon short- and long-term health measures and upon short- and long-term measures of psychological functioning. One caveat is in order, however: these results have been found only in the confines of a research laboratory with non-clinical samples. They are, therefore, only generalizable to writing tasks that are conducted in a laboratory with relatively healthy participants. Thus, the clinical significance, or "real-world" meaningfulness, of these findings is not clear. One way to address this problem is through an examination of the effect sizes obtained in the studies. In the words of Smyth (1998): "Although the diversity of outcomes suggests the possible breadth of the impact of the writing task, it is not clear if the effect size of the written emotional expression task is *clinically relevant* [italics added]. That is, does this manipulation have the potential to *meaningfully affect* [italics added] well-being, health, or

general functioning?" (p. 174). It is exactly these questions that Smyth (1998) set out to address in his meta-analysis of written disclosure research. This meta-analysis will now be explored in detail.

Citing the fact that writing interventions based on the results of Pennebaker and colleagues have been implemented and applied based on a relatively small number of studies and articles published in lay publications (e.g., Pennebaker, 1991; Willensky, 1993), Smyth (1998) set out to determine if this was justified. Past reviews of the research in this area have relied on the narrative method wherein "studies are grouped, the direction and significance of findings is noted, and overall conclusions are subjectively drawn from the number and consistency of findings" (Smyth, 1998, p. 175). Smyth (1998) sought to apply research synthesis, a form of meta-analysis, to the findings. Research synthesis consists of "statistical methods for generating an effect size for each observed between-group difference, classifies those effect sizes by domain (e.g., moderating variables), and quantitatively combines and compares effect sizes across studies by domain" (Smyth, 1998, p. 175). Therefore, Smyth (1998) had two goals in mind in the design of his research synthesis: (1) to evaluate the overall significance of and effect size of the writing task, and (2) to determine if potential moderating variables or factors may enhance or attenuate the effect of the writing task.

Smyth (1998) located only research articles that contained a variant of the original writing task developed by Pennebaker and Beall (1986). Other inclusion criteria for studies included random selection and an experimental writing manipulation; participants had to write about traumatic topics and control participants had to write about neutral topics; studies had to contain outcome measures that tapped mental health, physical health, or general functioning; statistical information needed to calculate effect size had to be available; and all studies had to

include participants that were both physically and psychologically healthy. With these inclusion criteria, a total of 13 studies were analyzed and included in the research synthesis. A discussion of the examined potential moderating variables follows.

Because many studies of written disclosure used college students as participants, generalization of the observed effects to other populations may not be possible. Therefore, Smyth (1998) used this participant characteristic as a potential moderating variable and compared results of student samples to non-student samples. Mean age and gender ratio of participants were also tested as potential moderating variables. Studies have also varied somewhat according to length, number, and duration of writing session (ranging from one 20-minute session to one 20-minute session per week for 4 weeks); therefore, "dose" of the writing task was also tested as a moderating variable. The instructions given to participants regarding the content of their essays have also varied across studies: some have asked participants to write about the most traumatic event of their lives, some have asked participants to write about ongoing traumatic events, and some have allowed participants to write about either past or current traumatic events. Smyth (1998), reasoning that the effect of the writing task may be influenced by the recency of the trauma, therefore examined writing instructions as a potential moderating variable. Another variable examined for its moderating effect was outcome type. Specifically, Smyth (1998) examined self-reported health, psychological well-being, physiological functioning, general functioning (i.e., reemployment status and grade point average), and health behaviors, all as measured at least one month after the writing task, as "certain types of outcomes may be more readily influenced if they are conceptually more closely related to the mechanism of action" (p. 177). Also, the short-term effects of the writing intervention (i.e., pre- to post-writing) were examined separately. Lastly, publications status was

examined as a potential moderating variable, as theses, dissertations, and unpublished work solicited from researchers were included in the meta-analysis. Smyth (1998) reasoned that inclusion of these materials would reduce potential biases in the peer review process that typically favor studies with significant findings. Further, publication status may be due to differences in study quality; therefore, the correlation between randomization, participant attrition, and manipulation checks and publication status was also examined.

The results of the meta-analysis are compelling, convincing, and suggest great clinical and practical import of written disclosure of traumatic experiences. The mean weighted effect size reported across all studies examined and across all outcome measurements was $d = .47$ (significant at the $p < .0001$ level). As Smyth (1998) notes, "this effect size is similar to or larger than those produced by other psychological, behavioral, or educational treatments…[and] the effect of the writing task is similar to that found in other quantitative analyses of psychological interventions" (p. 180). Even more convincing, to address the "file-drawer" problem whereby null findings in unpublished studies may have positively biased the overall effect size, a fail-safe *N* was computed that determined that 199 unpublished studies with null findings would have to exist for the observed effect to become nonsignificant.

Because 8 of the 13 studies included in the meta-analysis were studies that included Pennebaker as one of the authors, Smyth (1998) was concerned that artificially high effect sizes may have been obtained due to experimenter effects or increased within-group homogeneity in studies involving Pennebaker. Analyses, however, revealed that studies that did not involve Pennebaker had slightly higher, though not significantly higher, mean effect sizes. Therefore, "effects generated by other research groups are both reliable and not significantly different in magnitude," (p. 180), indicating that these effects are found regardless of research group.

Effect sizes across studies, however, were not heterogeneous, which indicates significant within-group variance and the need to examine the moderating variables discussed above. All effect sizes for the moderator variables were significantly different from zero, except for the health-behaviors variable; therefore, the written disclosure task leads to significant long-term (at least one month after writing) improvements in self-reported health, psychological well-being, physiological functioning, and general functioning. Specifically, psychological well-being and physiological functioning effect sizes were the highest (and not significantly different than each other), with self-reported health and general functioning following, respectively. Furthermore, none of the effect sizes for these outcomes were significantly different than the overall effect size, indicating that the overall effect of the writing task is not due solely to any one outcome type. Smyth (1998) addressed the complex associations between these moderator variables, speculating that the impact of written disclosure on self-reported health "may be lower than on physiological functioning because overall health is only partially mediated by physiological competence," and "the impact of writing on general functioning may be lower yet because it is in turn mediated by changes in well-being, reported health, and physiological functioning" (p. 181).

Regarding short-term (pre- to post-writing) distress, significant rises in experimental participants' distress was observed, and the effect size of short-term distress was significantly higher than, but unrelated to, all health outcome effect sizes. Although Pennebaker (1997a) has speculated that short-term distress is related to long-term positive outcomes, more short-term distress does not lead to more long-term benefits. However, all studies investigating written disclosure of traumas have found significant short-term distress increases; therefore, Smyth (1998) suggests that perhaps the "trauma-relevant fear network must be activated for

improvement to be made…[and] short-term distress may be required for cognitive change, but the *amount* [italics added] of short-term distress is not related to improvement" (p. 180).

Regarding participant characteristics, college students were found to evidence significantly higher mean psychological well-being effect sizes, and slightly higher, though not significantly higher, mean overall and physiological functioning effect sizes than non-students. However, age of participants was not related to any effect size. Interestingly, the percentage of males in studies was significantly related to overall mean effect size, which suggests that males may benefit more from writing about traumas. Pennebaker (1997a) has speculated that traditional gender roles may inhibit men more than women in discussing traumatic events and the emotions surrounding those events and, therefore, men may benefit more from writing due to higher levels of pre-writing inhibition being lifted and relieved. However, Smyth (1998) found a significant difference between males and females only in overall effect size, and not in physiological functioning outcomes. Significant gender differences in physiological functioning outcomes would be expected if the effects of writing were due to the mechanisms proposed by the inhibition-confrontation model originally forwarded by Pennebaker (Pennebaker & Beall, 1986).

Among measures of dose of writing examined, the time period of writing (i.e., time between writing sessions) was significantly associated with overall effect size. Studies in which writing sessions occurred with longer time periods in-between writing sessions had higher overall mean effect sizes. Smyth (1998) speculated that the beneficial processes involved in writing may progress over time, or that the longer time period may act like prolonged exposure to traumatic events, which has been found to be beneficial to persons who experience trauma. Another study characteristic that had a moderating effect was whether participants were instructed to write about past, current, or either past or current traumas. Specifically, writing

about current traumas only was related to significantly higher mean effect sizes on psychological well-being outcomes. Smyth (1998) reasoned that current traumas may be "more intimately linked to daily life" (p. 183) and that past traumas may be less salient to daily life. Also, studies in which participants wrote about either past or current traumas had significantly higher mean physiological functioning effect sizes than studies in which participants wrote only about past traumas. This, again, does not support the inhibition-confrontation model, as writing about past traumas should relieve more physiological load, thereby resulting in greater benefit when the inhibition is released (Lutgendorf, Antoni, Kumar, & Schneiderman, 1994). Finally, the publication status of studies was not related to any effect sizes, and none of the study quality variables examined (randomization, participant attrition, or manipulation checks) were related to publication status.

In summary, since 1986 (Pennebaker & Beall, 1986) compelling evidence has mounted documenting the short- and long-term health benefits of written disclosure of traumatic experiences across a wide range of populations; across a wide range of psychological, physiological, and behavioral outcomes; with participants writing about a variety of different types of traumas; and with participants writing about traumas that happened many years ago or traumas that are currently being experienced. Enough research has been done to now say confidently that the effects found are not spurious. The results of Smyth's (1998) meta-analysis are perhaps most compelling, given the strong support that researchers have given to the technique of meta-analysis in evaluating new interventions (e.g., Yeaton, Langenbrunner, Smyth, & Wortman, 1995). Enough research has also been done to allow the identification of specific conditions, or moderator variables, that enhance the health outcomes. Specifically, the overall effectiveness of the writing task has been found to be more pronounced for males and when

writing sessions are spaced out over long periods of time. Greater psychological benefits are found when the sample consists of college students and when participants write about current traumas (as opposed to traumas in the remote past). And physiological benefits are observed when participants write about either past or current traumas. To date, however, there has not been a writing intervention designed for use in psychotherapy with traumatized individuals that incorporates these results in its development. Perhaps this is because the mechanisms by which writing about traumas has these effects are unknown, although speculation has been abundant and several theories have been proposed. In discussing the results of his meta-analysis, Smyth (1998) states that "the question now becomes, how does writing about traumas produce these improvements?" (p. 181). To this question the present paper now turns.

## Proposed Mechanisms by which Written Disclosure of Traumatic Events has Psychological and Physiological Health Benefits

### *The Evolution of a Theory – From Inhibition to Narrative Structure*

Since the first studies of written disclosure of traumatic experiences, researchers have theorized about the underlying mechanisms responsible for the observed effects. The theory originally proposed by Pennebaker and his colleagues, dubbed inhibition theory (e.g., Pennebaker & Beall, 1986), was subsequently found to be inadequate to explain all of the findings of subsequent research studies and so evolved into a different, more complex, theory. In the following section, the evolution of this theory will be traced, culminating in a discussion of the most recent and currently popular form of the theory, which regards the narrative structuring of traumatic experience as necessary to realize the benefits observed in research studies.

The original theory that was proposed was variously dubbed the inhibition-confrontation model, the inhibition and disclosure hypothesis, and, simply, the inhibition theory by Pennebaker

and his colleagues (e.g., Pennebaker & Beall, 1986). Here, it will be referred to as the inhibition theory. The theory was based on the fact that many people who experience a traumatic event or other experiences of an emotionally charged nature are often reticent to openly discuss these experiences due to guilt or a fear of punishment. Therefore, these people must inhibit their overt behaviors, language, and facial expressions in order not to betray their true feelings. Furthermore, these individuals may also actively inhibit thoughts and feelings regarding theses experiences in a self-protective manner, because these thoughts and feelings are aversive and unresolved. Therefore, individuals who experience a trauma or other extremely upsetting events may work to cumulatively inhibit behaviors, thoughts, and feelings. Citing research that suggests that inhibiting disclosure to others of traumatic events over a long period of time may be related to disease processes, the inhibition theory forwarded by Pennebaker and Beall (1986) posited that actively inhibiting disclosure of personally traumatic experiences or other important psychological experiences requires physiological work. Furthermore, this physiological work may act as a long-term, low-level stressor, which may then cause or exacerbate psychosomatic processes and, in effect, increase the risk of illness, ineffective functioning, and other stress-related disturbances. Following this reasoning, if individuals are allowed to disclose traumatic events that have been actively inhibited over long periods of time, the disclosure should result in the reduction of long-term stress and, therefore, stress-related diseases. According to inhibition theory, exploration of inhibited emotions surrounding traumatic events results in cognitive reappraisal of traumatic memory schemata, which then results in decreased rumination and inhibition regarding the event(s), which then brings about the observed health benefits. According to Pennebaker, Barger, and Tiebout (1989), confronting past traumas facilitates the

"assimilation or understanding of the event, which, over time, results in a reduced need to inhibit thoughts and behaviors related to the experience" (p. 577).

Research findings were mixed in their support of the theory. For example, individuals who do not naturally discuss their emotions openly to others benefit more from written disclosure of traumatic experiences than individuals who are naturally open regarding their feelings (Graybeal, Sexton, & Pennebaker, 2002). Furthermore, individuals who do not disclose that they are homosexual (Cole, Kemeny, Taylor, & Visscher, 1996), or who are considered inhibited and shy by others (Kagan, Reznick, & Snidman), show more health problems than those who are less inhibited. Also, as discussed previously, Smyth (1998) found that men, who may be more restrained in openly discussing their feelings due to traditional gender role expectations, benefit more from writing about their thoughts and feelings surrounding a trauma than do women. Therefore, these people may benefit more from writing due to higher levels of pre-writing inhibition being lifted and relieved. However, there were no differences between men and women in physiological functioning outcomes, which would be expected if the physiological effects of writing were due to the mechanisms proposed by the inhibition-confrontation model. Several other factors appear inconsistent with inhibition theory. Disclosure of feelings about current or ongoing stressors that have not been subjected to prolonged inhibition also produces positive effects (e.g., Smyth, 1998). Individuals benefited as much from writing about traumas about which they had previously disclosed their thoughts and feelings to others as they did from writing about previously undisclosed traumas (Greenberg & Stone, 1992). As Pennebaker (1997b) states: "Whereas inhibition appears to contribute to long-term health problems, the evidence that disclosure reduces inhibition and thereby improves health has not

materialized….At this point, then, the precise role of inhibition in promoting health within the writing paradigm is not proven" (p. 164).

It became apparent that inhibition theory did not adequately explain the research findings, and so theorists, most notably Pennebaker and colleagues, sought other explanations. Pennebaker, Mayne, and Francis (1997) stated that the inhibition theory had "evolved by taking account of the central role of language [and]…. that linguistically labeling an event and its emotions forces the experience to be structured" (p. 863). Therefore, investigation turned to the role of the structure of language and the cognitive changes that accompany putting traumatic experiences into written language. This theory has been dubbed the cognitive change theory, and it posits that the structure produced by language promotes assimilation and understanding of the event, thereby reducing the emotional arousal associated with the event. More specifically, the cognitive change theory holds that writing promotes reorganization of the thoughts and feelings surrounding a traumatic experience and helps to create more coherent and meaningful narratives about the event. Therefore, the role of the structure of the memory of the experience – the narrative – became a central concern.

Investigation into the role of cognitive change in the positive health benefits of writing was spurred, first, by the inadequacy of inhibition theory and, second, by the consistent observation that, when participants in written disclosure experiments were interviewed in the months after the experiment, they reported that the experience changed the way they thought about the event. The writing appeared to promote insight into the experience and, more generally, into themselves. Most responses to open-ended questions regarding the value of the experiment contained words such as "realize," "understand," "resolve," and "work through" (Pennebaker, 1997a). Furthermore, this gaining of insight and self-awareness, combined with

positive health benefits, only occurred in experimental groups who had written about both the facts and emotions regarding a trauma. The researchers, then, sought to examine the language used by groups who had shown positive health benefits and the differences in language use between groups who did and did not show positive health gains.

The first investigation into language use involved the simple examination of a sample of essays from earlier written expression studies (Pennebaker, 1997a). Two groups of essays were examined and compared by a group of clinical psychologists, mental health workers, and college students. One group of essays was written by participants who had shown health improvements after writing about a trauma. The second group of essays was written by participants who did not benefit from writing about a trauma. The groups of psychologists, mental health workers, and college students were asked to examine the essays and to determine any differences between the groups of essays. Essays from those who showed health improvements were judged to be "more self-reflective, emotionally open, and thoughtful" (Pennebaker & Seagal, 1999, p. 1248), and the writers were judged to be "smarter….[and] more in touch with their emotions" (Pennebaker, 1997a, p. 102). The researchers, however, wanted to analyze the essays more systematically and empirically than simple clinical evaluation. Therefore, Pennebaker and Francis (1996) created a computer program entitled Linguistic Inquiry and Word Count (LIWC). LIWC was developed by having groups of judges first generate word categories. Over 2,100 words or word stems were then generated by judges, a Thesaurus, dictionaries, emotion and other types of questionnaires, and analyses of words used by previous samples of participants who wrote about both traumas and control topics. The judges then rated the degree to which these words and word stems were related to each of the over 70 word categories generated. Three judges independently determined if a word should go into each category; a word was entered into a category if at least two judges

agreed that it should be included. The percentage agreement between judges regarding word categorization was 93.1%. A second wave of judgments were made by a new group of judges. These judgments involved the broader categories to which words belonged, such as all negative words or all cognitive strategy words (Pennebaker, Mayne, & Francis, 1997). The finished product (i.e., the LIWC program) analyzes text files and computes the total number of words, total number of sentences, percentages of unique words, dictionary words, and the percentage of words that fall into 72 word categories.

Using LIWC, the researchers reanalyzed essays from previous studies in order to determine if they could isolate certain word categories that had been used to a relatively higher degree by participants who subsequently demonstrated health benefits. In essence, they sought to determine if there was any way to predict, by analyzing word usage, who does and who does not benefit from written disclosure of traumas (Pennebaker, Mayne, & Francis, 1997). From their analyses, some very interesting linguistic factors emerged. On theoretical grounds, the researchers reasoned that use of emotion words would be significant in predicting who would benefit from writing. Specifically, they hypothesized that expressing negative emotions would be more beneficial than expressing positive emotions, and that a high amount of expression of any emotions would also be beneficial. They found, first, that the more participants used positive emotion words, the more they subsequently improved. Second, they found that the expression of a moderate amount of negative emotion words, compared to very little and very high use of negative emotion words, predicted subsequent health improvements. In fact, those who used a moderate amount of negative emotion words evidenced the greatest drops in physician visits in the months after writing, whereas those who used very little or a great number of negative emotion words were most likely to have health problems after the study.

Thirdly, two cognitive categories of words were the most predictive of subsequent health gains from writing about traumas. Causal thinking words, such as "cause," "effect," "reason," "why," "thus," and "because," and insight or self-reflection words, such as "understand," "realize," "know," "reconsider," and "see" (Pennebaker, 1997a; Pennebaker, Mayne, & Francis, 1997; Graybeal, Sexton, & Pennebaker, 2002) were the most robust predictors of benefit. However, it was not the simple amount of usage of these insight/self-reflection words and causal thinking words that predicted health gains; rather, those experimental group participants who showed health improvements in the months after writing about traumas showed significant *increases* in their use of insight/self-reflection and causal thinking words from the first day of writing to the last.

These findings led Pennebaker and colleagues to the conclusion that participants who showed subsequent health improvements were displaying the process of creating a narrative, or story, regarding the traumatic events. In discussing the results, Pennebaker (1997a) wrote:

> Using our computer analyses as a guide, we realized that the people who benefited from writing were *constructing stories*. On the first day of writing, they would often tell about a traumatic episode that simply described an experience, often *out of sequence and disorganized*. But day by day, as they continued to write, the episode would take on shape as *a coherent story* with a clear beginning, middle, and end. Ironically, participants who started the study with a clear, coherent, and well-organized story rarely evidenced any health improvements (p. 103, italics added).

Participants who began the study with a well-organized story did not show health improvements. Pennebaker (1999) postulated that simply having a well-organized story already formed may not be enough, as the story may have been constructed while in the midst of a trauma, or when the person was very young and, therefore, it may not be sufficient later in life when "new information is discovered or broader perspectives are adopted" (p. 1249). That is, the story previously created, although a well-formed narrative, may not now be satisfactory in supplying

meaning or may not have incorporated facts or feelings subsequently learned or realized. In essence, the story previously created may have outlived its usefulness or been confronted with novel facts.

After these findings, it was some years before research efforts went into empirically investigating the role of story-making and narrative structuring in the observed health benefits of written disclosure of traumas. This area has still received relatively little attention, as only a handful of published research studies exist that systematically investigate narrative structuring in relation to the health benefits of writing (e.g., Amir, Stafford, Freshman, & Foa, 1998; Kellas & Manusov, 2003; Smyth, True, & Souto, 2001; Tuval-Mashiach et al., 2004). However, much theorizing went on in the meantime regarding why the acts of story-making and narrative structuring of memories of traumatic experiences promote psychological and physical benefits.

## The Narrative Nature of Human Existence – Theoretical Perspectives

> Just as we are drawn to good stories in literature or the movies, we need to construct coherent and meaningful stories for ourselves. Good narratives or stories, then, organize seemingly infinite facets of overwhelming events. Once organized, the events are often smaller and easier to deal with. Particularly important is that writing moves us to a resolution. Even if there is no meaning to an event, it becomes psychologically complete. In short, there is no more reason to ruminate about it (Pennebaker, 1997a, p. 103).

How do humans convey memories and accounts of personal experiences to others? How do humans infuse meaning into their lives and into the events they have experienced? One answer is in the stories they tell. Further, how do persons organize words into stories and accounts through which other people will be able to understand, follow along with, and really know the personal significance of those stories? The story must be coherent, meaningful, organized, and complete. And in order to tell a coherent story, or narrative, that memory or

account must be available first to the teller in a narrative or story form. In short, "narrative, or storytelling, is the form by which and in which everyday experience is processed" (Wigren, 1994, p. 415).

Recently in psychology and psychotherapy, there has been a movement away from objectivism and a movement toward more narrative epistemologies (Howard, 1991; Polkinghorne, 1988; Terrell & Lydon, 1995), which are subsumed under the meta-theoretical term "postmodernism." Objectivism, which dominated psychology throughout the latter half of the 20th century, assumes a free-standing reality whose truth can be discovered through scientific, empirical means. Postmodern thought and its various forms (e.g., narrative psychology, constructivism, social constructionism), assume that humans are the creators of all mental images and that any psychological "reality" is the active construction of the persons who might claim to have discovered it. Further, humans seek to construct reality in ways that make sense of lived experience and to imbue that experience with meaning. Indeed, the search for meaning has been proposed as the driving force in human action and experience (Howard, 1991). Accordingly, epistemology in the latter half of the twentieth century shifted from notions of truth to notions of meaning or significance. Following this line of thought, constructivism and narrative psychologies assert that people try to organize events that are upsetting or confusing in meaningful ways (Mahoney, 1995; Sewell et al., 1996).

Another point of postmodern departure from the tenets of objectivism is the conception of the self. In objectivist theories, the self has historically been viewed as individualistic, essential, singular, stable, and ultimately knowable. Postmodern conceptions view the self as more of a process than a product and stress the dialectical nature of self-development (Neimeyer, 2000). The self, in this view, is ever-changing in response to sensed discrepancies in the self-

system and to challenges to personal structure that arise in the social contexts in which humans construct reality. Further, the self is not seen as a stable, singular entity; rather, postmodernists view identity as comprising many "possible selves" (Markus & Nurius, 1986). Neimeyer (2000) sums up the postmodern view of the self as "inherently social, multiplistic, contingent, evolving, and, in principle, unspecifiable" (p. 209). Psychotherapy arising from objectivist perspectives usually comprises an authoritative posture on the part of the psychotherapist who uses techniques to influence self-change, focusing on disorders that impair adaptation and attempts to enhance self-awareness, self-actualization, and self-control. Psychotherapies arising from a postmodern perspective "tack between the self and the social system, helping clients to articulate, elaborate, and negotiate those (inter)personal meanings by which they organize their experiences and action" (Neimeyer, 2000, p. 209). Thus, the self is viewed as "heterogeneously distributed" (Wortham, 1999) within a social context and constructed in the social exchange of narratives or stories. As such, the life-story, or life stories, is (are) not only a format for telling oneself and others about one's life but is also the means by which identity takes shape (Bruner, 1990; Polkinghorne, 1988).

Different elaborations of postmodern narrative therapy have been forwarded by social constructionists, in which the self is absorbed in language and discourse, and by cognitive constructivists, in which the self is seen as substantial and integral. Neimeyer (2000) proposed a relational alternative that focuses "more centrally on the phenomenological context in which narration actually takes place: in the nexus of conversations with real or imagined others" (p. 215). Thus, the self is neither constituted wholly psychologically or socially, but dialogically, as a function of dialogue between people and their social world. This process is necessarily mediated by language and is the "hallmark of lived human experience" (Neimeyer, 2000, p.

215). Therefore, the self consists of a socially distributed network of roles or identities that each take shape in the context of the stories, or narratives, that one tells about oneself in certain situations with certain people (Hermans, 1995). This polyphonic, or heterogeneously distributed, self conceptualization implies that full personality integration is not achievable. It also implies that "whatever sense of coherence and continuity we achieve is in the context of….relationships" (Neimeyer, 2000, p. 215). Narratives, or life stories, told in the context of these relationships provide structures of meaning and coherence to the person's lived experience. A coherent self system emerges as the person successively emplots roles through narratives. The person who emplots a role "typically constructs a story that relates it to his or her preexisting sense of self or adopts one of the countless variations of the classical, timeless mythic narratives that organize and attribute significance to life events" (Neimeyer & Stewart, 1996, p. 361). When an experience is foreign and cannot be assimilated into preexisting narrative structures, such as when a trauma occurs, that normal narrative processing breaks down; meaning cannot be found in the experience. The psychologically healthy individual is capable of applying or rapidly constructing a coherent, meaningful, and dynamic narrative of him- or herself. On the other hand, a person whose story remains unavailable, flawed, or partial will be prone to psychological difficulties (Tuval-Maschiac et al., 2004). As Howard (1991) claims, "the development of identity is an issue of life-story construction; psychopathology can be seen as instances of life stories gone awry; and psychotherapy as exercises in story repair" (p. 191).

## Narrative Memory versus Traumatic Memory

Trauma theorists since the time of Pierre Janet have used clinical observation in theorizing about the differences between memories of traumatic events and memory for non-

traumatic events. The following section will outline what have been theorized as the differences between narrative memory, which is the form memories usually take, and traumatic memories, focusing on the writings of van der Kolk and colleagues (e.g., van der Kolk, 2002; van der Kolk and van der Hart, 1991) and Wigren (1994). The research evidence for the benefits of recoding traumatic experiences into narrative form will then be summarized.

Wigren (1994) proposed that "traumatic memories are emotionally vivid, uncondensed, and frequently dissociated from the primary memory system. They cannot be recalled at will, but emerge unbidden in response to 'triggers,' and are accompanied by intense affect" (p. 416). On the other hand, ordinary memories contain affect that is modulated; therefore, these memories do not produce overwhelming affect. Furthermore, ordinary memories are available to conscious recall and voluntary control over them is maintained. Most important to Wigren (1994) is that the narrative structure of ordinary memories serves to contain affect; in a narrative structure, "affect is linked to, and therefore contained in, an episode that is specific to time, place, character, and meaning" (p. 416).

Drawing on psychobiological models of memory storage, Wigren (1994) proposes that traumatic experiences disrupt "the psychophysiological connections that facilitate storymaking. Narrative offers a structure for binding psychophysiological events, that is, affect, with mental events, or cognition" (p. 417). Van der Kolk and van der Hart (1991) and van der Kolk (2002), drawing on research evidence using brain imaging techniques, propose that different types of experiences are processed in different areas of the brain. Under ordinary conditions, the brain structures that activate when interpreting what is going on in the environment function in harmony, and connections are created between the psychological (cognitive) and physiological (affective) systems. However, during traumatic experiences, subcortical areas of the brain

involved in the generation of affect (i.e., the limbic system) increase in activity, whereas the more recently evolved structures, located in the prefrontal cortex, are inhibited. These areas of the brain are thought to use different ways of representing past experience. Structures located in the prefrontal cortex allow people to use language and symbols to communicate about the past. During frightening or highly arousing experiences, however, the frontal areas of the brain may be inhibited, interfering with the functioning of Broca's area, the brain region involved in putting feelings into words (van der Kolk, 2002). Thus, people who have experienced a trauma are "ill equipped to talk about their traumas in rational or analytical fashion" (van der Kolk, 2002, p. 385). In support of this, Rauch et al. (1996) found that when people with PTSD are reliving their traumatic experiences in vivid memories, there is decreased activation of Broca's area and increased activation of the limbic system in the right hemisphere of the brain. Via the increase in limbic system activity, memories encoded during traumatic experiences are affectively intense and underorganized (van der Kolk, 1988; van der Kolk & Sapporta, 1991; van der Kolk & van der Hart, 1991). Thus, in traumatic memories, affect and cognition are unconnected, and affectively laden material is unorganized and uncontained in narrative structure. As Wigren (1994) states: "this material is not integrated in a complex cognitive/affective system, but remains organized on a physiological level only….These highly charged affects will ultimately be organized….only when the story of the traumatic experience can be fully told" (p. 418).

The notion that traumatic memories are stored differently than normal memories goes back to Pierre Janet in the latter part of the nineteenth and the beginning of the twentieth centuries. Janet (1919) viewed the memory system as the central organizing mental system. The memory system, in Janet's view, categorizes and integrates all aspects of lived experience and automatically integrates them into large and flexible meaning schemes (i.e., narratives). Some

memories, Janet claimed, are automatically stored in the "subconscious" and form the template that guides subsequent interaction with the world. When people respond to challenges with appropriate action, new information is immediately integrated without much conscious attention to what is happening. Healthy psychological functioning in this view "depends on the proper operation of the memory system which consists of a *unified* memory of all psychological facets related to particular experiences: sensations, emotions, thoughts, and actions" (van der Kolk & van der Hart, 1991, p. 426, italics added).

Narrative memory is distinguished from this automatic, unconscious integrative memory, which contemporary theorists call implicit memory. Narrative memory consists of mental constructs that are used to make sense, or meaning, out of lived experience (van der Kolk & van der Hart, 1991). Janet theorized that the ease with which experience is integrated into these mental constructs depends on the person's subjective appraisal of the experience. Familiar, predictable experiences are automatically assimilated without much conscious attention to details. Novel, frightening experiences do not easily fit into existing mental schemes. As van der Kolk and van der Hart (1991) observe, "under extreme conditions, existing meaning schemes may be entirely unable to accommodate frightening experiences, which causes the 'memory' of these experiences to be stored differently, and not be available for retrieval under ordinary conditions" (p. 427). The memory is fragmented and unintegrated into the memory system or personal narrative. Therefore, it becomes dissociated from conscious awareness and voluntary control (Janet, 1919). When this occurs, fragments of these unintegrated experiences may be organized only as sensory perceptions, obsessional ruminations, or behavioral reenactments. Later, the traumatic memory may spontaneously resurface in situations reminiscent of the original trauma (var der Kolk & van der Hart, 1991).

These concepts can also be explained in Piagetian terms. Trauma, by definition, confronts people with extremely unusual stress, and requires coping with a new, unexpected, and unfamiliar situation (*DSM-IV-TR*, 2000). Cognitive understandings depend on either assimilating new experience to previous understandings, or accommodating cognitive structure to create new categories of understanding (Piaget, 1936). Because assimilation involves incorporating new instances of what is already understood, trauma cannot be assimilated because it is alien and unfamiliar. Furthermore, accommodation can occur when new information is novel but non-threatening, when "novel" experience is defined as something unfamiliar but that can be understood by broadening or recombining existing understandings (Kelly, 1963). Information or experience that is too discrepant from existing understandings cannot be understood. Trauma represents information that is highly discrepant; therefore, it cannot be integrated without major shifts in existing understandings. Thus, a narrative must be constructed that unifies and makes sense of all of these fragmented, unassimilated, and highly emotional aspects of the experience (Wigren, 1994).

What does the construction of a narrative require? According to Wigren (1994), construction of a narrative requires, first, attention to an experienced sensation, such as fear, pain, or sadness. Next, a cognitive-perceptual selection process must take place, during which aspects of both the internal and external environments are "screened for relevance to the felt sensation" (Wigren, 1994, p. 415). This process allows causal chains to be constructed that identify events as causes and as consequences of other events. A very important outcome of this process is that events are connected to the characters in the story in ways that both evoke and account for affect. This, according to Wigren (1994), is the process of creating meaning that is necessary for the experience to be integrated with the self narrative, or preexisting meaning

schemes. Construction of a narrative further requires that there be an episodic organization to the events, such that certain experiences are linked to each other and separated from others. Finally, the person who constructs a narrative is able to draw conclusions from these episodes "that will guide future behavior, and contribute to the ongoing formation of a worldview and a personal identity" (Wigren, 1994, p. 415-416). In other words, the memory of the experience, now available to the storyteller in narrative form and therefore coherent, meaningful, and organized, is able to be integrated within preexisting meaning schemes because it is "smaller and easier to deal with" (Pennebaker, 1997a, p. 103). An apt metaphor for this process is that the memory of a traumatic event is much like a very cluttered room: there is no organization to the contents. The things are merely scattered here and there throughout the room, not grouped in any organized, meaningful way, probably covered with dust as they have sat unexamined. Trying to find something in this room would be a daunting task. However, if one were to organize the contents, creating groupings of similar items in meaningful piles and separating unrelated items, the contents would begin to seem much less perplexing and would start to make sense. Eventually, a structure would take form, one that makes sense to the particular person organizing the room. Words and narrative structure can be viewed as the groupings or piles; words serve as "packages of meaning" that group thoughts, feelings, and actions, and narrative structure is the organizing principle that organizes the "packages of meaning" into a meaningful arrangement.

## Review of Empirical Analyses Investigating the Effects of Manipulation of Narrative Structure of Traumatic Memories

Some empirical efforts, deriving from different theoretical viewpoints, have been put into investigating whether lack of narrative structure of traumatic memories is related to physiological/psychological health difficulties, and whether efforts aimed at improving the

narrative structure of traumatic memories lead to increases in health. The results of these studies support the notion that efforts aimed at improving the narrative structure of traumatic memories lead to increases in psychological and physical health and to decreases in health difficulties. Furthermore, the validity of various methods of assessing narrative structure of traumatic memories has been studied and have revealed conflicting results. In the following section, studies examining narrative structure and manipulations of narrative structure of traumatic memories first will be reviewed, highlighting areas that bear directly on the present investigation. Next, the present investigation of a guided writing intervention will be outlined and the hypotheses listed.

From an information-processing perspective, traumatic memories are viewed as disorganized, fragmented, confused, and consisting largely of representations of intense emotions, which is consistent with the conceptualization forwarded by Wigren (1994). Exposure therapy, then, is seen as repeated reliving of the traumatic memory with the aim of producing a more coherent, organized representation of the experience (Foa, Molnar, & Cashman, 1995). Coming from this perspective, Foa, Molnar, and Cashman (1995) compared narratives of 12 sexual assault victims with PTSD at the beginning and at the end of exposure therapy. They found that narratives at the end of treatment were longer, had lower percentages of actions and dialogues, and had a higher percentage of organized thoughts. Furthermore, reduction in an overall index of narrative fragmentation was positively associated with reduction in rape-related anxiety. Similarly, Amir, Stafford, Freshman, and Foa (1998) tested the hypotheses, derived from the above study, that trauma memories of victims with chronic PTSD are particularly simplistic and inarticulate, and that this lack of articulation would be related to immediate and delayed PTSD symptom levels. Articulation was operationally defined as reading level of written

trauma narratives as measured by a word-processing software package that examined number of characters per word, number of syllables per word, and number of words per sentence. They found that degree of articulation was not related to immediate PTSD symptom severity, but was related to degree of general anxiety immediately after the trauma (i.e., state anxiety). This fits with consistent observations by Pennebaker (Pennebaker & Beall, 1986) and others (e.g., Smyth, 1998) that negative mood levels rise immediately after writing about a trauma.

Amir et al. (1998) found also that reading level of trauma narratives was negatively correlated with PTSD symptom severity three months after the trauma. Sexual assault victims whose narratives showed lower reading levels also showed more severe chronic PTSD than participants who generated narratives with higher reading levels. This fits with the consistent findings of long-term, sometimes delayed, health benefits of writing about traumas (e.g., Smyth, 1998). The authors interpreted their findings as showing that the manner in which a traumatic memory is represented in memory has important bearing on recovery. They suggested that traumatic memories are particularly disorganized and simplistic, that emotional processing of the event involves organizing those memories, and that articulation is one aspect of organization. However, the small sample size impedes generalization of the findings. Additionally, writing skill and cognitive ability were not controlled and a negative relation has been observed between cognitive ability and PTSD (Gray & Lombardo, 2001).

Gray and Lombardo (2001) investigated the information-processing conceptualization of traumatic memories as fragmented and disorganized, as well as the method of using reading levels to gauge this fragmentation. They tested the validity of reading level measures as indices of trauma-specific memory deficits in non-treatment seeking undergraduates in two ways: (1) by comparing trauma narrative writing complexity between persons with and without PTSD, and (2)

by within-group comparisons of writing complexity of traumatic experiences, unpleasant experiences, and pleasant experiences. Concerned that writing skill and cognitive ability might account for the findings of Amir et al. (1998), the researchers statistically controlled for these factors. Initial findings replicated the findings of Amir et al. (1998). However, the reading level differences disappeared after controlling for cognitive and writing abilities. The researchers proposed that "the most parsimonious explanation that can be offered is that these complexity measures are simply alternative means of documenting the often observed lower cognitive performance of individuals with PTSD" (p. 180). Regarding the hypothesis that trauma memories are fragmented and disorganized, the researchers stated that "if persons with PTSD have impoverished memories of their traumas, they should provide both more terse descriptions of their traumas relative to other life events and more terse trauma descriptions relative to individuals without PTSD" (p. 181). These predictions were not supported by their data in that word counts did not differ significantly between the PTSD and no-PTSD groups, and trauma narratives of both groups were longer than both unpleasant and pleasant experience narratives. The researchers stated that reading level indices of trauma narratives do not offer information about memory clarity or cohesion; they may, instead, reflect more global cognitive differences between distressed and non-distressed persons. Therefore, using narrative reading level as an index of traumatic memory fragmentation is questionable and in need of further study.

Tuval-Mashiach et al. (2004) followed the development of post-trauma narratives in a small sample ($N = 5$) of survivors of a terror attack. They found a relation between narrative development over time and symptoms of PTSD. When the narrative developed a coherent story, in which meaning was found and self-image was positive, levels of PTSD symptoms were lower. This study was unique in that no previous studies had followed the natural and spontaneous

development of trauma narratives from immediately after the trauma. Previous studies almost exclusively relied on retrospective accounts of trauma. These researchers used accounts of trauma that had just happened. The researchers propose that three factors within narratives are crucial for effective coping, all of which are maintained through the dynamic creation of the story. They called these factors "continuity and coherence," "creation of meaning," and "self-evaluation." Regarding continuity and coherence, they posit that the ability to maintain a sense of continuity in the account of the trauma leads to better recovery. Regarding creation of meaning, the researchers posit that the process of coping with a trauma includes an active search for meaning in the events. The search for meaning will include questions such as "why me?" "why now?" and "what can I learn from the event?" Finally, the researchers state that degree of control, feeling guilty or responsible, and being active or passive are different aspects of self-evaluation and are related to efficacy of coping. The researchers supplied the narrative questionnaire they used in assessing these different aspects of the narratives, and each aspect of the narratives was scored on these dimensions using 5-point scales. However, the operational definitions of these concepts as judged in the narratives are unclear and not outlined in detail; specific examples are given, though, that shed some light on how these aspects were judged. For example, they stated that the following narrative is a good example of a broken, non-coherent narrative:

> We went for a 'task,' and we are on the way and suddenly we hear the noise of stones hitting the car, and afterwards we shouted: Shooting! but the greatest miracle is that bullets passed above my ears (p. 285).

The researchers state that this narrative is non-coherent because it is very short, it switches back and forth from past to present and back again, and it has no clear end. As an example of a good story, the researchers present the following:

> I would say that we went to make the soldiers celebrate, and suddenly we were shot from behind 13 bullets. Three friends were wounded, and until we went off the car, we didn't really know what happened. We thought it was stoning, and eventually it became clear that it was shooting and there are people who were injured…I remember I then felt a great responsibility for my friends, since I brought them to this activity, but today I can say that my functioning there was excellent. I'm proud that we kept on and did what we planned to do with the soldiers. I feel that life now has a much more valued meaning, and believe that what happened will have a positive impact on my life from now on (p. 289).

In this story, it is easy to see that it has a clear beginning and end, the survivor has found meaning in the event, and a positive self-image is presented. The researchers propose that narrative creation itself is a method of coping and could therefore be used as an intervention tool. They further state that "creating a trauma story through information, reconstruction, or cognitive processing helps the individual to charge the event with personal meaning and to place it as part of the rest his life, as opposed to being its focus" (p. 291). Therefore, to these researchers, a healthy narrative includes coherence in episodic structure, which then allows the person to finding meaning, different perspectives, and positive self-evaluation in the event. The very small sample used and the lack of precise operational definitions of trauma narrative components, however, impede generalization and stand out as threats to the internal validity of the study.

In a direct study of the relation between the degree to which individuals form narrative structure when writing about traumas and subsequent health improvements, Smyth, True, and Souto (2001) manipulated narrative formation during writing. They addressed whether narrative structure is necessary for writing to be beneficial. Drawing on the work and theory of Pennebaker and colleagues, the researchers hypothesized that expressing thoughts and feelings in a nonnarrative format would not result in subsequent health improvements, whereas writing in a narrative structure about a trauma would result in health improvements. Based on the theory of van der Kolk and van der Hart (1991) regarding the psychobiology of traumatic memory representation, they also hypothesized that if narrative formation alters the memory

representation of a trauma, then intrusive thoughts should decrease as narrative structure increases. One hundred and sixteen undergraduate students, ranging in age from 18 to 35 years, and representative of the United States population in terms of race/ethnicity, were randomly assigned to one of three experimental groups. Participants were seen in person and initially filled out three measures. They were administered the Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979), which is a measure of intrusive thoughts and avoidance surrounding a traumatic event. They were given a self-report measure of common physical symptoms and the amount of activity restriction experienced due to these symptoms. They were also administered a mood report that included four adjectives describing positive affect (happy, joyful, enjoyment/fun, pleased) and five adjectives describing negative affect (depressed/blue, unhappy, angry/hostile, frustrated, worried/anxious). The mood report was obtained before and after writing. All of these measures had been used previously in research investigating the effects of written disclosure of traumatic experiences and, so, were directly comparable to results of previous research.

Participants assigned to the control group were instructed to write about their plans for the previous week, and to describe them in detail while not discussing their thoughts and feelings associated with them. Participants assigned to the fragmented experimental group were instructed to write the thoughts, feelings, emotions, and sensations experienced during the most traumatic experience of their life in a list-like fashion, avoiding narrative structure. Participants in the narrative experimental group were given the following instructions:

> You were recently asked to answer some questions about the most traumatic or stressful event of your life. We would now like you to write briefly about that event. Don't worry about grammar, spelling, or sentence structure. The important thing is that you write about your deepest thoughts, feelings, and sensations about the experience. Let yourself go and touch those deepest emotions and thoughts you have. Most importantly, try to form a narrative about the experience. Start by describing the circumstances that led up to

> the event, then describe what happened during the event. Next, write about the consequences of the event. That is, what happened and how it made you think and feel. Finally, try to conclude by describing how the event turned out. That is, how did it resolve, or what did you do to deal with the event? In other words, tell a story about what happened and how it made you feel. Some people find writing thoughts, feelings, and sensations about a stressful event upsetting, and may cry, feel sad or depressed afterwards. This is quite normal, and we will allow you as much time as you want when you have finished writing to compose yourself (pp. 166-167).

Participants completed only one 20-minute writing session; the researchers reasoned that, despite being instructions to the contrary, the fragmented experimental group may form a narrative if the number of sessions were increased. Furthermore, strong health effects were found in previous written disclosure studies using a single session (Greenberg, Wortman, & Stone, 1996).

The essays were coded and evaluated by three graduate students who were trained in the coding process and who were blind to experimental condition. Essays were evaluated on 7-point scales, ranging from 0 (*not at all*) to 3 (*moderately*) to 6 (*extremely*), along three dimensions: how emotional they were, how personal they were, and the extent to which they showed a narrative structure. The operational definition of narrative structure was, however, not clearly defined, and consisted of "showing the organization characteristics of a story, most notably a clear beginning, middle, and end" (p. 165). Word count of the essays was also obtained. Interrater reliability was assessed and found to be .83 overall, with the category ratings ranging from .79 (how personal) to .87 (narrative structure).

The study yielded several important findings. First, both experimental groups' essays were more emotional, personal, and longer than the essays of the control group. The fragmented and narrative essays did not differ in the amount of emotion used, how personal they were, or in length. However, the essays of the narrative group were rated as containing significantly more narrative structure than fragmented essays. The researchers interpreted these findings to show that the manipulation (i.e., manipulating narrative use without compromising the expression of

thoughts and feelings) was successful and that "instructions to form a narrative during written disclosure produce a different response to writing than does fragmented or control writing" (p. 170).

Next, immediate effects of writing condition were examined. The researchers found, as has been found consistently in the expressive writing literature, that writing produced significant reductions in positive moods and increases in negative moods in the experimental groups as compared with controls. These short-term effects did not differ between the fragmented and narrative experimental groups. The researchers interpreted this finding as suggesting that participants were emotionally engaged in the task and took the writing seriously. They further suggested that this finding agrees with past findings that the immediate effect of writing about a trauma on mood is negative and "may represent a necessary condition for improvement" (p. 168).

Long-term effects of writing condition were then examined. On all measures, the fragmented writing group was indistinguishable from the control group. The narrative writing group, however, did show some indication of health improvement, but in an unexpected fashion: they reported less restriction of activity due to illness in the five weeks following the experiment, and they showed higher levels of avoidant thinking than the other groups. The hypothesis that intrusions would be reduced by narrative writing was not supported. The researchers interpreted these findings to show that "the mere expression of thoughts and feelings surrounding a traumatic experience may not be sufficient for improvement and that narrative formation is necessary" (p. 170). Regarding the finding that intrusive thoughts were not reduced by narrative writing, the researchers stated that this "may reflect the need for increases or improvements in narrative formation….One session of writing may not be sufficient to produce such changes" (p.

170). Regarding the finding that avoidant thinking levels increased in the narrative writing group, the researchers conjectured that a single writing session may serve a sensitizing function despite producing health benefits. Participants may, as a result, actively avoid thinking of the trauma. Multiple writing sessions, however, may allow participants the opportunity to habituate to the traumatic memory and so may not produce this avoidance response. Their study, the researchers noted, used a minimal intervention (only one writing session); therefore, it was unclear whether increasing the number of sessions would have enhanced group differences (a "dose" effect) or eliminated them, given that both groups might have imposed organization or narrative structure, regardless of instruction.

In the only extant study that has investigated the effects of a guided written disclosure protocol, Gidron et al. (2002) investigated the effects of a guided written disclosure protocol in a sample of frequent primary care clinic attenders in Israel. In their literature review and interpretation of findings, they focused exclusively on the effects of inhibition of disclosure of past stressful traumatic events, and subsequent active disinhibition; no mention was made of the narrative structure of traumatic memories. Their intervention, however, used aspects of previous studies that did focus on narrative structure and appear to promote narrative recoding of traumatic memories.

Gidron et al. (2002) stated that a close examination of written disclosure studies reveals that some participants do not benefit from the usual unstructured written disclosure procedure. For example, frequent clinic attenders have been found to make clinic visits after unstructured written disclosure at similar rates as before unstructured written disclosure (Gidron et al., 2002). Citing past research into the structure of traumatic memories and reviewed in the present proposal, they reasoned that guiding trauma victims to disclose traumatic events in a

chronological manner, to disclose their trauma while writing words that indicate self-reflection and insight, and to linguistically label stressful emotional and physical experiences would lead to the greatest health benefits. The researchers stated that "findings strongly suggest that people need and may benefit from *guidance* in the content and manner of written trauma disclosure" (p. 162). This guidance, they reasoned, may aid participants in shifting the encoding of traumatic memories from an uncontrolled sensory and affective memory mode to a more controlled cognitive memory mode. This shift, they postulated, may be necessary for health benefits to be achieved. The researchers developed a guided written disclosure protocol aimed at providing patients with greater control over their trauma memories, and thereby reducing their need to inhibit them and reducing potential health costs related to inhibition of traumatic memories. They then investigated the effects of the guided written disclosure on symptoms associated with somatization and on health care utilization among frequent clinic attenders.

Gidron et al. (2002) used 41 outpatients attending a community clinic in Israel, between the ages of 21 and 65 years, who had no known mental illness, and who were identified by their primary care physicians as visiting the clinic at rates above the mean number of visits at urban clinics in Israel. Participants were randomly assigned either to a control group or to a guided written disclosure group. Participants in the control group were asked to write for three consecutive days about neutral topics (i.e., daily activities, their house, their current or last job) without emphasizing emotions. Participants in the experimental group were guided in their disclosure of a recent trauma over three, 15-minute sessions. On the first day, participants were asked to describe the event in writing in chronological order without expression of emotions. On the second day, participants were asked to *verbally* describe their thoughts and feelings at the time of the event, and whether the event affected their life; it was reasoned that this would

enhance cognitive processing, verbal labeling of sensory and affective responses, and self-reflection. Finally, on the third day, participants were asked to write about how they currently thought and felt about the event and what they would do in the future if they encountered similar events; it was reasoned that this would enhance perspective and self-regulation. Dependent measures consisted of medical records of clinic visits during the three months prior to and after the experiment and 15 months after the experiment, and a 6-item scale derived from the Symptom Checklist-90 (SCL-90; Derogatis, 1994) that assessed symptoms associated with somatization. A manipulation check was conducted by comparing the frequency of use of negative emotion words and insight words in the experimental and control groups; it was found that experimental group participants used significantly more words reflecting negative affect and insight words than did controls. Therefore, experimental participants adhered very well to the guided writing instructions (i.e., the manipulation was successful).

As hypothesized, experimental participants reported significantly lower symptom levels at 3-month follow-up than did controls and showed larger reductions in symptom reporting (41%) than did controls (20%). Regarding frequency of clinic visits, experimental participants visited the clinic significantly fewer times than did controls at both the 3-month and 15-month follow-ups. The researchers then examined whether the findings regarding clinic visits were clinically, as well as statistically, significant. To do this, they compared the percentage of participants in each group at the 15-month follow-up who visited the clinic less than or more than the mean number of clinic visits in Israel over a 15-month period (10 visits). They found that 90% of experimental participants versus 67% of control participants visited the clinic fewer than 10 times, which represented a statistically and clinically significant difference.

The researchers stated that these results support those of previous written disclosure studies and extend them to a community sample of frequent clinic attenders. Furthermore, the guided writing intervention developed was the first of its kind and showed success, in that positive health benefits were observed. Some methodological considerations, however, stand out as threats to internal validity and the soundness of the findings and interpretations forwarded. First, it is unclear what health benefits the guided writing intervention added to the usual unstructured writing interventions used in all past expressive writing research. In their discussion, the researchers wrote that a limitation of their study is the lack of a non-guided trauma disclosure condition, but they still claim that their guided writing intervention "provides a more controlled, and thus healthier manner of processing trauma than the usual non-guided protocol" (p. 165). This claim, however, is unfounded due to the lack of a non-guided comparison group. A second weakness of the study is that the second day of guided writing did not consist of writing at all, but of verbally discussing their thoughts and feelings at the time of the trauma. This is not guided writing at all, but guided discussion. Therefore, verbally discussing thoughts and feelings is confounded with writing about thoughts and feelings. Thoughts and feelings at the time of the trauma may be the most important aspect of the trauma to explore and come to a new cognitive understanding regarding. Furthermore, there are important differences between verbal disclosure and written disclosure. In written disclosure paradigms, participants are assured of confidentiality and anonymity– the researchers will not know who wrote which essay. In verbal disclosure, however, participants are talking directly to the researcher and know that they cannot remain anonymous. Therefore, they may attempt to present themselves in a favorable light, may not be completely forthcoming regarding sensitive aspects of their trauma, feelings or thoughts, and/or may attempt to shape their disclosures to

match what they believe the researcher wants to hear (demand characteristics). Another limitation is that the writing occurred on three consecutive days; Smyth's (1998) meta-analysis found that writing sessions spaced more widely apart (i.e., by one week) were more effective in bringing about positive health benefits. It may be that had writing sessions taken place with more time in between sessions, more health benefits would have been observed.

## Overview of the Present Study and Hypotheses

Based on the plethora of research findings on the positive health benefits of expressive writing about a traumatic experience, on the theory and research regarding the non-narrative structure of traumatic memories and the need for narrative structuring of those memories, and on the few research studies investigating manipulations of narrative structure of traumatic memories and the positive health benefits shown in those studies, the following research study was conducted. Drawing heavily on Wigren's (1994) model of narrative incompleteness of traumatic memories, a guided written disclosure protocol was developed to assist participants in "completing" their trauma narratives - in "storying" their traumatic experience so that the experience can become part of their personal narrative, self-narrative, or life story. This study adds important information to the written disclosure research base and the clinical psychology research base, in that the effects of a written disclosure protocol that can potentially be applied in psychotherapy settings was investigated.

Undergraduate students from a large Texas university were solicited for participation in the study, and a guided written disclosure protocol was developed (outlined in Methods section) to assist these participants in developing a healthy narrative of a traumatic experience, according to the elements of a complete narrative proposed by Wigren (1994) and incorporating further

elements of a "good" narrative forwarded by Tuval-Mashiach et al. (2004). These authors were chosen because their conceptualizations of a complete or "good" narrative incorporate elements proposed by Pennebaker and colleagues (e.g., Pennebaker, 1997) and many others involved in written disclosure research (e.g., Smyth, True, & Souto, 2001). Specifically, the elements of a "good" narrative that were included in the present guided written disclosure protocol are: (1) episodes in the story are arranged sequentially and episodically; (2) events are connected causally so that causes and consequences of the events in the narrative are explained and understood; (3) characters are developed and causes and consequences are linked to characters; (4) affect is evoked, made sense of, and connected to characters and events; (5) meaning is drawn from the events relayed within the narrative; (6) the narrative is coherent to others reading it; and (7) the narrative includes an evaluation of the participants' role in the events, be it positive or negative. The first five elements are derived from Wigren (1994); the latter two are derived from Tuval-Mashiach (2004). These elements will be operationally defined in the Methods section.

Participants completed four writing sessions that lasted approximately 30 minutes, spaced by one week, during which a series of specific directions to include or develop certain elements of the narrative were given by me to guide them in "completing" their narratives. Four sessions were chosen because that is the number of sessions used in many written disclosure studies. Gidron et al. (2002) found positive health benefits with three sessions utilizing their guided written disclosure protocol, yet Smyth, True, and Souto (1998) suggested that additional sessions may enhance the benefits they found using one writing session. The spacing of sessions one week apart was chosen based on the finding in the meta-analysis by Smyth (1998) that writing sessions spaced further apart, as opposed to consecutive days, were more effective at bringing

about positive health benefits. The essays were rated by trained graduate student judges along the seven dimensions of a complete narrative included in the present guided written disclosure protocol. They were also analyzed using the LIWC program developed by Pennebaker and Francis (1996). The LIWC program was used to evaluate increases in the use of positive and negative emotion words, insight words, and causal thinking words across the four writing sessions. This was particularly important, given the importance placed on these dimensions by Pennebaker and colleagues (e.g., Pennebaker, Mayne, & Francis, 1997) and on their theorized role in the positive health benefits realized in past studies.

Participants completed a battery of self-report measures before and one month after the experiment, most of which were drawn directly from the work of Pennebaker and colleagues (e.g., Pennebaker & Beall, 1986). These measures tapped physical, psychological, and behavioral aspects of functioning, including physician visits, health-relevant behaviors, and amount of days their activity had been restricted due to illness. In this way, the results of the present study are directly comparable to past written disclosure research outcomes. This battery also included additional measures that have been used in past written disclosure research that tap a wider variety of psychological domains of functioning (such as intrusive thoughts, avoidance behaviors, and personality variables). Participants also completed self-report measures immediately before and after each writing session that tap domains of mood and immediate physiological arousal, as has been done in past studies.

The following hypotheses were proposed and tested in the present study based on research and theory reviewed previously in this paper.

Hypotheses regarding the long-term effects (at one-month follow-up) of the present proposed guided written disclosure protocol were as follows:

H1: One month after the study is completed, participants will report significantly fewer physical symptoms of illness in the past month than they reported at the outset of the study for the previous month.

H2: One month after the study is completed, participants will report experiencing significantly less general symptoms of psychological distress than they reported at the outset of the study.

H3: One month after the study is completed, participants will report fewer intrusive thoughts and avoidance behaviors related to the trauma they wrote about than they reported at the outset of the study.

H4: One month after the study is completed, participants will report significantly fewer physician visits, days sick, and days in which their activity was restricted due to illness in the past month than they reported at the outset of the study for the previous month.

H5: Judges' ratings of the narrative quality of participants' final essays will correlate negatively with participants' physical and psychological symptom levels one month after the study is completed. That is, higher narrative quality ratings will be associated with lower physical and psychological symptom levels.

H6: Participants whose essays show relatively greater increases in the amount of narrative completeness across the three writing sessions as rated by judges and calculated by the LIWC program will show significantly more long-term positive change in physical, psychological, and behavioral domains of functioning. That is, rate of increases in narrative quality over the four writing sessions will predict amount of positive change in physical and psychological symptom levels.

H7: Participant characteristics of age, ethnicity, and education level will have no effect upon the results of H1, H2, H3, or H4.

H8: LIWC dimensions of positive emotion words, causal words, and insight words will increase significantly from the first writing session to the last writing session, as suggested by Pennebaker and colleagues (e.g., Pennebaker & Graybeal, 2001).

The following hypotheses concern short-term effects of the guided written disclosure intervention:

H9: Participants will report higher levels of negative moods and signs of physiological arousal after each writing session than they reported before the beginning of each session.

H10: Participants will rate their essays as becoming increasingly more personal and as revealing increasingly more of their emotions after each session. This will serve as a manipulation check, as this will show that participants became more personally engaged and emotionally involved with the writing task with each session.

# CHAPTER 2

# METHOD

## Participants

Participants were recruited from the undergraduate population of students at the University of North Texas (UNT), located in Denton, Texas. UNT has a student body of 30,183 students; 71% are Caucasian, 10.1% are African-American, 8.7% are Hispanic, 0.9% are Asian-American, 4% are Native American, and 5.2% are of other ethnicities. Participants were recruited in one of two ways. One group of participants was recruited by offering a course in the UNT psychology department entitled "Writing About Stressful Experiences" that was worth one credit hour and was taught by me. Students enrolled in this class had the option of participating in the study if they so chose and their grades for the course were not affected by non-participation. On the first day of the class, I explained what participation in the study would entail, that there was no pressure for them to participate, and that their grade for the class would not be affected by non-participation. No students in the class declined to participate. Classes were spaced one week apart. Seventeen participants were recruited in this manner.

Participants were also recruited by posting the title and a brief summary of the study on a Web site designed by the psychology department for the purpose of recruiting students for psychological studies. Interested students could then sign up for the study. Twenty-one participants were recruited in this way. All participants received five extra credit points that could be used in any psychology class for which the instructor accepted extra credit points. Therefore, a total of 38 participants were recruited for the present study. However, of these 38 participants, only 30 completed all four writing sessions (completers), whereas eight participants completed pre-writing measures and from one to three writing sessions (non-completers). Of

these eight non-completers, six also completed one month follow-up measures. There were no statistically significant differences between completers and non-completers on any demographic variables. Table 1 shows important demographic characteristics of both groups of participants.

*Completers*

Completers ranged in age from 17 to 51 years, with an average age of 22.4 years (*SD* = 7.02). Twenty-two were females and eight were males. Thirteen were Caucasian, seven were Hispanic, six were African-American, two were Asian, and two were of another ethnicity. Number of years of reported education ranged from 12 to 16 years, with an average of 13.21 years (*SD* = 1.4). All completers reporting experiencing at least one traumatic event in their lifetime, and the average number of lifetime traumas was 4.43. Participants ranked their traumas on a 7-point scale (see below), where 1 = *not at all traumatic* and 7 = *extremely traumatic*; the average ranking for completers was 4.7. Therefore, all completers had experienced a traumatic event and the traumas experienced were considered to be, on average, at least somewhat traumatic. The average number of childhood traumas experienced by completers was 2.4, with an average trauma ranking of 5. The average number of recent traumas was 2.03, with an average recent trauma ranking of 4.4. Examination of the types of traumas experienced by completers revealed that the traumas experienced were of a very serious nature.

Regarding childhood traumas, 18 (60%) had experienced the death of a friend or family member, 13 (43.3%) experienced a parental upheaval, 6 (20%) experienced a traumatic sexual experience, 5 (16.7%) had experienced violence of a non-sexual nature, 11 (36.7%) had been extremely ill or injured, and 19 (63.3%) experienced another type of traumatic event. Other types of childhood traumatic events noted by completers included a family move, family member

incarcerated, abandonment by parents, parental infidelity, automobile accident, and learning that he/she was adopted.

Regarding recent traumas, 10 (33.3%) reported experiencing the death of a family member or friend, 7 (23.3%) had a relationship upheaval, 3 (10%) reported a traumatic sexual experience, 4 (13.3%) were the victim of violence of a non-sexual nature, 6 (20%) reported being extremely ill or injured, 17 (56.7%) experienced a sudden change in work/career, and 14 (46.7%) reported experiencing another type of traumatic event, including going to college, having an eating disorder, being incarcerated, and failing classes.

Four completers (13.3%) reported being diagnosed with a psychiatric disorder in the past; only one (3.3%) reported currently being diagnosed with a psychiatric disorder. Fifteen completers (50%) reported past engagement in outpatient psychotherapy; two (6.7%) reported currently attending psychotherapy. Twenty-three completers (76.7%) reported keeping a journal or diary in the past; 12 (40%) reported currently keeping a journal or diary.

## Measures

### *Demographic Questionnaire*

The demographic questionnaire used in the present study is attached in its entirety in Appendix A.

### *Childhood Traumatic Events Scale (CTES) and Recent Traumatic Events Scale (RTES)*

The CTES and the RTES (Pennebaker & Susman, 1988) are brief surveys of the experience of six traumatic events and the degree to which the individual confided to others that he/she had experienced the trauma. The CTES and RTES have been used in many studies done

by Pennebaker and colleagues (e.g., Pennebaker & Susman, 1988). The CTES is attached in full in Appendix B, and the RTES is attached in full in Appendix C. The CTES queries whether an individual experienced, before the age of 17, a death of a very close friend or family member, a major upheaval between her/his parents such as divorce or separation, a traumatic sexual experience, violence perpetrated against the respondent, a debilitating illness or major injury, or another form of traumatic experience not named. The RTES queries whether the respondent experienced any of the same traumas after the age of 17. These questions are answered in a dichotomous yes/no format. If respondents endorse having experienced any of these traumas, they are asked to rate how traumatic each experience was on a 7-point scale, where 1 = *not at all traumatic*, 4 = *somewhat traumatic*, and 7 = *extremely traumatic*. They are then asked to rate how much they confided in others about each traumatic experience on a 7-point scale, where 1 = *not at all*, 4 = *somewhat*, and 7 = *a great deal*. Barsky, Wool, Barnett, and Cleary (1994), in a study of adult hypochondriacal patients, reported that these measures have "been shown to be reliable and valid" (p. 398). In addition, Barsky et al. (1994) were able to differentiate hypochondriacal from non-hypochondriacal patients in a general medical outpatient clinic based on scores on the CTES and RTES. Pennebaker and Susman (1988) found that participants who endorsed experiencing a trauma on either the CTES or the RTES and who also endorsed not confiding to others about the trauma were far more likely than a control group who did not endorse experiencing a trauma to have reported both major and minor health problems.

From these measures, it was determined what traumatic experience a participant would write about during the study. Participants were asked to write about a trauma that they rated at least a 5 regarding how traumatic the experience was, and that they confided to others about very little (equal to or lower than a rating of 4). These measures were also used to explore whether the

effects of writing about one single trauma are affected, positively or negatively, by the experience of multiple traumas.

*Activities and Behaviors Questionnaire*

The Activities and Behaviors Questionnaire (Pennebaker, Colder, & Sharp, 1990; attached in its entirety in Appendix D) is a brief survey of health-relevant behaviors. It asks respondents to indicate how many times, in the past week, they have engaged in behaviors such as exercising, visiting a physician, eating too much at one meal, attending a social function, reading, or writing down their deepest thoughts and feelings. It also asks respondents to indicate how much they have consumed of the following: alcoholic beverages, prescribed drugs, cigarettes, nonprescribed drugs, cups of coffee, snacks with sugar, aspirin or other pain relievers, and vitamins. This measure has been used in virtually all past studies of written disclosure performed by Pennebaker and colleagues (e.g., Pennebaker, Colder, & Sharp, 1990). Participants completed this measure before the first writing session and again at one-month follow-up.

*The Pennebaker Inventory of Limbic Languidness (the PILL)*

The PILL (Pennebaker, 1982; attached in its entirety in Appendix E) is a 54-item scale that taps the frequency of occurrence of a group of common physical symptoms and sensations respondents have experienced in the past month, such as ringing in the ears, lump in the throat, asthma or wheezing, chest pains, insomnia, tightness in the chest, and nausea. It also asks respondents to indicate, in the past month, the number of times they have made visits to a physician for illness, the number of days they have been sick, and the number of days their activity has been restricted due to illness. The frequency of occurrence of symptoms in the past

month is indicated on a 5-point scale where 1 = *have not experienced the symptom*, 2 = *once*, 3 = *2 or 3 times*, 4 = *every week or so*, and 5 = *more than once every week.* Cronbach alphas for the PILL range from .88 to .91; 2-month test-retest reliability ranges from .79 to .83 (Pennebaker & Beall, 1986). The PILL has been scored by summing up the total number of items on which individuals score 3, 4, or 5 (more than two times). With this strategy, the mean score is 17.9 (*SD* = 4.5) based on a sample of 939 college students. For the present study, the PILL was scored in this same manner. This measure was given to participants before the first writing session and at one-month follow-up.

*NEO-FFI*

The NEO-FFI (Costa & McCrae, 1992) is a 60-item short form of the NEO-PI-R. It assesses five major domains of normal adult personality: Neuroticism (*N*), Extraversion (E), Openness to Experience (O), Agreeableness (A), and Conscientiousness (C). The NEO-FFI is based on the Five Factor Model of personality, which has been called an adequate taxonomy (Norman, 1963), a gold standard for personality models, or a robust taxonomy of personality (see Digman, 1990; Goldberg, 1993; John, 1991 for theoretical and historic reviews of the five-factor model). The psychometric properties of the NEO-FFI are very good, with reliabilities ranging from .86 to .95, and validity has been demonstrated in a variety of ways (Costa & McCrae, 1992). The authors have also found links between the five factors, psychological well-being (high scores on well-being scales relate to high scores on E, A, C, but low scores on *N*), and coping style (positive coping styles related to high E and O scores; negative coping styles are related to high *N* scores). The NEO-FFI consists of 60 statements and responses to statements range from SD (*strongly disagree*) to SA (*strongly agree*) and are scored on a 0 to 4 scale.

*Impact of Events Scale (IES)*

The IES (Horowitz, Wilner, & Alvarez, 1979; attached in its entirety in Appendix F) taps two categories of response to a specific past trauma: intrusion, defined as intrusively experienced ideas, images, feelings, or bad dreams related to the specific trauma, and avoidance, defined as consciously recognized avoidance of certain ideas, feelings, or situations having to do with the specific trauma. The IES has been used as a process measure in many other written disclosure studies (e.g., Lutgendorf & Antoni, 1999; Smyth, True, & Souto, 2001). Respondents are asked to identify a certain, specific trauma (in the case of the present study, the trauma they wrote about) and respond to 15 items assessing the frequency of intrusive thoughts (e.g., "I had dreams about the event") or attempts to avoid thinking about the event (e.g., "I tried not to talk about it") for the past seven days. Items are rated on a 4-point scale, and possible ratings consist of 0 (*not at all*), 1 (*rarely*), 3 (*sometimes*), and 5 (*often*). Intrusion and avoidance scores consist of the sums of the relevant item subsets. Cronbach's alphas range from .79 to .92 for intrusion, and from .82 to .91 for avoidance (Zilberg, Weiss, & Horowitz, 1982). The IES is one of the most widely used self-report instruments designed to assess posttraumatic stress reactions. In a recent review of this scale, Joseph (2000) concluded that the IES has good psychometric properties, although it should not be used as a diagnostic instrument. The most frequently raised reservation about this scale is that it does not assess all three of the criteria for PTSD; specifically, it does not assess the criterion of hyperarousal. This limitation, however, does not seem to prevent the IES from being an effective screener for PTSD. Several cutoff points on this continuum have been suggested in the literature to distinguish potential PTSD cases from noncases. For example, Horowitz (1982) suggested that a score of 19 indicates a high level of clinical concern. Bryant and Harvey (1996) used a score of 30 to define PTSD cases in victims of motor vehicle

accidents. Neal et al. (1994) found a sensitivity of 89% and a specificity of 88% with the IES with a cutoff score of 35 in a sample of 70 patients referred to a PTSD unit in a hospital.

*Hopkins Symptom Checklist (HSCL)*

The HSCL (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974) is a 58-item self-report symptom inventory that taps current (in the past week) psychological symptom status. The HSCL is scored and interpreted in term of five primary symptom dimensions and one global index of distress. The primary symptom dimensions and abbreviations are: Somatization (SOM), Obsessive-Compulsive (OBS), Interpersonal Sensitivity (INT), Depression (DEP), and Anxiety (ANX). The global index of distress is the total of all 58 items. These indices reflect both intensity of distress and prevalence of symptoms in each symptom dimension and across symptom dimensions. Internal consistency coefficient alphas for all symptom dimensions are uniformly high, and are as follows: SOM = .87, OBS = .87, INT = .85, DEP = .86, ANX = .84 (Derogatis, et al., 1974). Item-total correlations were also calculated for the items contributing substantially to each dimension, with all of them being above .50, and most at about .70, which indicates substantial shared common variance among items. Test-retest stability over one week was calculated, and the coefficient alphas are as follows: SOM = .82, OBS = .84, INT = .80, DEP = .81, ANX = .75. Criterion-related validity of the HSCL was established by demonstrating the sensitivity of the symptom dimensions of the HSCL to the effects of psychotropic drug treatment in outpatient samples diagnosed with various psychological disorders (e.g., Depression, anxiety disorders; Derogatis, et al., 1974).

*Before-Writing Questionnaire and After-Writing Questionnaire*

These questionnaires (Richards, Beal, Seagal, & Pennebaker, 2000; attached in their entirety in Appendices G and H, respectively) assess the respondent's current experience of 8 physical symptoms and 8 moods. These questionnaires have been used extensively in past written disclosure studies as measures of the immediate effects of writing about traumas on mood and physiological arousal. All items are rated on a 5-point scale, where 1 = *not at all* and 5 = *a great deal*. The physical symptoms consist of racing heart, upset stomach, headache, dizziness, shortness of breath, cold hands, sweaty hands, and pounding heart. The moods consist of nervous, sad, guilty, contented, fatigued, constrained, and anxious. Cronbach's alphas are reported to be .81 for moods and .76 for physiological arousal (Richards, Beal, Seagal, & Pennebaker, 2000). In addition, Richards, Beal, Seagal, and Pennebaker (2000) reported that the measures "have high construct validity when compared with other measures of anxiety" (p. 158). The After-Writing Questionnaire also contains 5 items that assess the respondent's feelings about the writing that he/she did on that day that are rated on the same 5-point scale. These questions consist of: "Overall, how personal was the essay that you wrote today?" "Overall, how much have you told other people about what you wrote today?" Overall, how much did you reveal your emotions in what you wrote today?" "How much have you wanted to tell another person about what you wrote today?" and "How much have you actively held back from telling others about what you wrote today?"

*Last Day of Writing Questionnaire*

The Last Day of Writing questionnaire (Pennebaker, Colder, & Sharp, 1990; attached in its entirety in Appendix I) is a 17-item questionnaire that assesses participants' moods and

beliefs on the last day of writing concerning the essays they wrote and the experiment itself. This questionnaire has been used in nearly all previous written disclosure studies, and consists of questions such as "Overall, how personal were the essays you wrote?" "Overall, how much did you reveal your emotions in what you wrote?" "In general, how sad or depressed have you felt over the last 3 weeks?" and "To what degree has this experiment been valuable or meaningful for you." Respondents rate the items on a 7-point scale, where 1 = *not at all* and 7 = *a great deal*. There are also 2 open-ended items at the end of the questionnaire. These are: "In your own words, what do you think this experiment is trying to prove?" and "Any comments that you have about the experiment would be greatly appreciated."

*Longterm Thoughts about the Writing Experiment Questionnaire*

This questionnaire (Pennebaker, Colder, & Sharp, 1990; attached in its entirety in Appendix J) is very similar to the Last Day of Writing Questionnaire, but the questions query participants' more long-term (i.e., one month later) moods and beliefs regarding the experiment, as many prior written disclosure studies have found moods and beliefs regarding the writing experiment to change over longer periods of time.

## Procedure

Participants were recruited in two ways. A psychology course was offered at UNT in the Spring 2006 semester entitled "Writing About Stressful Experiences." The class was worth one credit hour and met once per week for 50 minutes. Students who enrolled in the class were told that they could also elect to participate in a research study that would take place during class periods, but that they could refuse participation and that refusal would have no effect on their

grade. Students were also recruited electronically by posting an announcement on the Sona system available at the UNT psychology department Web site. The Sona system is a Web-based listing of available research studies for which undergraduate students can volunteer in order to receive extra credit applicable to any psychology classes taught at UNT. The title of the study read: "Writing about stressful experiences," and the description read: "participation in this study involves completing questionnaires and writing about a stressful experience in 4 separate sessions, once per week, over a course of 4 weeks. Students will then complete questionnaires one month after the writing is completed. Extra credit = 5 credits." The principal investigator also approached instructors of psychology courses and asked them to announce the study in their classes and to inform students that they can go to the Sona website to sign up for participation.

Potential participants signed up for a specific date and time period when they volunteered for the study on the Sona system. They were then contacted by email by the Sona system on the day before their selected date/time slot to confirm their participation and the time slot for which they volunteered. Five participants could sign up for each time slot posted.

At the initial session, participants who signed up via the Sona system were led by me to a private research room located in Terrill Hall, which houses the UNT psychology department. The participants then sat at a table on which pens for participants to use and tablets of lined paper were available. At this time, the participants first read the informed consent form (attached in Appendix K) that outlined the general purposes and structure of the study. The purposes of the study as listed were very general so that demand characteristics, self-fulfilling prophecies, and placebo effects would have little influence on the results. The informed consent form further provided a description of the procedures to be used, an acknowledgement that writing may cause some discomfort in the form of depressed feelings and reminders of a stressful experience, a very

general description of the possible benefits of the study to participants so as not to influence subsequent health ratings, and a detailed description of how all essays would be completely anonymous and would remain confidential (detailed below). The informed consent form further listed my telephone number and the telephone numbers of the faculty sponsor of the research, the psychology department, the UNT Counseling and Testing Center, and the UNT Student Health and Wellness Center should the participants feel the need to talk with someone about their participation in the study. After participants acknowledged that they understood the informed consent form and were given time to ask any questions regarding the study, the participants signed and received a copy of the consent form. At this time, the participants were assigned a code number between 001 and 039 and instructed to write this number, and not their name, on all subsequent measures and essays. He/she was informed that this code number will remain confidential and will be traceable to their name only by the principal investigator and by no one else. The principal investigator then recorded the participants' code numbers on a sheet of paper that was kept confidential. Furthermore, the participants were instructed not to include any personally identifiable information regarding her-/himself or any other persons in their written disclosure essays.

The participants then completed the Childhood Traumatic Events Scale and the Recent Traumatic Events Scale in order to determine the traumatic experience that the participants would write about. When these scales were completed, the participants were asked to write about a trauma that he/she rated at least a 5 (on a scale of 1-7) regarding how traumatic the experience was and that she/he had confided to others about very little (equal to or lower than a rating of 4, also on a scale of 1-7). When this was accomplished, the participants were then asked to write her/his code number on and complete the demographic questionnaire, the NEO-FFI, the HSCL,

the PILL, and the Activities and Behaviors Questionnaire. The participants were then asked to complete the IES and were instructed to answer the questions on the IES specifically regarding the trauma that was selected to write about. All measures were marked only with the participant's code number, and with no other identifying information.

When these measures were completed, the participants were asked to complete the Before-Writing Questionnaire that taps symptoms of physiological arousal and moods. Next, I supplied the participants with writing tablets consisting of yellow, wide-ruled paper and a large manila envelope. The following instructions were then given to the participants orally and copies of the instructions were given to them on a separate sheet of paper:

> You were just asked to complete a questionnaire that asked you about your experience of several different traumatic experiences, and one was selected by you and me for you to write about throughout this study. I would now like you to write a brief account of that traumatic experience. You may choose to write about the experience in any way you see fit and about whichever aspects of the event you want.
>
> You will be given these instructions on a sheet of paper to keep with you while you write, so please refer to them as often as you need. Please allow yourself approximately 15-30 minutes to write your account in this way. When you are finished, please fold your essay, put it in the envelope supplied to you, seal the envelope, and give the envelope to me. At the next writing session, you will be given the sealed envelope containing your essay to use while you write the next essay. Remember, ***your essay will remain anonymous*** – no one but me will know who wrote which essay. Your essays will be kept confidential and in a secure place so that no one can read them. The only

identifying information that will be attached to your essay will be your code number and no one but me will be able to attach your name to that code number.

Some people find writing about a traumatic experience upsetting, and may cry, feel sad or depressed afterward. This is quite normal, and you will be allowed as much time as you want when you have finished writing to compose yourself. When you are ready, please inform me that you are done. Furthermore, on the informed consent form that you signed, there are telephone numbers listed for places you can contact should you feel the need to talk to someone later. Thank you very much for your continued participation in this study. Your next scheduled writing session will occur on _____ at _____ am/pm.

When a participant indicated that she/he was finished with the essay, I asked the participant to complete the After-Writing Questionnaire. The participants' next writing session was then scheduled and written down on the instruction sheet for the participant to take with her/him. The participant was then thanked and reminded of the importance of participating in all four writing sessions.

In subsequent writing sessions, the participants were greeted by me, led to a private room in Terrill Hall, given the Before-Writing Questionnaire to complete and given the instructions and procedures as outlined in the Guided Written Disclosure Protocol (GWDP) section below. The sealed manila envelope in which the essays they had already written were kept were then supplied, along with an instruction sheet for writing that session's essay, a writing tablet, a new manila envelope, and pens. After the participant was finished writing the session's essay, she/he was asked to complete the After-Writing Questionnaire. All participant materials (measures, essays, informed consent forms) were kept in a locked filing cabinet where they remained locked

throughout the duration of the study. Only the manila envelopes containing participants' essays were removed from the filing cabinet on the days of that participant's writing sessions. At each writing session, the participants received their manila envelopes still sealed so that they remained confident that the essays remained confidential, and a new envelope in which to seal that session's and the previous sessions' essays.

After the last writing session was completed, in addition to the After-Writing Questionnaire, the participants were asked to complete the Last Day of Writing Questionnaire. A one-month follow-up session was then scheduled with each participant, and this date was recorded on the last day's writing instruction sheet for the participant to take with him/her. The participants were also informed that I would contact him/her one week before and again on the day prior to his/her scheduled follow-up session as a reminder of the time and place of the follow-up session.

At the one-month follow-up session, the participants were led to a private room in Terrill Hall and asked to complete several self-report measures. These measures were the HSCL, the IES, the PILL, the Activities and Behaviors Questionnaire, and the Longterm Thoughts about the Writing Experiment Questionnaire. When these were completed, the participants were informed that they could receive information about the results of the study at a future date and how to go about getting those results. They were also informed of all of the hypotheses of the study, given a brief synopsis of the findings of past written disclosure studies, and given a list of reference books, journal articles, and websites that supply information regarding the effects of writing about traumatic experiences.

The procedure differed slightly for participants who completed the study and were also enrolled in the class "Writing About Stressful Experiences." The class met once per week and all

students were informed about the procedures involved in the study on the first day that the class met. Students were then asked if they wanted to participate in the study and informed that participation or non-participation in the study would have no effect on their grades for the class. All students enrolled in the class agreed to participate. Informed consent forms were then distributed, explained, and signed by the participants and me. Participants then completed all pre-writing measures, as described above. The first class meeting was then concluded.

At the next class meeting, which took place one week later, participants were given writing tablets and large envelopes, and the instructions for the first writing session were read. For the first and remaining three sessions, the procedure followed the same general guidelines as outlined above for Sona participants, but writing took place in a large group format. During the three classes between the final writing session and the session in which follow-up measures were completed, there was no discussion of the study, of the research literature on written disclosure, and participants were asked not to pursue any information on the subject outside of class. After follow-up measures were completed, class discussion focused on the rationale for the study, the hypotheses, and on the large literature base on written disclosure of traumatic events.

*Guided Written Disclosure Protocol (GWDP)*

The GWDP that was used in the present study was developed by me for use in this study. It was designed to guide participants in writing a complete narrative account of their selected trauma so that the finished product (i.e., the final essay) included and elaborated on these seven elements of narrative completeness: (1) episodes in the story are arranged sequentially and episodically, (2) events are connected causally so that causes and consequences of the events in the narrative are explained, (3) characters are developed and causes and consequences are linked

to characters, (4) affect is evoked and described, made sense of, and connected to characters and events, (5) some meaning is drawn from the events relayed within the narrative, (6) the narrative is coherent to others reading it, and (7) the narrative includes an evaluation of the participants' own role in the events, be it a positive or negative evaluation. Participants were guided in including and elaborating on these seven elements in their narrative by a series of probes given to participants before the second, third, and fourth writing sessions. In the first writing session, participants wrote about the selected trauma without any instructions to include or elaborate on elements of the story (outlined in *Procedure* section). In subsequent writing sessions (i.e., second, third and fourth sessions), I first verbally relayed the instructions/probes to participants, and participants were then given a sheet of paper with the instructions/probes listed, so that they would be able to have them on hand and refer to them as often as needed while writing. Day 1 of the GWDP focused on elements 1, 2, and 3 of narrative completeness; Day 2 of the GWDP focused on elements 4 and 5; and Day 3 of the GWDP focused on elements 6 and 7.

Day 1 of the GWDP posed instructions to participants that were aimed at guiding them in connecting episodes of the event sequentially and episodically, in connecting events causally so that causes and consequences are explained, and in developing the characters of the story so that causes and consequences are linked to characters. The instructions for this day were as follows, and were adapted from previous writing studies (e.g., Smyth, True, and Souto, 2001):

> Last week, you were asked to answer some questions about certain traumatic experiences, and one traumatic event that you experienced was picked for you to write about. In the first session, you wrote about the experience with little instruction from me. I would now like for you to write about that event again. Don't worry about grammar, spelling, or

sentence structure. There *are,* however, three important elements of your experience that I would like you to focus on and elaborate on this time as you write. These are:

- I want you to focus on the timeline of the story, making sure that the events in your story are in the same order that they actually occurred. In other words, make sure that the events in the story are arranged sequentially, in *the order they happened*. If you feel like you can't remember the order of events, take a moment to reflect on the events and then write the events in the order that makes the most sense to you.
- As you write about your experience, please focus on the *causes and consequences* of the chain of events, on what caused what, and on what happened because of prior events. For example, "I needed milk, *so* I got in my car and turned the ignition, *which caused* the engine to start. *Therefore,* I drove to the store, where I bought milk." Again, please try to focus on the *causes and consequences* of the events in your story.
- Please focus also on the characters in the story and try to tell *who* they are, what their *role* in the events was, what each character may have *caused,* and what *happened* to each character. In other words, try to *develop* your characters like authors do in novels or books.

You will be given these instructions on a sheet of paper to keep with you while you write, so please refer to them as often as you need. Please allow yourself approximately 30 minutes to write your account in this way. When you are finished, please fold your essays, put them in the envelope provided to you in the first writing session, seal the envelope, and give the envelope to me. Remember to put all of your

essays in the envelope. At the next writing session, you will be given the sealed envelope containing your essays to use while you write the next essay. Remember, ***your essays will remain anonymous*** – no one but me will know who wrote which essay. Your essays will be kept confidential and in a secure place so that no one can read them. The only identifying information that will be attached to your essay will be your code number and no one but me will be able to attach your name to that code number.

Your next scheduled writing session will occur on _____ at _____ am/pm.

Day 2 of the GWDP posed instructions/probes to participants that were aimed at guiding them in evoking and describing the affect involved in the experience, in making sense of the affect, in connecting the affect to characters and events, and in describing or realizing any meaning that can be drawn from the events relayed within the narrative. The instructions for this session were as follows:

You've written about your selected traumatic experience twice now, once with little instruction on what to include in your account and once with instructions to include and elaborate on certain elements of the event. Your sealed envelope containing your anonymous essays was given to you when you arrived today. I would now like for you to write about that event again. Again, don't worry about grammar, spelling, or sentence structure. When I leave the room, please open the sealed envelope and briefly read your essays that you wrote previously. After you briefly read those essays, I would like you to write about your trauma again. This time, however, I would like you to focus on some other aspects of your experience as you write. Please keep the parts of your essay that you wrote about and elaborated on in the last session in today's essay. Those elements

were: making sure that the events in the story were arranged sequentially, in *the order they happened*; focusing on the *causes and consequences* of the chain of events; and *developing* your characters like authors do in novels or books. This time, I would like you to focus on and write about these two other elements of your experience as you write:

- Your deepest feelings/emotions and sensations having to do with the experience. Describe the feelings and sensations you had *before* the event occurred, your feelings and sensations *while the event was occurring*, and your feelings and sensations *after* the event occurred. Also, describe *why* you believe you had those feelings/sensations and *who or what* caused those feelings/sensations. The important thing is that you really let yourself go and touch those deepest emotions or feelings you have or had regarding the event.
- Write about how the event changed your life and what meaning you drew, or can draw now, from the event. You might write about how the event affected your relationships with others, including parents, lovers, friends, or relatives; your past, your present, or your future; or who you have been, who you would like to be, or who you are now. The event may seem like it has no meaning, but really try to find *some* meaning or significance to the event.

You will be given these instructions on a sheet of paper to keep with you while you write, so please refer to them as often as you need. Please allow yourself approximately 30 minutes to write your account in this way. When you are finished, please fold all of your essays, put them in the envelope provided to you, seal the envelope, and give the envelope to me. Remember to put all of your essays in the envelope. At the next writing session, you will be given the sealed envelope containing

your essays to use while you write the next essay. Remember, ***your essays will remain anonymous*** – no one but me will know who wrote which essay. Your essays will be kept confidential and in a secure place so that no one can read them. The only identifying information that will be attached to your essay will be your code number and no one but me will be able to attach your name to that code number.

Your next scheduled writing session will occur on _____

at _____ am/pm.

Day 3 of the GWDP, the final writing session, posed instructions/probes to participants that were aimed at guiding them in making sure that the narrative was coherent to others reading it, and that the essay included an evaluation of their own role in the events, be it a positive or negative evaluation. The instructions for this session were as follows:

You've written about your selected traumatic experience three times now, once with little instruction on what to include in your account and twice with instructions to include and elaborate on certain elements of the event. Your sealed envelope containing your anonymous essays was given to you when you arrived today. I would now like for you to now write about that event again. Again, don't worry about grammar, spelling, or sentence structure. When I leave the room, please open the sealed envelope and briefly read your essays that you wrote previously. After you briefly read those essays, I would like you to write about your traumatic experience again. This time, however, I would like you to focus on some other aspects of your experience as you write. Please keep the parts of your essay that you wrote about and elaborated on in the last session in today's essay. Those elements were: making sure that the events in the story were arranged sequentially, in *the order they happened*; focusing on the *causes and consequences* of the chain of

events; *developing* your characters like authors do in novels or books; your deepest feelings/emotions and sensations having to do with the experience; and how the event changed your life and what meaning you drew, or can draw now, from the event. This time, I would like you to focus on and write about these two other elements of your experience as you re-write your essay:

- *Is your account of your experience written coherently, in a way that would make sense to other people reading your essay, like a story in a book.* In other words, try to make your essay *a good read* for other people. You may pretend that you are someone else reading your essay. If you come across a part of your essay that seems confusing, please attempt to make it more understandable in any way you see fit, but please do not leave out any of the elements you were asked to include in previous writing session.
- Include your evaluation, *from your current perspective,* of how you acted in the situation, including an evaluation of your reactions, your behavior during the event and afterward, and the emotions you had during and after the event. Furthermore, include how your evaluation of your reactions/behavior/emotions may have changed since the event and how you evaluate your reactions/behavior/emotions NOW, presently.

You will be given these instructions on a sheet of paper to keep with you while you write, so please refer to them as often as you need. Please allow yourself approximately 30 minutes to write your account in this way. When you are finished, please fold all of your essays, put them in the envelope provided to you, seal the envelope, and give the envelope to me. Remember to put all of your essays in the

envelope. ***Your essays will remain anonymous*** – no one but me will know who wrote which essay. Your essays will be kept confidential and in a secure place so that no one can read them. The only identifying information that will be attached to your essay will be your code number and no one but me will be able to attach your name to that code number.

Thank you very much for your participation in this study. Remember, ***your essays will remain anonymous*** – no one but me will know who wrote which essay. Your essays will be kept confidential and in a secure place so that no one can read them. The only identifying information that will be attached to your essay will be your code number and no one but me will be able to attach your name to that code number. I cannot begin to tell you how much I appreciate your help with this project. You are asked to meet one more time with me in approximately 30 days to complete some questionnaires, but you will not be asked to write about your experience again. This meeting, however, is very important for the study. You are scheduled to meet with me for the last time on

_____ at _____ am/pm.

*Judges' Ratings of Essays*

Participants' essays were rated by two graduate student judges in order to assess the narrative completeness of essays. Judges worked independently in an attempt to increase the accuracy and objectivity of somewhat subjective criteria. Each judge was responsible for rating half of the total number of participants' essays, as well as a subset of essays that were also scored by the other judge in order to establish interrater reliability. Judges were blind as to who wrote which essays, and each participant's essays were not linked, so that judges did not know which

four essays were written by the same participant. Each judge did, however, read and rate all four essays by a given participant, but in a randomized fashion. For each essay, judges used a 7-point unipolar scale, where 1 = *not at all* and 7 = *a great extent* to answer the following 7 questions: (1) To what extent in this essay are episodes arranged sequentially and episodically? In other words, to what extent do the events in the essay seem to be arranged in the order in which they occurred? (2) To what extent are the events in the essay connected causally, so that causes and consequences of the events are explained? (3) To what extent are characters developed, and causes and consequences linked to characters? In other words, to what extent does the writer tell *who* the characters are, what their *role* in the events was, what each character may have *caused,* and what *happened* to each character? (4) To what extent is affect evoked and described, made sense of, and connected to characters and events? In other words, to what extent did the writer seem to touch on his/her deepest emotions and sensations having to do with the experience? (5) To what extent does the writer draw meaning from the events relayed in the narrative? In other words, to what extent did the writer write about how the event changed her/his life and the meaning he/she drew, or can draw now, from the event? (6) To what extent is the essay written coherently? In other words, to what extent is the essay a "good read?" (7) To what extent does the essay include an evaluation of the author's own role in the events, be it a positive or negative evaluation?

*Inter-rater Reliability*

Judges' ratings of each element of narrative completeness of participants' essays were averaged to form a composite narrative completeness rating for each essay. Following the rating, both raters exchanged and rated all essays for eight total participants in order to assess the inter-

rater reliability of composite completeness ratings. Therefore, each judge scored a total of 32 essays that the other judge also rated. Inter-rater reliability was examined, first, by performing a two-way ANOVA, with essay number as the within-subjects variable and judge number as the between-subjects variable. For this analysis, the ratings for all four essays of four subjects rated by Judge 1 were randomly chosen to be compared to ratings of four subjects' essays by Judge 2. For essay one, the mean composite rating by Judge 1 was 4.75 (*SD* = .65), whereas the mean composite rating for Judge 2 was 4.71 (*SD* = 1.5). For essay two, the mean composite ratings by both judges was 4.86 (Judge 1 *SD* = .98; Judge 2 *SD* = 1.35). For essay three, the mean composite rating by Judge 1 was 5.43 (*SD* = 1.06), and the mean composite rating by Judge 2 was 5.54 (*SD* = .52). Finally, for essay four, the mean composite rating by Judge 1 was 5.47 (*SD* = .91), whereas the mean composite rating for Judge 2 was 5.57 (*SD* = .31). ANOVA revealed no main effect for judge, $F(1, 6) = .021$, $p = .889$. This yielded an overall intraclass correlation (ICC) of .92, demonstrating that the effect of judge on the variability in ratings was minimal.

To further examine interrater reliability, another two-way ANOVA was performed comparing all essays rated by each judge. Therefore, the composite ratings of all four essays by 15 participants rated by Judge 1 were compared to the composite ratings of all four essays by the remaining 15 participants rated by Judge 2. Again, essay number served as the within-subjects variable and judge number served as the between-subjects variable. The mean rating by Judge 1 on essay 1 was 3.29 (*SD* = .85), whereas the mean rating for Judge 2 was 3.78 (*SD* = 1.21). The mean rating by Judge 1 on essay 2 was 4.14 (*SD* = .72), whereas the mean rating for Judge 2 was 4.37 (*SD* = 1.2). On essay 3, the mean rating for judge 1 was 5.14 (*SD* = 1.06), and the mean rating for Judge 2 was 5.4 (*SD* = .93). Finally, on essay 4, the mean rating for Judge 1 was 5.46 (*SD* = .9), whereas the mean rating for Judge 2 was 5.57 (*SD* = .75). Analyses revealed no

significant main effect for Judge, $F$ (1, 28) = .728, $p$ = .401. Therefore, ratings of the judges did not differ significantly across essays. The ICC for this analysis was .85. Thus, adequate inter-rater reliability was established. There was a main effect for essay, $F$ (3, 84) = 78.1, $p$ < .001. Post-hoc analyses revealed that overall judges' ratings were significantly different on essay one, two, three, and four. Thus, judges' average rating for essay two was greater than the average for essay one, greater for essay three than for essay two, and greater on essay four than on essay three.

*Computer Text Analysis (LIWC)*

In addition to judges' ratings, all essays were analyzed by a computerized text analysis program called Linguistic Inquiry and Word Count (LIWC; Pennebaker & Francis, 1996). LIWC was developed by having groups of judges first generate word categories. Over 2,100 words or word stems were then generated by judges, a Thesaurus, dictionaries, emotion and other types of questionnaires, and analyses of words used by samples of participants from past written disclosure studies. Judges then rated the degree to which these words were related to each of the 72 word categories generated. Three judges independently determined if a word should go into each category, and a word was entered into a category if at least two judges agreed that it should be included in that category. Reliabilities were computed and it was found that percentage agreement between judges regarding word categorization was 93.1%. A second wave of judgments were made by a new group of judges, and the judgments involved the broader categories to which words belonged, such as all negative words or all cognitive strategy words (Pennebaker, Mayne, & Francis, 1997). The finished product (i.e., the LIWC program) analyzes text files and computes the total number of words, total number of sentences, percentages of

unique words, dictionary words, and the percentage of words that fall into 72 word categories. The sums of each of the categories are converted to percentage of total words.

Word categories in LIWC are subsumed under broader headings, which include *Standard Linguistic Dimensions, Psychological Processes, Relativity,* and *Personal Concerns.* These headings are then broken down into more specific categories within each broad category, which are then broken down again into even more specific word categories. The present study focused on the broad category of *Psychological Processes.* This broad category includes Affective or Emotional Process words, which subsumes positive emotion, positive feeling, optimism and energy, negative emotion, anxiety or fear, anger, and sadness or depression words; Cognitive Process words, which subsumes causation, insight, discrepancy, inhibition, tentative, and certainty words; Sensory and Perceptual Process words, which subsumes seeing, hearing, and feeling words; and Social Processes, which subsumes communication, other references to people, friends, family, and human words. For the present study, the main specific word categories of interest were those that have been found to be related to health benefits realized in past written disclosure studies. These included positive emotion, negative emotion, causation, and insight words. A complete list of LIWC word dimensions, categories, subcategories, and examples of representative words is attached in Appendix K.

# CHAPTER 3

# RESULTS

## Hypotheses

The method by which hypotheses were statistically analyzed will be outlined for each hypothesis separately. First, the hypothesis will be restated, then the measures and statistical procedures that were used to analyze the hypothesis will be outlined. The results reported in the following section will be those that examined only participants who completed all four writing sessions, as well as the pre-test and one month follow-up measures ($N = 30$). These participants will be referred to as "completers." There were eight participants that did not complete all four writing sessions, but who completed pretest and one month follow-up measures. These participants will be referred to as "non-completers." Because they did not receive the full treatment condition, it was reasoned that non-completers would likely dampen the results. However, some important differences emerged between completers and non-completers, and these differences will be outlined in a later section.

H1: One month after the study is completed, participants will report significantly fewer physical symptoms of illness in the past month than they reported at the outset of the study for the previous month. The PILL and the SOM scale of the HSCL served as the dependent measures. Specifically, the PILL was scored by summing up the total number of items scored 3 (*experienced the symptom 2-3 times in the past month*), 4 (*experienced the symptom every week or so*), or 5 (*experienced the symptom more than once every week*) for each participant. Participants completed the PILL prior to the first writing session (pre-test) and again at one-month follow-up (post-test). The PILL scores and the HSCL SOM scale score were then subjected to separate repeated measures analyses of variance (ANOVA) to test for significant

differences between pretest and one month follow-up scores. It was predicted that scores on the PILL and the SOM scale of the HSCL at one month follow-up would be significantly lower than pre-test scores. This hypothesis was not supported. For total PILL scores, the pre-test average score was 11.8 (*SD* = 8.04), whereas the average posttest score was 12.9 (*SD* = 7.9), $F$ (1, 29) = .86, $p$ = .36. For HSCL SOM scale scores, the average pre-test score was .61 (*SD* = .582), and the average posttest score was .45 (*SD* = .533), $F$ (1, 29) = 2.6, $p$ = .118. Therefore, at one month follow-up, participants did not realize any significant self-reported physiological health benefits from following the guided written disclosure protocol in writing about a stressful experience.

H2: One month after the study is completed, participants will report experiencing significantly fewer general symptoms of psychological distress than they reported at the outset of the study. The HSCL total score served as the dependent measure. As the SOM scale of the HSCL taps the experience of physical symptoms related to illness, this scale score was not included in the HSCL total score. The remaining four primary symptom dimensions and the total score (not including the SOM scale) were analyzed. However, a prediction was only forwarded for the total score, which is an overall indicator of the current level or depth of psychological distress. It was predicted that participants' total scores would be significantly lower at post-test than they were at pre-test. To analyze this prediction, total scores were subjected to a repeated-measures $t$-test. Figure 1 shows results for HSCL subscales and total score. As can be seen, the hypothesis was supported. The average total HSCL pretest score was .69 (*SD* = .48), whereas the average posttest score was .55 (*SD* = .42), $t$ (29) = 2.045, $p$ = .05. Thus, participants' overall level and depth of psychological distress was significantly lower one month after the guided written disclosure intervention. The effect size was $r^2$ = .13, and the power to find a significant

difference when one really existed was .51. Thus participants' self-reported psychological distress improved a small, but significant, amount over the course of the study.

The remaining four primary symptom dimensions were subjected to exploratory analyses to determine any specific dimensions of improvement from pre- to post-test. These dimensions were analyzed by conducting a repeated-measures MANOVA using the four primary symptom dimensions as dependent measures. On the OBS scale, the average pretest score was .85 (*SD* = .69), whereas the average posttest score was .66 (*SD* = .61), $F$ (1, 29) = 4.032, $p$ = .05. The effect size of this difference was $r^2$ = .12, and the power to find a significant difference when one really existed was .50. On the INT scale, the average pretest score was .91 (*SD* = .63), and the average posttest score was .76 (*SD* = .64), $F$ (1, 28) = 1.008, $p$ = .324. On the DEP scale, the average pretest score was .67 (*SD* = .59), and the average posttest score was .51 (*SD* = .44), $F$ (1, 28) = 1.9, $p$ = .179. On the ANX scale, the average pretest score was .43 (*SD* = .59), whereas the average posttest score was .31 (*SD* = .37), $F$ (1, 28) = 2.93, $p$ = .098. Thus, participants improved most on the specific domain of obsessive-compulsive thoughts/behaviors at one month follow-up.

H3: One month after the study is completed participants will report fewer intrusive thoughts and avoidance behaviors related to the trauma they wrote about than they reported at the outset of the study. The intrusion and avoidance scores of the IES served as the dependent measures. These scores were subjected to a repeated measures ANOVA, with the prediction that these scores would be significantly lower at post-test than they were at pre-test. As can be seen in Figure 2, this hypothesis was supported. On the intrusion subscale, the average pretest score was 11.9 (*SD* = 9.5), and the average posttest score was 6.98 (*SD* = 7.8), $F$ (1, 29) = 10.204, $p$ = .003. The effect size of this difference was $r^2$ = .26, and the power to find a significant difference was

.87. On the avoidance subscale, the average pretest score was 16.37 (*SD* = 11.6), whereas the average posttest score was 11.95 (*SD* = 11.24), $F$ (1, 28) = 7.23, $p$ = .012. The effect size of this difference was $r^2$ = .20, and the power to find a significant difference was .74. Thus, the guided written disclosure protocol was successful in reducing two symptom domains of PTSD, and this reduction lasted through the one-month follow-up. As an exploratory analysis, the IES total scores were analyzed. The mean pretest IES total score was 28.27 (*SD* = 19.2), whereas the average mean posttest score was 18.93, $F$ (1, 29) = 11.17, $p$ = .002. The effect size of this difference was $r^2$ = .30, and the power to find a significant difference was .90. Thus, the guided written disclosure protocol was successful in reducing participants' PTSD symptoms, and the effect size, or the real-world effect, of this intervention was moderate.

H4: One month after the study is completed participants will report significantly fewer physician visits, days sick, and days in which their activity was restricted due to illness in the past month than they reported at the outset of the study for the previous month. The last three questions of the PILL served as the dependent measures. These questions directly asked participants to report the number of visits made to a physician and the number of days of illness and activity restriction due to illness. These reported visits/days were subjected to a repeated measures multivariate analysis of variance (MANOVA) with the prediction that participants will report significantly fewer physician visits, number of days of illness, and number of days of activity restriction due to illness at post-test than at pre-test. As can be seen in Table 2, this hypothesis was not supported for physician visits, $F$ (1, 29) = .781, $p$ = .38, number of days sick, $F$ (1, 29) = .0, $p$ = 1.0, or mean number of days of activity restriction, $F$ (1, 29) = .851, $p$ = .364.

H5: Judges' ratings of the narrative quality of participants' final essays will correlate negatively with participants' physical and psychological symptom levels one month after the

study is completed. Pearson correlation coefficients were computed, with the prediction that significant negative correlations would be found. That is, higher narrative quality ratings would be associated with lower physical and psychological symptom levels at post-test. The variables examined consisted of the total and all subscale scores of the HSCL, IES total and subscale scores, PILL total scores, and number of physician visits, days sick, and days of activity restriction. As can be seen in Table 3, the hypothesis was not supported, in that none of these variables were significantly correlated with final writing session composite scores.

H6: Rates of increases in narrative quality over the four writing sessions will predict the amount of positive change in physical and psychological symptom levels. Canonical correlations were used to examine the relation between the rates of change in narrative ratings of participant essays across the four writing sessions and rates of change on physical and psychological symptom measures. Canonical correlation computes linear composites of one set of measures that correlate maximally with linear composites of a second set. Participants' rates of change over the course of the four writing sessions were represented by changes in judges' composite narrative completeness ratings across the four essays and changes in LWIC dimensions of positive emotion, negative emotion, causation, and insight words across the four essays. Separate analyses were performed for rates of change in judges' ratings and for changes in LWIC word dimensions, and these measures served as the independent variables. Rates of change on physical and psychological symptom levels were represented by changes on overall PILL scores, the SOM scale score of the HSCL, total scores on the HSCL (not including the SOM scale), and intrusion and avoidance scores on the IES. None of the multivariate or univariate tests reached significance. Thus, neither rates of change in judges' ratings nor in LWIC dimensions across the

four essays were associated with rates of change in psychological or physical symptom levels from pretest to posttest.

Exploratory analyses were then conducted examining the percentages of participants whose essays showed increases and decreases in judges' composite ratings and LWIC dimensions across writing sessions. As can be seen in Table 4, from writing Session 1 to 2 and from Session 2 to 3, many more participants' showed increases in these variables than were seen from Session 3 to 4. Therefore, a canonical correlation was conducted examining only the relation between rates of change in judges' composite ratings and LWIC dimensions across the first three sessions (excluding the fourth session) and rates of change in physical and psychological symptom levels from pretest to posttest. Again, none of the multivariate tests reached significance. However, further examination of the univariate findings revealed that the rate of increase in the use of negative emotion words was significantly correlated with pretest to posttest decrease in IES intrusive symptoms, $t$ (1, 29) = -4.99, $p < .001$. The mean percentage of LWIC negative emotion words used in Session 1 was 1.16 ($SD$ = .67), in Session 2 was 1.19 ($SD$ = .71), and in Session 3 was 1.72 ($SD$ = .81). It is interesting to note that the mean percentage of LWIC negative emotion words in Session 4 was lower at 1.49 ($SD$ = .67), which accounts for why this trend was not evident in the analysis containing all four writing session.

Individual Pearson correlations between rates of increase in negative emotion words from session to session and intrusive symptom decline from pretest to posttest were conducted to more closely examine this association. The correlation was not significant from Session 1 to Session 2 ($r$ = .359, $p$ = .051). The correlation was significant from Session 2 to 3, $r$ = -.503, $p$ = .005. The negative correlation indicates that an *increase* in negative emotion words was significantly associated with a *decrease* in intrusive symptoms over the course of the study. Interestingly, a

significant positive correlation was found ($r$ = .371, $p$ = .043) from Session 3 to 4. Thus, an *increase* in use of negative emotion words from Session 3 to 4 was associated with an *increase* in intrusive symptoms at posttest.

H7: Participant characteristics of age, ethnicity, and education level will have no effect on results of H1, H2, H3, or H4. To examine the participant characteristic of age, the correlation of age with both pretest and posttest PILL totals, HSCL SOM totals, IES intrusive totals, IES avoidance totals, number of physician visits, days sick, and days of activity restriction was computed. None of these correlations were significant. Next, the correlations between age and pretest to posttest difference scores on these measures were examined. Again, none of these correlations were significant. Thus, age was not associated with pretest or posttest physical or psychological symptom levels or with improvement/decline in physical or psychological symptom levels from pretest to posttest.

To examine the effect of ethnicity, participants were divided into two groups, white ($N$ = 13) and non-white ($N$ = 17). This was done because the number of participants who listed their ethnicity as African-American ($N$ = 6), Asian ($N$ = 2), Hispanic ($N$ = 7), or "other" ($N$ = 2) were too few to perform statistical analyses comparing all groups. Analyses were conducted that examined the significant differences found in H1, H2, H3, and H4, which consisted of differences on the avoidance and intrusion subscales of the IES, HSCL total scores, and HSCL OBS subscale scores. To examine the effect of ethnicity on the IES, a two-way mixed MANOVA, with ethnicity as the between-subjects variable and scores on the intrusion and avoidance subscales of the IES as the within-subjects variables, revealed a main effect for ethnicity, $F$ (1, 28) = 6.03, $p$ = .021, such that nonwhite participants' scores were significantly higher at both pretest and posttest. The effect size of this difference was $r^2$ = .18 and the power to

find a significant difference was .66. As can be seen in Figure 3, univariate tests revealed that nonwhite participants' scores on both the intrusive subscale, $F$ (1, 28) = 9.2, $p$ = .005, and the avoidance subscale, $F$ (1, 28) = 6.5, $p$ = .017, were higher than white participants' scores at both pretest and follow-up. There was not, however, a significant ethnicity by time interaction, $F$ (2, 27) = .537, $p$ = .591, revealing that the magnitude of the difference between pre- and posttest scores was not significantly different for white and nonwhite participants. Means and standard deviations for white and non-white participants on the IES subscales can be seen in Table 5.

To examine the effect of ethnicity on HSCL total scores, a mixed ANOVA was conducted, with pre- and post-test serving as the within-subjects factor and ethnicity (white vs. non-white) serving as the between-subjects variable. As can be seen in Figure 3, this analysis revealed that there was not a significant main effect for ethnicity, $F$ (1, 28) = 1.26, $p$ = .272. There also was not a significant ethnicity by time (pre- or post-test) interaction, $F$ (1, 28) = .418, $p$ = .523. Thus, the magnitude of the difference between pre- and posttest scores was not significantly different for white and nonwhite participants. A separate one-way, mixed ANOVA was conducted to analyze the effect of ethnicity on HSCL OBS scores. This analysis also revealed no significant main effect for ethnicity, $F$ (1, 28) = .03, $p$ = .864. There also was not a significant ethnicity by time interaction, $F$ (1, 28) = .049, $p$ = .826. Means and standard deviations for white and non-white participants on HSCL total and OBS scores can be seen in Table 5.

To examine the effects of level of education, a median split was performed, with participants who reported 12 or fewer total years of education ($N$ = 13) being assigned to Group 1 and those with 13 or more total years of education ($N$ = 16) being assigned to Group 2. One participant failed to report education level. Partial correlations revealed one significant positive

correlation, with higher education level being associated with higher scores on the intrusive subscale of the IES at one-month follow-up. Thus, those participants with more total years of education reported experiencing higher levels of intrusive thoughts about the trauma they wrote about one month after writing than those participants with fewer years of education.

H8: LIWC dimensions of positive emotion words, causal words, and insight words will increase significantly from the first writing session to the last writing session. A repeated-measures MANOVA was conducted with LIWC calculations of percentages of positive emotion words, causal words, and insight words in the first and last writing sessions serving as the dependent variables. As can be seen in Table 4, analysis revealed that the mean percentage of positive emotion words in the final essays was significantly higher than percentage of positive emotion words in the first essay, $F$ (1, 29) = 14.08, $p$ = .001. The same was true of insight words, $F$ (1, 29) = 9.04, $p$ = .005. Although the use of causal words was higher in the final essays, this difference was not significant, $F$ (1, 29) = 3.1, $p$ = .09. Thus, the use of positive emotion and insight words increased significantly from the first to the last essay, whereas the use of causal words did not increase significantly.

H9: Participants will report higher levels of negative moods and signs of physiological arousal after each writing session than they reported at the beginning of each session. The Before-Writing and After-Writing Questionnaires were used to derive the dependent measures. Participants' ratings of the experience of 8 signs of physiological arousal and 8 negative moods (with "happy" and "contented" reverse scored) were averaged to form composite ratings. These composite ratings were then subjected to four separate repeated-measures MANOVAs (one performed for each writing session), with composite ratings of physiological and mood

symptoms serving as the dependent variables. Figure 4 shows the results for each writing session.

For the first writing session, the mean composite rating of physiological symptoms immediately prior to writing was 1.5 (*SD* = .44), whereas the mean after writing was 1.6 (*SD* = .55), $F$ (1, 29) = .993, $p$ = .327. The mean composite rating of mood symptoms at pretest was 1.9 (*SD* = .5), whereas the mean rating at posttest was 2.4 (*SD* = .82), $F$ (1, 29) = 15.1, $p$ = .001. Thus, participants reported significantly higher mood symptoms, but not physiological symptoms, after writing at the first writing session than they reported before writing. The effect size of the difference in mood symptoms was $r^2$ = .34 and the power to find a significant difference was .96.

For the second writing session, the mean composite rating of physiological symptoms prior to writing was 1.25 (*SD* = .3), whereas the mean after writing was 1.4 (*SD* = .31), $F$ (1, 29) = 4.6, $p$ = .04. The mean composite rating of mood symptoms prior to writing was 1.7 (*SD* = .37), whereas the mean composite immediately after writing was 2.4 (*SD* = .6), $F$ (1, 29) = 34.62, $p$ < .001. The effect size of the difference in physiological symptoms was $r^2$ = .15 and the power was .54. The effect size of the difference in mood symptoms was $r^2$ = .57 and the power was 1.0.

At the third writing session, the mean composite rating of physiological symptoms prior to writing was 1.4 (*SD* = .35), whereas the mean after writing was 1.31 (*SD* = .27), $F$ (1, 29) = 1.7, $p$ = .202. The mean composite rating of mood symptoms prior to writing was 1.9 (*SD* = .59), whereas the mean after writing was 2.14 (*SD* = .62), $F$ (1, 29) = 2.28, $p$ = .14. Thus, there were no significant differences between reported physiological and mood symptoms from before to immediately after writing.

At the final writing session, the mean composite rating of physiological symptoms prior to writing was 1.24 (*SD* = .3), whereas the mean rating immediately after writing was 1.4 (*SD* = .48), *F* (1, 29) = 3.4, *p* = .074. The mean composite rating of mood symptoms both prior to writing and immediately after writing was 2.07 (*SD* = .8 at both ratings). Thus, participants did not report higher levels of physiological nor mood symptoms after writing than they reported before writing in the final session.

H10: Participants will rate their essays as becoming increasingly more personal and as revealing increasingly more of their emotions after each session. Two questions on the After-Writing Questionnaire that directly queried these domains served as the dependent measures. The questions were, "Overall, how personal was the essay that you wrote today?" and "Overall, how much did you reveal your emotions in what you wrote today?" These questions were rated by participants on a 5-point scale, where 1 = *not at all*, and 5 = *a great deal*. Participants' daily ratings on these questions were subjected to three separate repeated-measures MANOVAs, with the prediction that ratings on these questions after the second writing session will be significantly higher than after the first writing session, higher after the third writing session than after the second writing session, and higher after the fourth writing session than after the third writing session.

After the first writing session, the mean rating of how much participants revealed their emotions was 3.15 (*SD* = 1.4), and the mean rating after the second writing session was 3.28 (*SD* = 1.5), *F* (1, 29) = .223, *p* = .64. The mean rating of how personal participants' essays were after the first writing session was 4.0 (*SD* = 1.07), and the mean rating after the second writing session was 4.15 (*SD* = 1.2), *F* (1, 29) = .312, *p* = .58. After the third writing session, the mean rating of how much participants revealed their emotions was 4.12 (*SD* = .91), and the mean rating of how

personal their essays were was 4.5 (*SD* = .99). Participants' ratings of how much they revealed their emotions after the third session was significantly different from their ratings after the second session, $F$ (1, 29) = 10.23, $p$ = .004. The effect size of this difference was $r^2$ = .29, and the power to find a significant difference was .87. There was not a significant difference between how personal the essays were from the second to the third session, $F$ (1, 29) = 1.45, $p$ = .241. After the final writing session, the mean rating of how much participants revealed their emotions was 3.97 (*SD* = .90), and the mean rating of how personal the essays were was 3.97 (*SD* = 1.02). There was not a significant difference between how much emotion was revealed from the third to the fourth writing session, $F$ (1, 29) = .96, $p$ = .336, but there was a significant difference in how personal the essays were, $F$ (1, 29) = 7.93, $p$ = .009. This difference, however, was not in the expected direction, with participants' mean rating becoming significantly lower from the third to the fourth writing session.

To examine whether the finding that participants rated their final essays as being less personal was associated with less overall benefit of the protocol, Pearson correlations were conducted between ratings of how personal Essay 4 was and difference scores between pretest and follow-up on total IES, total HSCL, and HSCL OBS scales. None of the correlations were significant. Thus, less personal attributions on essay 4 were not associated with less overall psychological benefit from engaging in the guided written disclosure protocol.

*Completers vs. Non-completers*

Although completers and non-completers did not differ significantly on any demographic variables, there were some differences that emerged on some pre-test measures. The variables examined consisted of the five subscales of the NEO-FFI, IES subscales and total, HSCL

subscales and total, PILL total, and the three last questions on the PILL that query health-related behaviors. A MANOVA conducted with all of these variables as the dependent variables revealed that there were significant differences between completers and non-completers, with non-completers scoring significantly higher, on the IES intrusive subscale, $F$ (1, 36) = 9.19, $p$ = .004, the IES avoidance subscale, $F$ (1, 36) = 4.47, $p$ = .041, the IES total score, $F$ (1, 36) = 8.15, $p$ = .007, and the PILL total score, $F$ (1, 36) = 4.67, $p$ = .037. Table 6 shows the means (*SD*) for completers and non-completers on these measures.

Differences between completers and non-completers were also examined on the one month follow-up measures. However, two non-completers did not complete follow-up measures, lowering the total number of non-completers to six at follow-up. The same variables as above served as the dependent variables, with the exception of the NEO-FFI, which was administered only at pretest. As can be seen in Table 7, A MANOVA revealed eight significant differences. Non-completers reported significantly more days of activity restriction due to illness in the prior month than completers, $F$ (1, 34) = 5.14, $p$ = .03. Non-completers' mean score on the IES intrusive subscale was significantly higher than completers', $F$ (1, 34) = 6.042, $p$ = .019. Non-completers' mean IES total score was significantly higher than completers' mean score. Mean scores on the IES avoidance scale were not significantly different at follow-up, $F$ (1, 34) = 2.14, $p$ = .153. On the HSCL, non-completers' mean scores were significantly higher than completers' mean scores on the SOM, $F$ (1, 34) = 5.24, $p$ = .028, OBS, $F$ (1, 34) = 4.86, $p$ = .034, DEP, $F$ (1, 34) = 9.29, $p$ = .004, and ANX, $F$ (1, 34) = 17.67, $p$ < .001, subscales. Non-completers' mean HSCL total score was also significantly higher than completers', $F$ (1, 34) = 8.56, $p$ = .006.

The data from only non-completers was then examined to determine if their scores on measures were significantly different at one month follow-up than at pretest. As can be seen in

Figure 5, IES total scores and subscale scores were not significantly different at follow-up, although all scores were lower. However, all scores on the HSCL (see Figure 6) and numbers of physician visits, days sick, and days of activity restriction due to illness were higher at follow-up than at pretest for non-completers, but not to a significant degree. The same was true for PILL total scores.

*Sona Participants vs. Classroom Participants*

As discussed in an earlier section, some participants participated in the study while enrolled in a class entitled "Writing About Stressful Expereinces," whereas others signed up for the study via UNT's Sona system. These groups participated in the study in different environments. Participants who were enrolled in the class participated in a classroom environment in a large group ($N = 17$). Participants who signed up for the study via the Sona system participated in the study in a smaller room and in smaller groups ($N = 21$). Thus, participation in these different environments could have potentially affected the significant results found when examining the sample as a whole. To test this, a two-way mixed MANOVA, with participation environment as the between-subjects variable, pretest versus follow-up as the within-subjects variable, and total IES scores and total HSCL scores as the dependent variables, was conducted. This analysis revealed no main effect for participation environment, $F(1, 36) = .431$, $p = .53$, such that classroom participants' and Sona participants' scores were not significantly different at pretest nor at follow-up. Neither was there a significant participation environment by time interaction, $F(2, 35) = .59$, $p = .47$. Thus, the differing environments did not appear to have an effect on the benefits realized by participation in the guided written disclosure protocol.

# CHAPTER 4

# DISCUSSION

The present study sought to build on the body of previous research that has consistently found significant health benefits from written disclosure of traumatic experiences, and that those who realize the most health benefits are those who structure their written accounts in a "narrative" fashion. This was attempted by developing a written disclosure protocol designed to assist participants, over four writing sessions, in supplying an increasing amount of narrative structure to their written accounts of a traumatic experience. Measures of physical and psychiatric symptoms were administered prior to the first writing session and one month after the writing sessions were completed. Although past research in written disclosure about stressful or traumatic events has consistently found significant physical health-related benefits for participants, the present study failed to find those benefits. However, the present study found that guiding participants through the written disclosure protocol resulted in significant decreases in two symptom clusters of Posttraumatic Stress Disorder (PTSD) – intrusive and avoidance symptoms. Furthermore, the overall effect size of these decreases was moderate ($r^2 = .30$) and similar to effect sizes found in previous written disclosure research for physical health benefits. This represents an important, clinically relevant reduction in posttraumatic symptomatology that can be extended from the research realm into the clinical realm. The present study also found that leading participants through the guided written disclosure protocol was associated with a reduction in symptoms of general psychological distress, including both intensity of distress and prevalence of symptoms across several symptom dimensions. In addition, significant reductions were found in intensity and prevalence of obsessive thoughts and behaviors. The effect sizes of these effects were relatively small (12 – 13%), but nonetheless represent clinically significant

changes in symptomatology. These statistically significant reductions were found after only four sessions of writing. It follows that with continued treatment, writing or otherwise, these symptoms would continue to lessen.

The findings and implications of long-term and immediate effects of following the present guided written disclosure protocol will be summarized below, followed by a discussion of the research and clinical implications of those findings. The limitations of the present study will then be discussed. Finally, future directions for written disclosure research that are suggested by the present study will be forwarded.

## Long-term Effects

### *Physical Health*

Beginning in 1986 (Pennebaker & Beall, 1986), a large body of research has accumulated that has found significant, long-term health benefits of writing about a traumatic experience. These effects have most consistently been found in the area of physical health, most notably in significant reductions in visits to a physician for illness. (e.g., Francis & Pennebaker, 1992; Greenberg & Stone, 1992; Greenberg, Wortman, & Stone, 1996). These effects have been found across many different populations, including different social classes, racial/ethnic groups, and in studies from several different countries. Furthermore, these effects have been noted in relatively healthy samples after 2 months, 6 months, and 14 years. However, most of these studies have used objective measures of physical health and physician visits. Participants in Pennebaker and Beall (1986), for example, gave permission for their medical records to be examined to determine the number of times participants visited the Student Health Center four months before and four months after writing.

The present study failed to find physical health benefits, using the same self-report measures that have been used many times in prior studies. In fact, scores on a self-report measure of physical symptoms (the PILL) experienced in the past month were slightly higher at one month follow-up than at pretest, though not significantly higher. The number of self-reported physician visits and days of activity restriction due to illness also were slightly higher at follow-up, though, again, not significantly higher, whereas self-reported days sick remained the same. There are several possible explanations for these findings. Follow-up measures were completed one month after the final writing sessions; the vast majority of past research studies have measured physical health at least four months after the writing was completed. Thus, it may have been that not enough time had elapsed for the physical health benefits to emerge. Had more time elapsed, the physical health benefits may have become more apparent to participants, which leads to another possible explanation: the present study did not utilize any objective measures of physical health, relying only on self-reported physical symptoms. In his meta-analysis of written disclosure studies, Smyth (1998) found that effect sizes in written disclosure studies for self-reported health were significantly lower than for physiological functioning, which consisted of objective markers of physical health. He reasoned that this may be because "overall health is only partially mediated by physiological competence (p. 181)," meaning that knowledge of one's physical health (i.e., awareness that one's body is functioning in a healthy manner) is not equivalent to one's actual physical health. It may be that participants in the present study were not aware of physiological functioning changes that were underway. Another possible explanation for this finding may be that the writing sessions were completed in the middle of February and the follow-up measures completed in the month of March. According to the Centers for Disease Control and Prevention (CDC; CDC, 2006), the number of cases of influenza

in the Unites States peaks in mid-February and slowly declines thereafter. Thus, the failure to find any health benefits may have been due to the timing of the study.

Another possible reason that participants did not realize physical health benefits may involve the nature of the written disclosure protocol. The directions given to participants were much more structured than directions given in past written disclosure studies. The directions given by Pennebaker and Beall (1986), which provided the template for directions given in future studies, state that participants should "write about your very deepest thoughts and feelings" and entreat participants to "really let go and explore your very deepest emotions and thoughts" (p. 1244; Pennebaker & Seagal, 1999). Some suggestions for writing are then given (e.g., "you may tie your topic to your relationships with others;" p. 1244). In the present study, participants were given concrete instructions on what to write about the trauma and to structure their writing in a certain way. These instructions may have caused participants to focus too closely on the structure and content of what they were writing, and less on the trauma they were writing about. Participants in most written disclosure studies, including Pennebaker and Beall (1986), are told to write "without regard to spelling, grammar, or sentence structure" (p. 1244; Pennebaker & Seagal, 1999), whereas the instructions to participants in the present study may have influenced participants to focus on those types of elements. Also, in the majority of written disclosure studies, participants are given the choice to write about one trauma or to write about different traumas in different writing sessions. Participants in the present study were limited to writing about a single traumatic experience. It may be that writing about more than one trauma results in greater health benefits (although such an association has never been reported in the published literature). Future research that compares instructions that ask for varying amounts of

structure, and that compares writing about a single trauma to writing about multiple traumas, would shed light on these issues.

*Psychological Health*

Although findings of past written disclosure studies have found mixed results regarding psychological benefits (e.g., Greenberg & Stone, 1992; Pennebaker & Francis, 1996), the present study found that the guided written disclosure protocol appeared successful in significantly reducing avoidance and intrusive symptoms related to the trauma, in significantly reducing general levels of psychological distress, and in significantly reducing levels of obsessive thoughts/behaviors. Furthermore, the effect sizes of these findings were moderate, illustrating the clinical importance of the findings.

On the Impact of Events scale (IES; Horowitz, Wilner, & Alvarez, 1979), a commonly used measure of posttraumatic symptomatology in both research and clinical contexts, scores on the intrusive subscale fell 4.9 points from pretest to one month follow-up, scores on the avoidance subscale fell 4.4 points, and total IES scores fell 9.3 points. The effect sizes (reported in $r^2$) of these differences were .26, .20, and .30, respectively. In addition to statistical significance, these represent clinically significant reductions in symptoms. The most commonly used cutoff score used to detect the presence of PTSD with the IES is a total score of 20, suggested by Horowitz, Wilner, and Alvarez (1979), who originally developed the measure. Other researchers have suggested using different cutoff scores, such as 27 (e.g., Coffey, 2006) and 19 (Grieger, Fullerton, & Ursano, 2003). Thus, a 9.3 point average decrease in IES total scores represents a relatively large decrease that is equal to almost half of the cutoff score. Items on the IES, which query specific symptoms of PTSD, are rated on a 5-point scale, where 0 = *not*

*at all* and 5 = *often*. Given that the IES consists of 15 items, the highest score possible is 75. A 9.3 point decrease in total scores, then, translates to a 12.4% reduction in symptom severity from the total possible. The clinical significance of this large a reduction in symptom severity after only four sessions of an intervention seems clear.

In a direct study of the effects of instructions designed to manipulate the amount of narrative included by participants, Smyth, True, and Souto (2001) reasoned that narrative formation alters the way that a memory is represented and, therefore, intrusive thoughts of the experience written about should decrease as narrative structure increases. However, their study did not yield this finding, using the IES as the dependent measure. As participants in their study wrote about a trauma only once, the researchers speculated that one writing session may not be enough to alter the memory representation. In the present study, participants wrote about the same trauma on four separate occasions and were supplied with very concrete instructions for increasing narrative structure, and significant reductions in intrusive thoughts were found.

Smyth, True, and Souto (2001) also found increases in avoidant thinking in their participants. They speculated that a single writing session may serve a sensitizing function and, therefore, cause participants to actively avoid thinking about the traumatic experience. They further speculated that multiple writing sessions may allow habituation to the traumatic memory and not produce an avoidance response. In the present study, levels of avoidant symptoms were significantly lower at one month follow-up. Thus, the speculations of Smyth, True, and Souto (2001) appear to be accurate. Multiple writing sessions, at least four, appear to be sufficient in altering the memory representation of a traumatic experience, thereby condensing and solidifying fragmented aspects of the memory, and reducing intrusive memory fragments. Furthermore, multiple writing sessions, again at least four, may be required to reduce avoidant symptoms.

After writing once about a trauma, avoidant symptoms may become more pronounced; more sessions appear to result in habituation and desensitization to the traumatic memory and a reduction in avoidant symptoms.

Participants in the present study also scored significantly lower at follow-up on the HSCL total score and the Obsessive-Compulsive (OBS) symptom dimension of the HSCL. Thus, the guided written disclosure protocol was successful in reducing the intensity of participants' psychological distress and the prevalence of psychological symptoms across symptom dimensions and within the specific dimension of obsessive-compulsive symptoms. The effect sizes of the differences in these dimensions were not as large as they were for posttraumatic symptoms, though. For overall psychological distress (HSCL total), the effect size was .13, whereas for the OBS scale, the effect size was .12. The reduction on the OBS scale may be related to the significant reduction in intrusive symptoms. Intrusive symptoms in the *DSM-IV-TR* (APA, 2000) are described as "recurrent" and "distressing." On a general psychological symptom measure such as the HSCL, a person's self-report of the recurrence of intrusive thoughts about a trauma would very likely raise the score on a scale of obsessive thoughts.

*Effects of Demographic Variables*

As was hypothesized, participants' age, ethnicity, and level of education did not affect any of the statistically significant findings. Thus, the guided written disclosure protocol appears to be just as effective in reducing avoidance and intrusive symptoms, general psychological distress, and obsessive-compulsive symptoms, regardless of age, ethnicity, and education level. However, non-white participants' intrusive and avoidance symptoms were significantly higher at pretest and at one month follow-up than white participants' symptoms, though the guided written

disclosure protocol had the same beneficial effects for non-white participants. This is an interesting finding with important implications. Although non-white participants did not report a greater number of traumas in their lives, on average, than white participants, their posttraumatic symptom levels were significantly higher. In white cultures, it is more acceptable to discuss emotions, emotional problems, and to seek psychological help when it is needed (Sue & Sue, 1990). Perhaps non-white participants had not discussed their traumas or their trauma reactions with others as much as white participants had, and, because they had to actively inhibit thoughts, feelings, and impulses associated with their traumatic memories, they experienced a greater level of symptoms. Wegner, et al. (1987), in discussing the inhibition-confrontation model, speculated that previously inhibited thoughts and feelings would rebound as intrusive memories, which would then result in chronic stress, and a continuation of active inhibition. A comparison of the extent to which white and non-white participants had confided in others about their traumatic experiences revealed no significant differences. Therefore, the inhibition-confrontation model does not explain these differences in posttraumatic symptoms. In a review of the literature examining ethnic/racial differences in PTSD rates, Rosenheck, Fontana, and Cottol (1995) state that, despite some conflicting data, "being an ethnic minority may cause one to be more 'at risk' for PTSD" (p. 556). They speculate that the different experiences of ethnic minorities, such as racism and other negative race-related events, may be the cause of higher rates of PTSD. Whatever the reason, clinicians need to be aware of this difference and tailor treatments with this in mind. Rosencheck et al. (1995) suggest that matching clients with PTSD to clinicians of the same race can be beneficial.

Participants with more total years of education (13 or more) reported greater levels of intrusive symptoms at follow-up than those participants with relatively fewer years of education

(12 or less). None of the written disclosure studies reviewed has revealed a similar finding. In his meta-analysis, Smyth (1998) found that participants who were college students evidenced significantly higher scores than participants who had not gone to college on measures of psychological well-being after writing. Thus, in past studies, those with higher levels of education fared significantly better after writing than those with lower levels of education. The reasons for this contradictory finding in the present study are unclear and in need of future exploration. It is possible that those with higher levels of education, who have thus attended college for longer periods of time, have experienced a greater number of stressful events in college, such as sexual coercion or stress regarding nearing the end of college and having to begin a career. It has been found that college women are more at risk for rape and other forms of sexual assault than women of the same age who are not in college, and it has been estimated that almost 25 percent of college women have been victims of rape or attempted rape (Benson, Charton, & Goodheart, 1992). In a large-scale study conducted more than a decade ago, Cook (1995) found that there were 35 rapes per 1,000 female college students over a seven month period at two large universities in the U.S. Thus, those who have been in college for relatively more years have a greater chance of being the victims of sexual assault. However, more research support is needed in order to confidently assert that those with higher levels of education experience greater levels of intrusive symptoms even after engaging in expressive writing about a trauma.

*Judges' Ratings of Essays*

Two trained graduate students in psychology rated participants' essays along the seven dimensions of narrative that the guided written disclosure protocol was designed to enhance.

Inter-rater reliability was established and found to be satisfactory. However, contrary to hypothesis, judges' ratings were not predictive of subsequent physical or psychological benefits at one month follow-up, nor were judges' ratings of participants' final essays associated with lower physical or psychological symptom levels at follow-up. Therefore, it is unclear whether successful adherence to the guided written disclosure protocol specifically facilitated any changes in physical or psychological symptoms. However, as discussed above, in the only extant written disclosure study that directly manipulated the amount of narrative participants included in their essays, Smyth, True, & Suoto (2001) did not find the hypothesized reduction in intrusive symptoms and speculated that more than one writing session is needed to realize this benefit. The present study supports this and suggests that guiding participants to include greater amounts of narrative structure in their essays over several writing sessions produces psychological benefits above and beyond those found in unstructured written disclosure studies, especially with regard to symptoms of PTSD. Smyth et al. (2001) also found that avoidance symptoms increased after one writing session, whereas the present study found significant reductions in avoidance symptoms after four writing sessions. Thus, the guided written disclosure protocol designed for this study appears to be effective above and beyond unstructured writing, in that it facilitates significant reductions in avoidance and intrusive symptoms of posttraumatic reactions. However, this conclusion must be tentative without a direct link between structure-change and symptom-change.

*LIWC Word Dimensions*

As investigation into written disclosure evolved, the role of the structure of language and the cognitive changes involved in putting experience into words in the observed effects became

more central. Specifically, Pennebaker and Francis (1996) developed the Linguistic Inquiry and Word Count (LIWC) computer program to analyze the types of words used by participants who realized health benefits from written disclosure. They found that the more participants used positive emotion words, causal words, and insight words in their essays, the more subsequent health benefits they realized. However, it was not simple word usage, but significant increases in the use of these words, that predicted subsequent benefits. Pennebaker (1997a) concluded that participants who showed increases in their usage of these words, and who subsequently benefited, were displaying the process of creating a narrative. Therefore, essays from the present study were analyzed using the LIWC program to determine if usage of these words increased as writing sessions progressed. It was found that participants increased significantly in their usage of positive emotion and insight words, but not in causal words, from the first to the last writing session. Thus, two categories of word usage that have been specified as markers of amount of narrative in written disclosure essays were found to increase significantly in the present sample, supporting the contention that the guided written disclosure protocol was successful in facilitating clients in supplying an increasing amount of narrative to their written disclosures.

Exploratory analyses revealed that use of negative emotion words was associated with pretest to posttest changes in intrusive symptoms on the IES. Specifically, it was found that an increase in the use of negative emotion words from Session 2 to 3 was associated with a decrease in intrusive symptoms at posttest. However, it was also found that an increase in the use of negative emotion words from Session 3 to 4 was associated with an *increase* in intrusive symptoms at posttest. In Session 3, participants were *instructed* to focus on the emotions aroused by the traumatic experience about which they were writing. The instructions in Session 4 asked participants to again focus on their emotions while also incorporating other elements of a

complete narrative into their writing. Thus, it may have been that the ventilation of the negative emotions associated with the experience in Session 3 allowed some participants to examine and process these negative emotions—to, in effect, integrate these emotions into the more complete and less fragmented narrative that was forming. Other participants did not show this moderated use of negative emotion words in Session 4. To again focus on these emotions in the final session may have re-aroused these negative emotions without the contextualization provided by a more complete narrative. It may be that some psychological distance from these emotions is achieved after they are situated within a complete narrative, leading to lower levels of intrusive symptoms. Therefore, in the final writing session, it may be beneficial not to instruct participants to focus on their emotions per se, but rather to focus on placing all aspects of the experience (including their emotions) into broader context.

*Completers vs. Non-completers*

Eight participants did not complete all four writing sessions, participating in only one to three sessions. There were no demographic differences between completers and non-completers; however, at pretest, non-completers had higher mean scores than completers on intrusive and avoidance symptoms and on self-reports of physical symptoms of illness. This suggests that, because non-completers' had higher levels of PTSD symptoms, writing about their traumatic experiences might have been perceived as overwhelming or otherwise distressing, and missing writing sessions could have been a manifestation of avoidance. Thus, one could argue that writing about a trauma, or disclosing it in any way, may be too difficult when more severe, or acute, levels of PTSD symptoms are present. Following this line of thought, writing about a trauma may even be *detrimental* for persons with this level of symptom severity; at one month

follow-up, non-completers reported significantly greater mean number of days of activity restriction due to illness, greater levels of intrusive (but not avoidance) symptoms, and greater levels of somatic, obsessive, depressive, and anxiety symptoms than completers. In fact, examination of the data from only non-completers revealed that their physical symptoms of illness, overall psychological distress, and mean numbers of physician visits, days sick, and days of activity restriction due to illness *increased* from pretest to one month follow-up, though not to a significant degree. However, non-completers, by definition, did not fully engage in the writing process, as they were not present for all four sessions. Thus, it cannot be concluded that the process of writing was responsible for exacerbating their symptoms. As there were only eight non-completers, it is highly possible that these participants experienced other stressful or aversive events during the two-month course of the study.

As an exploratory analysis, it was discovered that four completers had total IES scores at pretest that were at least as high as the mean score for non-completers at pretest (48.8). Of these four, three showed significant improvement at follow-up, with decreases in IES total scores of 12, 45, and 22 points. One, however, showed an increase of 14 on the IES total score. Thus, as three of four completers with IES total scores as high as the average score for non-completers at pretest showed improvement at follow-up, it appears that the writing process itself is not responsible for symptom exacerbation, but that some other personality or environmental variables may be responsible.

## Immediate Effects

The most consistent finding in written disclosure research has been that negative moods and physiological symptoms of arousal increase immediately after writing about a trauma (e.g.,

Pennebaker & Beall, 1986; Pennebaker & Seagal, 1999; Smyth, 1998). However, this effect usually disappears after one to two writing sessions (Pennebaker & Beall, 1986). In the present study, mood symptoms increased significantly from before to after the first writing session, whereas physiological symptoms did not. And at the second writing session, both physiological symptoms and mood symptoms increased significantly from before to after writing. In the third and fourth sessions, neither physiological nor mood symptoms increased significantly after writing. As can be seen in Figure 4, mood symptoms decreased consistently after the second writing session. This finding is consistent with the findings of past written disclosure research. Writing about the same trauma over several writing sessions may have the effect of prolonged exposure and response prevention, in effect desensitizing participants to the traumatic memories. Such desensitization has been found to be beneficial to persons who have experienced a trauma (Smyth, 1998).

In discussing immediate increases in physiological and mood symptoms, Pennebaker and Beall (1986) explained these effects as appropriate to the topics participants write about, as the topics are necessarily traumatic. Later, Smyth (1998) suggested that the "trauma-relevant fear network must be activated for improvement to be made" (p. 180) and that this short-term distress may be required for the cognitive change speculated to occur during writing. This is consistent with the theories proposed by Wigren (1994) and van der Kolk (2002) who propose that "traumatic memories are emotionally vivid, uncondensed, and…accompanied by intense affect" (p. 416; Wigren, 1994). Wigren (1994) goes on to propose that narrative activity, or shifting the memory from disorganized and uncondensed to narrative, or normal, memory, serves the purpose of binding "psychophysiological events, that is, affect, with mental events, or cognition" (p. 417). Thus, narrative structure serves to contain strong affect and make sense of that affect,

making the affect less distressing. The results of the present study support this theory: participants initially experienced significant increases in distressing affect but, as the memories acquired increasingly more narrative structure, these emotions became more contained and less distressing to participants.

After each writing session, participants also rated how personal their essays were and how much they revealed their emotions in the essay written in that session. This was analyzed as a manipulation check to determine how personally engaged and emotionally involved participants were with the writing task. Contrary to prediction, there was only a significant difference between how much emotion participants revealed after the third writing session and how much emotion they revealed after the second writing session. This difference is explained by the fact that the guided written disclosure protocol for the third session instructed participants to focus on revealing their emotions regarding the trauma they were writing about. However, this also serves to show that participants listened to and followed the instructions of the guided written disclosure protocol, thus supporting that the manipulation was successful.

Ratings of how personal participants' essays were increased from Session 1 to Session 2 and from Session 2 to Session 3, although these were not statistically significant increases. Surprisingly, participants rated their essays from the fourth and final writing session as being significantly *less* personal than their essays from the third session. However, this, again, can be explained by the instructions of the guided written disclosure protocol for the fourth session. These instructions asked participants to focus on making sure that their essays were coherent to others reading it and to evaluate their own role in the events they were writing about. These instructions, in effect, require participants to consider the point of view of *others* who may read the essays and to shift cognitively from focusing exclusively on their *own* perceptions and

feelings to those of others. This would, necessarily, cause participants to feel that the essays were less personal.

## Clinical Implications

The clinical implications of the present study are many. Most importantly, guiding people who have experienced a trauma in writing about that trauma using the guided written disclosure designed for this study appears to result in significant reductions in intrusive and avoidance symptoms of posttraumatic reactions, in less general psychological symptoms of distress, and in reductions in obsessive-compulsive symptoms. Moreover, the effect size of the reductions in overall PTSD symptoms suggests a moderate real-world, clinical effect of the intervention. Furthermore, the beneficial effects of the guided written disclosure protocol are not affected by race/ethnicity, age, or education level. The guided written disclosure protocol could, therefore, be easily transitioned to use in clinical contexts, especially those where base rates of PTSD are high, regardless of the diversity in ethnicity, age, or education level. Further, along with reductions in PTSD symptoms, general symptoms of psychological distress also appear to lessen, which should supply those with PTSD even more symptom relief.

Some caveats are in order, however. In clinical contexts, at least some clients who present with very high levels of PTSD symptoms, especially intrusive symptoms, may not be ready to write about their traumatic experiences. For these clients, writing about their traumatic experiences may initially increase their overall psychological distress to unacceptable levels. Severe clients who are prematurely encouraged to write about traumatic experiences may, due to symptom exacerbation, terminate psychotherapy early and, therefore, not receive treatment that is necessary. They may then come to believe that psychotherapeutic treatment will not help them

and that their condition is hopeless, and that avoidance of traumatic memories is their only hope. Clients with very high levels of PTSD symptoms should, therefore, first be instructed in coping skills designed to aid them in coping with confronting traumatic memories. These coping skills may include relaxation techniques, grounding techniques, and/or distress tolerance techniques. Also, sharing aspects of the traumatic memories verbally with a caring therapist can begin the desensitization process before writing is encouraged. After symptoms are reduced, or clients are able to tolerate confronting their traumatic memories without destabilizing effects, clients can be introduced to the writing task.

Because writing about trauma often results in immediate increases in physiological symptoms of arousal and in negative moods, clients should initially be encouraged to write about their traumas only inside the therapy context. The writing initially should be done with immediate access to the therapist, who can then reassure clients that an increase in physiological symptoms and negative moods is normal and can then encourage clients to engage in distress tolerance techniques, resulting in *in vivo* instruction in coping skills. As clients become habituated and desensitized to their traumatic memories, they may be encouraged to write about their traumatic experiences outside of the therapy context.

## Research Implications

The present study adds to the large body of accumulated evidence that writing about traumatic experiences results in significant long-term improvements in psychological well-being, and in immediate increases in physiological symptoms of arousal and negative moods. However, in the present study, writing about a trauma did *not* result in self-reported physical health improvements after one month. As positive long-term physical health benefits have been

consistently found in past research, and most past research has measured long-term improvements in physical health two months or longer after writing, it appears likely that physical health improvements from writing, or participants' recognition of physical health improvements, are delayed longer than one month. Therefore, self-report measures of physical health should be administered at least two months after participants are done writing. Furthermore, using more direct, objective measures of physical health than self-report measures would allow clearer examination of the effects of writing about a trauma on physical health. Past studies of written disclosure have used many such measures, such as blood markers of immune system functioning (Pennebaker, Kiecolt-Glaser, & Glaser, 1988), and antibody titer responses (Esterling et al., 1994; Petrie et al., 1995). Direct, objective measures such as these are more reliable and valid than are self-report instruments.

It was observed that the majority of participants with significantly higher scores on PTSD symptom measures did not attend all writing sessions and, more importantly, actually saw their overall psychological and physical symptom levels increase after writing. However, it cannot be concluded that the guided written disclosure protocol was directly responsible for this symptom exacerbation, as these participants did not fully engage in the writing process. Also, it was found that four completers who had IES total scores at pretest that were at least as high as the mean score for non-completers realized significant reductions in IES total scores at follow-up. Thus, it appears that the symptom exacerbation was not due to the writing process itself, but to some personality and/or environmental variable(s). This is in need of future exploration. If future research finds that the majority of participants with very high IES total scores experience symptom exacerbation after writing studies, researchers may need to screen for, and exclude

from written disclosure studies, those participants who have relatively high levels of intrusive and avoidance symptoms, and instead encourage them to seek treatment.

The results of the present study lend support to the cognitive change model of the benefits of written disclosure of traumatic events. It appears that the original inhibition model is insufficient in explaining the results. Investigation has turned away from attempting to explain the benefits of written disclosure as a result of the releasing of inhibitory processes and has turned toward examining the role of language and the structure produced by language in accounting for the positive changes. This investigation has found that helping participants supply an increasing amount of narrative to their written disclosures is associated with significant psychological benefits. However, investigation into the role of narrative is in its infancy stage. Although judges' ratings of the amount of narrative in participants' essays was not statistically predictive of subsequent benefits, judges' ratings did steadily increase across essays. Thus, participants, on average, did supply more narrative to their accounts as writing sessions progressed. Furthermore, two of three language markers theorized in past research to indicate level of "narrativeness" of written disclosures were also found to increase significantly across essays. Thus, it can be tentatively stated that an increasing amount of narrative is associated with long-term psychological health benefits, and that the guided written disclosure protocol tested in the current study was successful in helping participants supply an increasing amount of narrative to their essays. Investigation, then, should turn away from examining inhibitory processes and should focus on the role of narrative in written disclosures and ways of increasing the amount of narrative.

## Limitations of the Present Study

The present study was limited by lack of a control group. If there had been a control group, results of the experimental group could be compared to a control group that did not receive the intervention. This would supply more solid evidence that the guided written disclosure protocol was responsible for the observed benefits. However, a plethora of past research has shown that, compared to a control group, those participants who engage in writing realize significantly more health benefits than those who do not write. Furthermore, participants in the present study, because it was a within-subjects design, served as their own control group; the pretest results of the participants can be considered to be an accurate picture of the level of symptomatology that would have continued to be present had they not engaged in the study. Even more valuable would have been the inclusion of a third group that wrote about a traumatic experience but did so in an unstructured way. In this way, it could have been shown more clearly that the benefits realized by following the guided written disclosure protocol go above and beyond those benefits realized from unstructured writing about a traumatic experience.

Another obvious limitation of the present study was the small sample size tested ($N$ = 30), which impedes the generalizability of results. However, the power found for statistically significant differences was well within acceptable limits.

The fact that all participants were college students is also a limitation. It can be assumed that these college students were high functioning and were middle to upper class in socioeconomic status. Thus, the generalizability of results is further impeded and constrained to high functioning, middle to upper class college students.

Another threat to the internal validity of the present study is the fact that participants participated in the guided written disclosure protocol and were tested in different environments;

one group of participants participated in a classroom environment, whereas others participated in smaller groups and in a different room. The different environments could have potentially influenced the results in subtle ways. However, analyses comparing participants who participated in the classroom and those who participated in a different room revealed that there were no differences between the groups in psychological benefits realized on the IES or on the HSCL. Thus, the differing environments did not appear to have an effect on the results.

Due to the nature of the study, most importantly the length of the study and the spacing of writing sessions (one week apart), history effects and maturation effects may have influenced the results. Because there was a week between writing sessions and a month between the final writing session and follow-up measure administration, it remains possible that events that took place during breaks in the study, or the normal effects of maturation, influenced participants psychological and physical health. However, in studies of this nature, this is unavoidable. Furthermore, no campus-wide or community-wide events during the course of the study were identified that would have had likely systematic impact on the study's participants.

Also due to the nature of the study, participants may have been able to guess what I was hypothesizing and what was expected. Therefore, demand characteristics are a potential limitation. Participants, especially those who took part while enrolled in the college course, may have shaped their responses to follow-up measures in a way that confirmed what participants guessed I was hoping to find. Furthermore, participants who were also enrolled in the course being taught may have felt particular pressure to answer in a way desired by me for fear that their grade in the class would be affected by the outcome (even though they were assured to the contrary).

## Suggested Directions for Future Research

Because this was the first and only study to examine the effects of the guided written disclosure protocol designed for this study, much more research support is needed in order to state confidently that the intervention is responsible for the observed benefits. In future studies, inclusion of a group that writes about a traumatic experience in an unstructured manner would supply valuable information as to whether the effects realized by following the guided written disclosure protocol go above and beyond those effects realized by simply writing about a traumatic experienced with no guidance.

Because it has become apparent that the benefits of writing about a traumatic experience are not simply due to a release of inhibitory processes and that the benefits appear to be due to the cognitive changes that accompany structuring written accounts with progressively more elements of a "good narrative," research and theory should evolve to accommodate this. Therefore, research efforts should abandon the inhibition theory and examine ways that participants can be aided in increasing the narrative structure of written accounts of traumatic experiences.

In future research examining the effects of the present guided written disclosure protocol, follow-up measures should be administered at least two months after the final writing session. This would allow time for the physical health benefits to emerge and to become apparent to participants. The use of more objective measures than self-report of physical health would also be valuable and would supply more convincing evidence of physical health benefits. Also, long-term follow-up measures would allow the examination of the length to which health benefits remain after writing.

Table 1

*Demographic Characteristics of Participants Who Completed All Four Writing Sessions (Completers) and Participants Who Did Not Complete All Writing Sessions (Non-completers)*

| | Completers (*n* = 30) | Non-completers (*n*= 8) |
|---|---|---|
| Gender | 22 (73.3%) females<br>8 (26.7%) males | 6 (75.0%) females<br>2 (25.0%) males |
| Ethnicity | 13 (43.3%) Caucasian<br>7 (23.3%) Hispanic<br>6 (20.0%) African-Amer.<br>2 (6.7%) Asian<br>2 (6.7%) other | 5 (62.5%) Caucasian<br>1 (12.5%) Hispanic<br>1 (12.5%) African-Amer.<br>1 (12.5%) other |
| Age | 22.4 (7.0) | 21.8 (5.6) |
| Highest Grade level completed | 13.2 (1.4) | 13.1 (1.3) |
| Number of childhood traumas | 2.4 (1.2) | 3.0 (1.2) |
| Childhood trauma ranking | 5.0 (1.4) | 5.5 (1.1) |
| Number of recent traumas | 2.0 (1.2) | 2.6 (1.2) |
| Recent trauma ranking | 4.4 (1.5) | 4.3 (2.0) |
| Total traumas | 4.4 (1.9) | 5.6 (1.9) |
| Overall trauma ranking | 4.8 (1.1) | 5.0 (1.3) |

*Note.* All numbers represent the mean (*SD*), except for gender and ethnicity, where numbers represent raw totals (*%*).

Table 2

*Pretest and One Month Follow-up Mean Scores* (SD) *of Health-related Information for the Prior Month*

| | Pretest | One Month Follow-up | *p* |
|---|---|---|---|
| Number of physician visits | 0.57 (1.9) | 0.87 (1.6) | 0.38 |
| Number of days sick | 3.10 (5.7) | 3.10 (4.5) | 1.00 |
| Number of days of activity restriction due to illness | 1.30 (2.9) | 1.70 (3.0) | 0.36 |

Table 3

*Significance Levels and Pearson Correlation Coefficients Between Judges' Composite Rating of Participants' Final Essay and Physical and Psychiatric Symptom Levels at One Month Follow-up*

| | Pearson Correlation | *p* |
|---|---|---|
| IES | | |
| Avoidance | -0.06 | 0.74 |
| Intrusive | -0.08 | 0.68 |
| Total | -0.08 | 0.67 |
| HSCL | | |
| Somatic | 0.03 | 0.87 |
| Obsessive | 0.03 | 0.88 |
| Interpersonal Sensitivity | -0.16 | 0.41 |
| Depression | -0.02 | 0.93 |
| Anxiety | -0.04 | 0.83 |
| Total | -0.03 | 0.86 |
| PILL total | 0.00 | 1.00 |
| Number of Physician Visits | 0.17 | 0.36 |
| Days Sick | 0.24 | 0.21 |
| Days of Activity Restriction | -0.05 | 0.78 |

Table 4

*Percentages of Session-to-session Assessments Marked by Increases/decreases in Use of Elements of Narrative Completeness*

| | Session | | |
|---|---|---|---|
| Narrative element | 1-2 | 2-3 | 3- 4 |
| Judges' composite rating | 66.3/03.3 | 70.0/06.6 | 46.6/10.0 |
| LWIC positive emotion words | 33.3/10.0 | 26.6/06.6 | 10.0/20.0 |
| LWIC negative emotion words | 20.0/16.6 | 53.3/06.7 | 13.3/33.3 |
| LWIC causal words | 10.0/03.3 | 20.0/13.3 | 00.0/23.3 |
| LWIC insight words | 23.3/13.3 | 56.6/00.0 | 03.3/40.0 |

Table 5

*Mean Percentage* (SD) *of Word Category Used by Participants in the First and the Final Essays*

| | First essay | Final Essay |
|---|---|---|
| Positive emotion words*** | 0.82 (0.51) | 1.20 (5.70) |
| Causal thinking words | 0.46 (0.30) | 0.60 (0.30) |
| Insight words** | 1.07 (0.50) | 1.40 (0.38) |

** $p < .01$. *** $p < .001$

Table 6

*Means* (SD) *for White and Non-white Participants on IES Subscales and HSCL Total and OBS Scores at Pretest and One-month Follow-up*

| | White participants ($N$ = 13) | Non-white participants ($N$ = 17) |
|---|---|---|
| IES Intrusion | | |
| Pretest | 07.4 (06.7) | 15.4 (10.1) |
| Follow-up | 04.3 (03.3) | 09.0 (09.6) |
| IES Avoidance | | |
| Pretest | 15.4 (10.7) | 20.9 (11.8) |
| Follow-up | 11.4 (10.4) | 14.6 (11.4) |
| HSCL Total | | |
| Pretest | 00.6 (00.2) | 00.8 (00.6) |
| Follow-up | 00.5 (00.5) | 00.6 (00.4) |
| HSCL OBS | | |
| Pretest | 00.9 (00.6) | 00.8 (00.8) |
| Follow-up | 00.7 (00.7) | 00.6 (00.6) |

Table 7

*Pretest Means* (SD) *of Completers and Non-completers*

| | Completers ($N$ = 30) | Non-completers ($N$ = 8) |
|---|---|---|
| NEO-FFI | | |
| Neuroticism | 24.5 (8.2) | 25.6 (12.1) |
| Extraversion | 28.0 (6.3) | 26.9 (7.9) |
| Openness to Experience | 29.0 (7.2) | 28.6 (7.2) |
| Agreeableness | 30.2 (7.0) | 29.5 (4.0) |
| Conscientiousness | 28.9 (7.0) | 30.0 (9.5) |
| IES | | |
| Avoidance* | 16.4 (11.6) | 25.6 (8.1) |
| Intrusive** | 11.9 (9.5) | 23.1 (8.4) |
| Total** | 28.3 (19.2) | 48.8 (12.3) |
| HSCL | | |
| Somatic | 0.6 (0.6) | 0.9 (0.7) |
| Obsessive | 0.9 (0.7) | 1.1 (0.7) |
| Interpersonal Sensitivity | 0.9 (0.6) | 1.0 (0.7) |
| Depression | 0.7 (0.6) | 1.0 (0.8) |
| Anxiety | 0.4 (0.6) | 0.9 (0.7) |
| Total | 0.7 (0.5) | 1.0 (0.6) |
| PILL total* | 11.8 (8.0) | 19.6 (12.6) |
| Number of Physician Visits | 0.6 (1.9) | 0.0 (0.0) |
| Days Sick | 3.1 (5.7) | 1.4 (1.4) |
| Days of Activity Restriction | 1.3 (2.9) | 0.6 (0.9) |

*$p < .05$.  **$p < .01$

Table 8

*Means* (SD) *of Completers and Non-completers at One Month Follow-up*

| | Completers ($N = 30$) | Non-completers ($N = 6$) |
|---|---|---|
| IES | | |
| Avoidance | 12.0 (11.2) | 19.0 (7.6) |
| Intrusive* | 7.0 (7.8) | 15.2 (5.1) |
| Total* | 19.0 (16.1) | 34.2 (10.5) |
| HSCL | | |
| Somatic* | 0.5 (0.5) | 1.0 (0.4) |
| Obsessive* | 0.7 (0.6) | 1.3 (0.5) |
| Interpersonal Sensitivity | 0.8 (0.7) | 1.1 (0.6) |
| Depression** | 0.5 (0.6) | 1.2 (0.8) |
| Anxiety*** | 0.3 (0.6) | 1.2 (0.8) |
| Total** | 0.5 (0.4) | 1.1 (0.6) |
| PILL total | 12.9 (7.9) | 19.3 (10.4) |
| Number of Physician Visits | 0.9 (1.6) | 1.5 (1.9) |
| Days Sick | 3.1 (4.5) | 5.5 (1.4) |
| Days of Activity Restriction* | 1.7 (3.0) | 5.5 (6.7) |

*$p < .05$. **$p < .01$. ***$p < .001$

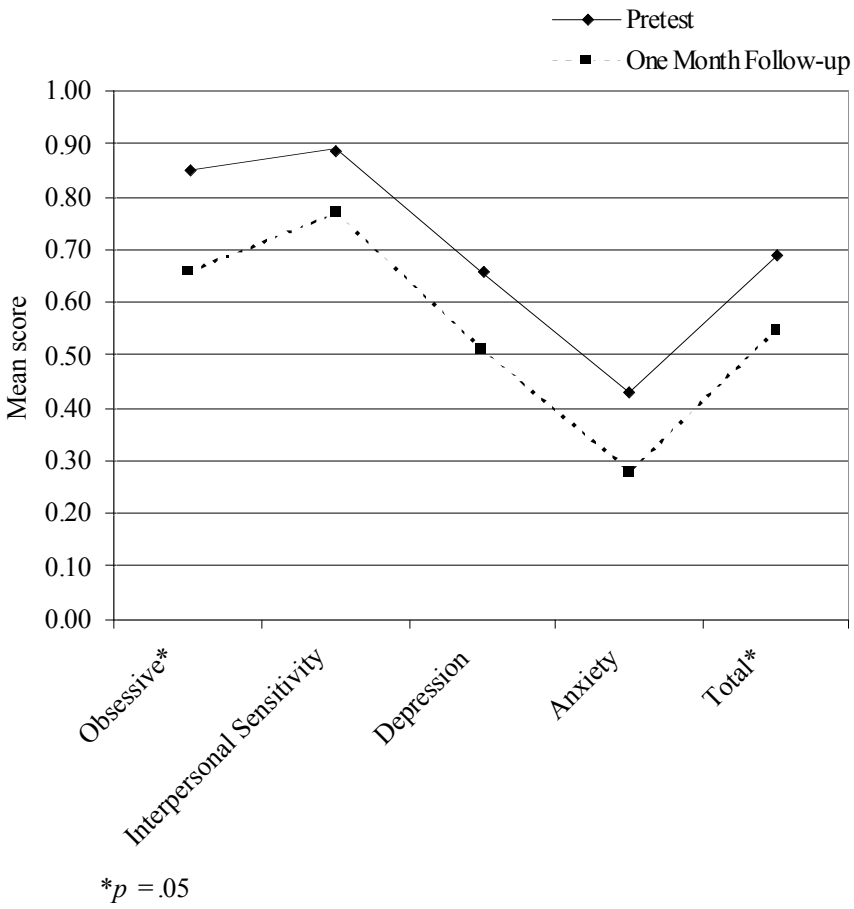


*Figure 1.* Mean pretest and one month follow-up scores for HSCL total and subscales.

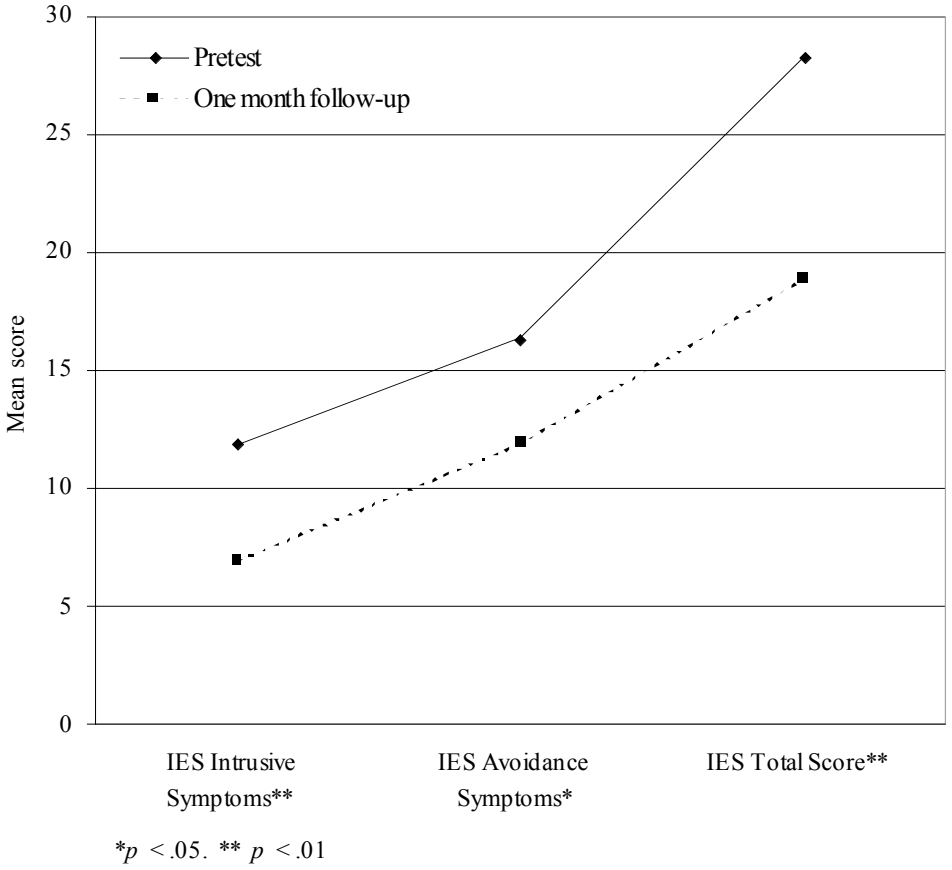


*Figure 2.* Mean pretest and one month follow-up scores for IES intrusive and avoidance subscales, and IES total

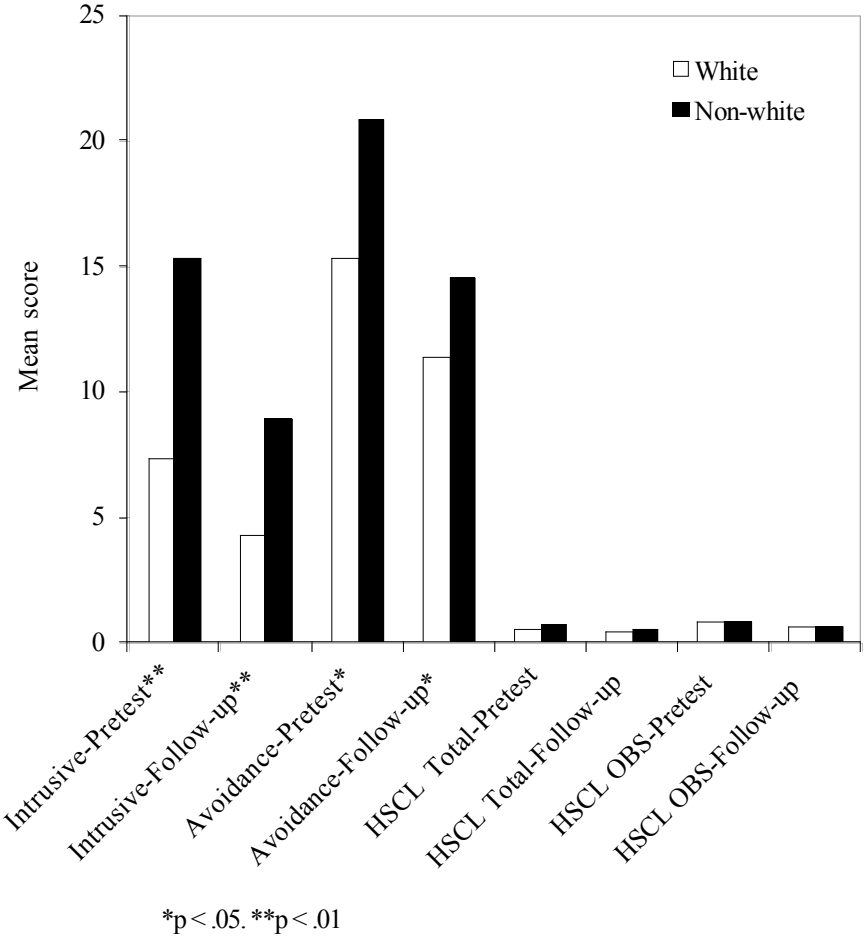


*Figure 3.* Mean pretest and one month follow-up scores for white and non-white participants on IES intrusive and avoidance subscales, and HSCL total and OBS scores.

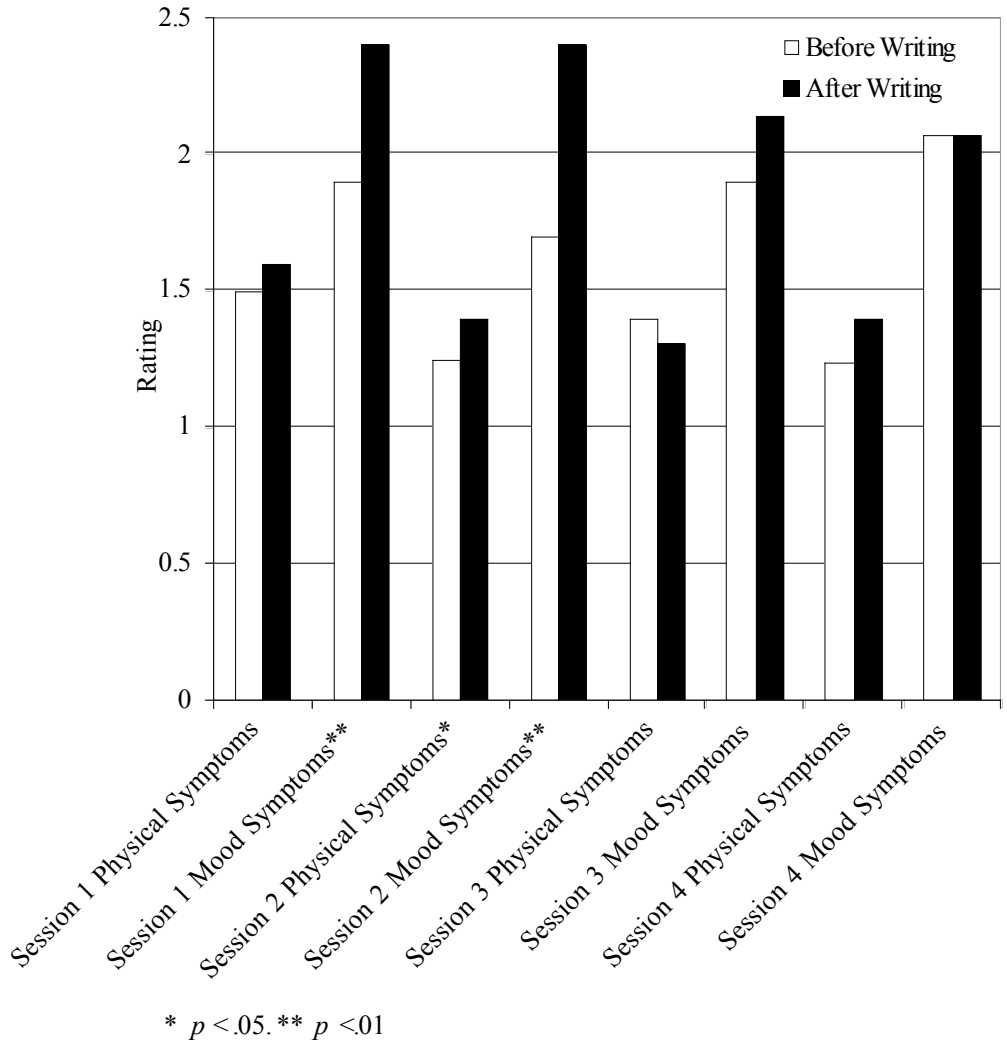


*Figure 4.* Mean immediate physiological and mood symptom scores before and after writing.

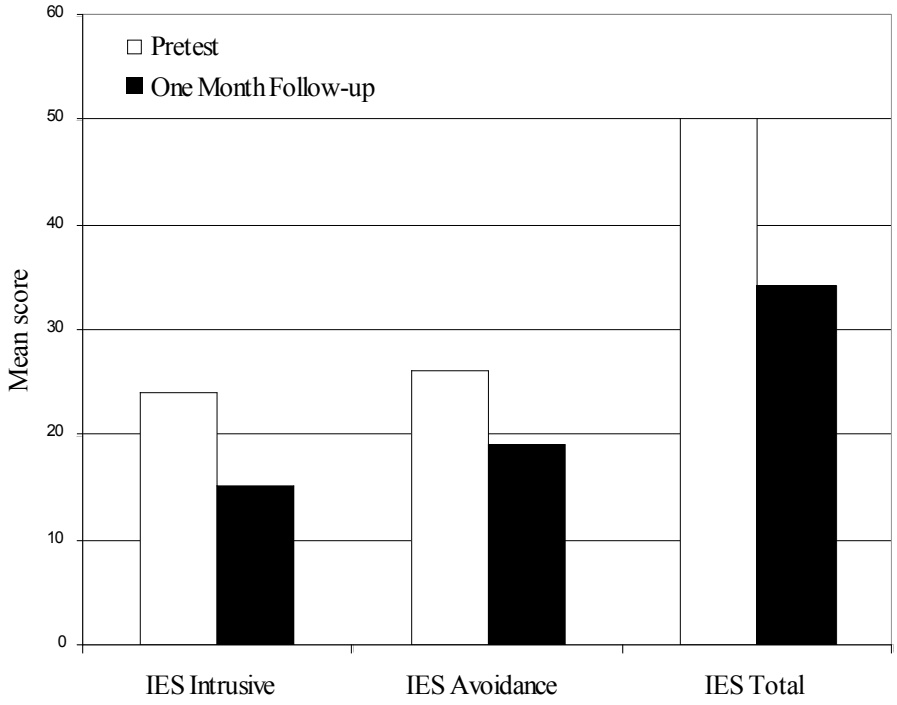


*Figure 5.* Mean pretest and one month follow-up scores for non-completers on IES total score and intrusive and avoidance subscales.

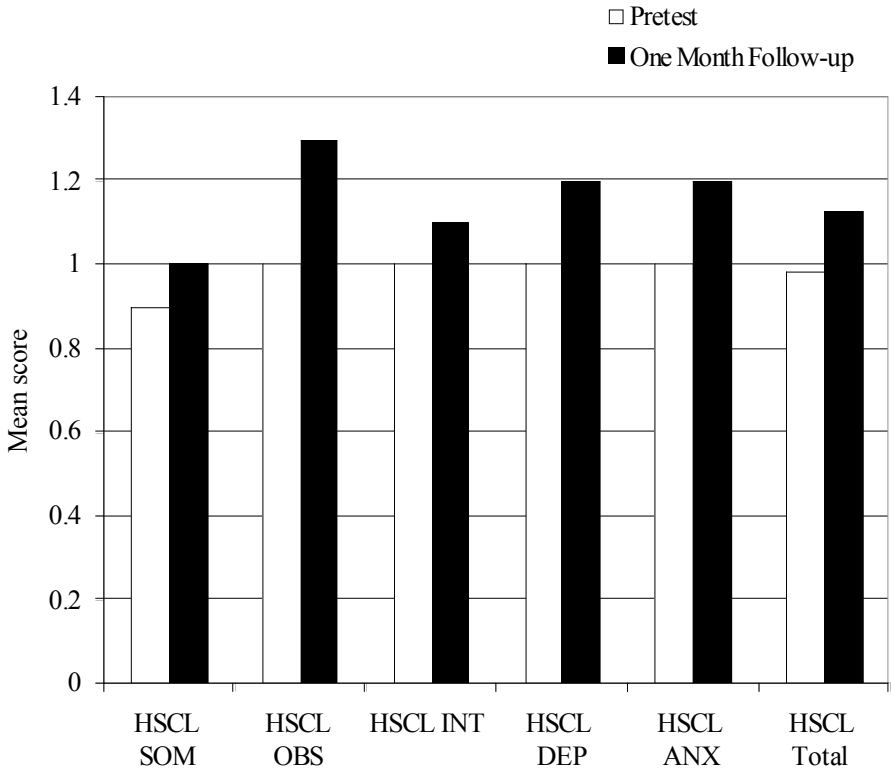


*Figure 6.* Mean pretest and one month follow-up scores for non-completers on HSCL total and subscale scores.

# APPENDIX A

# DEMOGRAPHIC QUESTIONNAIRE

**Demographic Questionnaire**

**Please answer these questions by filling in the blank or marking the appropriate space.**

1. What is your age? _____

2. What is your gender? (*Please mark one answer*) _____1) Male _____2) Female

3. What is your ethnic origin

| | |
|---|---|
| ____ Caucasian | ____ Hispanic |
| ____ African-American | ____ Native American |
| ____ Asian | ____ other please describe: _____ |

4. What is your current relationship status? *(Please mark one answer)*

| | |
|---|---|
| _____1) Single (never married) | _____4) Widowed |
| _____2) Married | _____5) Divorced |
| _____3) In committed relationship | _____6) Separated |

5. Do you have any children?

_____1) No _____2) Yes (including step or adopted)

If Yes, How many children? _____

6. Highest grade level completed _____

7. Number of college credits currently enrolled in _____

8. What is your religious orientation?

| | |
|---|---|
| _____1) Catholic | _____6) Christian-nondenominational |
| _____2) Baptist | _____7) Jewish |
| _____3) Methodist | _____8) Islamic |
| _____4) Presbyterian | _____9) Buddhist |
| _____5) Lutheran | _____10) Agnostic |
| | _____11) Atheist |
| | _____12) Other (specify): _____ |

9. Have you *ever* been diagnosed with a psychological disorder by a physician or mental health professional?

| | |
|---|---|
| _____1) No, Never | _____3) Yes, Several times |
| _____2) Yes, Once or twice | _____4) Yes, Fairly often |

10. Are you *currently* diagnosed with a psychological disorder?

_____1) No _____2) Yes

11. Have you *ever* been prescribed medication for a psychological disorder?

_____1) No (If No, go to Question 12) _____2) Yes

12. Are you *currently* taking prescribed medication for a psychological disorder?

_____1) No _____2) Yes

13. Have you *ever* received outpatient psychotherapy or counseling?

_____1) No _____2) Yes

14. Are you *currently* receiving outpatient psychotherapy or counseling?

_____1) No _____2) Yes

15. Have you *ever* been an inpatient in a psychiatric hospital or unit?

_____1) No _____2) Yes

16. Do *either* of your parents have a history of psychological difficulties?

_____1) No _____2) Yes _____3) Don't Know

17. Have you *ever* kept a journal or diary in which you wrote about difficult personal experiences?

_____1) No _____2) Yes

18. Do you *currently* keep a journal or diary in which you write about difficult personal experiences?

_____1) No _____2) Yes

If you answered YES to question 17, how often do you write in your journal/diary?

_____1) every day
_____2) every 2 – 3 days
_____3) once a week
_____4) every 2 – 3 weeks
_____5) once a month
_____6) once every 2 – 3 months

# APPENDIX B

# CHILDHOOD TRAUMATIC EVENTS SCALE

Childhood Traumatic Events Scale

For the following questions, answer each item that is relevant. Be as honest as you can. Each question refers to any event that you may have experienced prior to the age of 17.

1. Prior to the age of 17, did you experience a death of a very close friend or family member?_____ If yes, how old were you?_____

If yes, how traumatic was this? (using a 7-point scale, where 1 = *not at all traumatic*, 4 = *somewhat traumatic*, 7 = *extremely traumatic*)_____

If yes, how much did you confide in others about this traumatic experience at the time? (1 = *not at all*, 7 = *a great deal*)_____

2. Prior to the age of 17, was there a major upheaval between your parents (such as divorce, separation)?_____ If yes, how old were you?_____

If yes, how traumatic was this? (where 7 = *extremely traumatic*)_____

If yes, how much did you confide in others? (7 = *a great deal*)_____

3. Prior to the age of 17, did you have a traumatic sexual experience (raped, molested, etc.)?_____ If yes, how old were you?_____

If yes, how traumatic was this? (7 = *extremely traumatic*)_____

If yes, how much did you confide in others? (7 = *a great deal*)_____

4. Prior to the age of 17, were you the victim of violence (child abuse, mugged or assaulted - other than sexual)?_____ If yes, how old were you?_____

If yes, how traumatic was this? (7 = *extremely traumatic*)_____

If yes, how much did you confide in others? (7 = *a great deal*)_____

5. Prior to the age of 17, were you extremely ill or injured?_____ If yes, how old were you?_____

If yes, how traumatic was this? (7 = *extremely traumatic*)_____

If yes, how much did you confide in others? (7 = *a great deal*)_____

6. Prior to the age of 17, did you experience any other major upheaval that you think may have shaped your life or personality significantly?_____ If yes, how old were you?_____

If yes, what was the event?_____

If yes, how traumatic was this? (7 = *extremely traumatic*)_____

If yes, how much did you confide in others? (7 = *a great deal*)_____

# APPENDIX C

# RECENT TRAUMATIC EVENTS SCALE

Recent Traumatic Events Scale

For the following questions, answer each item that is relevant and again be as honest as you can. Each question refers to any event that you may have experienced within the last 3 years.

1. Within the last 3 years, did you experience a death of a very close friend or family member? _____

If yes, how traumatic was this? (1 = *not at all traumatic*, 7 = *extremely traumatic*)_____

If yes, how much did you confide in others about the experience at the time? (1 = *not at all*, 7 = *a great deal*)_____

2. Within the last 3 years, was there a major upheaval between you and your spouse (such as divorce, separation)?_____

If yes, how traumatic was this?_____

If yes, how much did you confide in others?_____

3. Within the last 3 years, did you have a traumatic sexual experience (raped, molested, etc.)?_____

If yes, how traumatic was this?_____

If yes, how much did you confide in others?_____

4. Within the last 3 years, were you the victim of violence (other than sexual)?_____

If yes, how traumatic was this?_____

If yes, how much did you confide in others?_____

5. Within the last 3 years, were you extremely ill or injured?_____

If yes, how traumatic was this?_____

If yes, how much did you confide in others?_____

6. Within the last 3 years, has there been a major change in the kind of work you do (e.g., a new job, promotion, demotion, lateral transfer)?_____

If yes, how traumatic was this?_____

If yes, how much did you confide in others?_____

7. Within the last 3 years, did you experience any other major upheaval that you think may have shaped your life or personality significantly?_____

If yes, what was the event?_____

If yes, how traumatic was this?_____

If yes, how much did you confide in others?_____

# APPENDIX D

# ACTIVITIES AND BEHAVIORS QUESTIONNAIRE

Within the last week, HOW MANY TIMES have you done each of the following:

1. Number of times exercised strenuously ____

2. Number of times had difficulty falling asleep ____

3. Talked on the phone to one or both parents or old friends ____

4. Visited a physician or the student health center for illness ____

5. Ate far too much at one meal ____

6. Had a heart-to-heart talk with someone ____

7. Attended a meeting of an organization (e.g., church, fraternity) ____

8. Studied or read _____

9. Talked or corresponded with an old girlfriend or boyfriend ____

10. Made a new friend ____

11. Received a traffic ticket (including parking violation) ____

12. Written down your deepest thoughts and feelings _____

In the last week, how many of the following have you consumed:

13. Alcoholic beverages ____ 14. Doses of prescribed drugs____

15. Cigarettes ____ 16. Doses of nonprescribed drugs___

17. Cups of coffee _____ 18. Snacks with sugar____

19. Aspirin or other pain reliever ____ 20. Vitamins ____

# APPENDIX E

# THE PILL

Several common symptoms or bodily sensations are listed below. Most people have experienced most of them at one time or another. We are currently interested in finding out how prevalent each symptom is among various groups of people. On the page below, write how frequently you have experience each symptom in THE PAST MONTH. For all items, use the following scale:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| *Have never experienced* | *Once* | *2-3 times* | *Every week or so* | *More than once every week* |

For example, if your eyes tend to water once every week or two, you would answer "4" next to question #1.

___1. Eyes water
___2. Itchy eyes or skin
___3. Ringing in ears
___4. Temporary deafness or hard of hearing
___5. Lump in throat
___6. Choking sensations
___7. Sneezing spells
___8. Running nose
___9. Congested nose
___10. Bleeding nose
___11. Asthma or wheezing
___12. Coughing
___13. Out of breath
___14. Swollen ankles
___15. Chest pains
___16. Racing heart
___17. Cold hands or feet even in hot weather
___18. Leg cramps
___19. Insomnia or difficulty sleeping
___20. Toothaches
___21. Upset stomach
___22. Indigestion
___23. Heartburn or gas
___24. Abdominal pain
___25. Diarrhea
___26. Constipation
___27. Hemorrhoids
___28. Swollen joints
___29. Stiff or sore muscles
___30. Back pains
___31. Sensitive or tender skin
___32. Face flushes
___33. Tightness in chest
___34. Skin breaks out in rash
___35. Acne or pimples on face
___36. Acne/pimples other than face
___37. Boils
___38. Sweat even in cold weather
___39. Strong reactions to insectbite
___40. Headaches
___41. Feeling pressure in head
___42. Hot flashes
___43. Chills
___44. Dizziness
___45. Feel faint
___46. Numbness or tingling in any part of
___47. Twitching of eyelid
___48. Twitching other than eyelid
___49. Hands tremble or shake
___50. Stiff joints
___51. Sore muscles
___52. Sore throat
___53. Sunburn
___54. Nausea

Since the beginning of the semester, how many:
_____ Visits have you made to a physician for illness

_____ Days have you been sick

_____ Days your activity has been restricted due to illness

# APPENDIX F

# THE IMPACT OF EVENT SCALE

Below is a list of comments made by people after stressful life events. Using the following scale, please indicate (with a number) how frequently each of these comments were true for you DURING THE PAST SEVEN DAYS in regard to this specific life event:
_____.

SCORE EACH ITEM AS ONE OF THESE FOUR CHOICES:

(0) *Not at all* (1) *Rarely* (3) *Sometimes* (5) *Often*

1. I thought about it when I didn't mean to ____

2. I avoided letting myself get upset when I thought about it or was reminded of it ____

3. I tried to remove it from memory ____

4.I had trouble falling asleep or staying asleep because of pictures or thoughts about it that came into my mind ____

5. I had waves of strong feelings about it ____

6. I had dreams about it ____

7. I stayed away from reminders of it ____

8. I felt as if it hadn't happened or wasn't real ____

9. I tried not to talk about it ____

10. Pictures about it popped into my mind ____

11. Other things kept making me think about it ____

12. I was aware that I still had a lot of feelings about it, but I didn't deal with them ____

13. I tried not to think about it ____

14. Any reminder brought back feelings about it ____

15.My feelings about it were kind of numb _____

# APPENDIX G

# BEFORE-WRITING QUESTIONNAIRE

Before-Writing Questionnaire

**********

Right now, to what degree are you currently experiencing each of the following, where:

1 = *not at all* 3 = *somewhat* 5 = *a great deal*

| | |
|---|---|
| Racing heart____ | Nervous___ |
| Upset stomach___ | Sad___ |
| Headache___ | Guilty___ |
| Dizziness___ | Happy___ |
| Shortness of breath___ | Contented___ |
| Cold hands___ | Fatigued___ |
| Sweaty hands___ | Constrained___ |
| Pounding heart___ | Anxious___ |

# APPENDIX H

# AFTER-WRITING QUESTIONNAIRE

After-Writing Questionnaire

**********

Right now, to what degree are you currently experiencing each of the following, where:

1 = *not at all* 3 = *somewhat* 5 = *a great deal*

| | |
|---|---|
| Racing heart____ | Nervous___ |
| Upset stomach___ | Sad___ |
| Headache___ | Guilty___ |
| Dizziness___ | Happy___ |
| Shortness of breath___ | Contented___ |
| Cold hands___ | Fatigued___ |
| Sweaty hands___ | Constrained___ |
| Pounding heart___ | Anxious___ |

Overall, how personal was the essay that you wrote today ___

Overall, how much have you told other people about what you wrote today ___

Overall, how much did you reveal your emotions in what you wrote today ___

How much have you wanted to tell another person about what you wrote today ___

How much have you actively held back from telling others about what you wrote today ___

Briefly below, describe how you feel about what you wrote today:

# APPENDIX I

# LAST DAY OF WRITING QUESTIONNAIRE

Last Day of Writing

ID # _____ Date _____

In answering the following questions, consider all four writing sessions.

1. Overall, how personal were the essays that you wrote:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| *not personal* | | | | | | *personal* |

2. Prior to the experiment, how much had you told other people about what you wrote:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| *not at all* | | | | | | *a great deal* |

3. Overall, how much did you reveal your emotions in what you wrote:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| *not at all* | | | | | | *a great deal* |

4. How much have you actively held back from telling others about what you wrote:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| *not at all* | | | | | | *a great deal* |

5. Prior to the experiment, how much had you wanted to talk with someone about what you wrote:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| *not at all* | | | | | | *a great deal* |

6. Over the last 4 weeks, how difficult has it been for you to write during the experiment:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| *not at all* | | | | | | *extremely* |

7. In general, how sad or depressed have you felt over the last 4 weeks:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| *not at all* | | | | | | *extremely* |

8. In general, how happy have you felt over the last 4 weeks:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| *not at all* | | | | | | *extremely* |

9. During your normal day, to what degree have you thought about this experiment since it began:

1 2 3 4 5 6 7
*not at all* *a great deal*

10. Since the beginning of the study, during the hours that you were not involved in the experiment, to what degree have you thought about the topics that you wrote about:

1 2 3 4 5 6 7
*not at all* *a great deal*

11. Before the experiment ever began, to what degree did you think about the topics you wrote about:

1 2 3 4 5 6 7
*not at all* *a great deal*

12. How important has it been to you that your essays were anonymous:

1 2 3 4 5 6 7
*not at all* *extremely*

13. To what degree would you like other people (who you don't know) to read your anonymous essays:

1 2 3 4 5 6 7
*would not like* *would like it a great deal*

14. To what degree would you like to have your essays thrown away without anyone ever reading them:

1 2 3 4 5 6 7
*would not like it at all* *would like it a great deal*

15. To what degree has this experiment been valuable or meaningful for you:

1 2 3 4 5 6 7
*not at all* *extremely valuable/meaningful*

16. In your own words, what do you think this experiment is trying to prove:

17. Any comments that you have about the experiment would be greatly appreciated. (Use back if necessary)

# APPENDIX J

## LONGTERM THOUGHTS ABOUT THE WRITING EXPERIMENT

All of the following questions refer to your thoughts and feelings surrounding your participation in the 4-session writing experiment in which you participated in _____

Answer the following questions on a scale from *1* to *7* with *1* being *not at all* and *7* being *a great dea*":

1. In the past month, how much have you thought about what you wrote in the writing experiment? _____

2. In the past month, how much have you talked to other people about what you wrote? _____

3. Looking back on the experiment, to what degree do you feel that the experiment had a positive longlasting effect on you? _____

4. Looking back on the experiment, to what degree do you feel that the experiment had a negative longlasting effect on you? _____

5. In the past month, how happy have you felt? _____

6. In the past month, how sad or depressed have you felt? _____

7. Looking back on the writing experiment, to what degree was the experiment valuable or meaningful for you? _____

8. Now that the experiment is completed, could you tell us how it may have influenced you in the longrun? What have been the positive effects as well as the negative effects?

9. If you had the chance to do it over again, would you participate in this study:
definitely yes____
probably yes____
don't know____
probably no____
definitely no____

10. Any other comments you have about the experiment will be greatly appreciated (Use back if necessary):

APPENDIX K

INFORMED CONSENT FORM

University of North Texas Institutional Review Board

Informed Consent Form

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose and benefits of the study and how it will be conducted.

Title of Study: An Exercise in Story Repair: A Guided Written Disclosure Protocol for Fostering Narrative Completeness

Principal Investigator: Daniel A. Tomczyk, a graduate student in the University of North Texas (UNT) Department of Psychology.

**Purpose of the Study:**

You are being asked to participate in a research study which involves writing about a single stressful experience on four separate occasions in order to help make the memory of that experience more manageable and potentially reduce the stress associated with the memory, reduce physical symptoms of illness, and reduce general psychological symptoms.

**Study Procedures:**

You will be directed in experiential writing exercises that are purported to structure stressful life experiences into coherent narratives. You will be asked to write four essays in four separate writing sessions as part of a class entitled "The Psychology of Writing about Stressful Experiences." The writing will take place during four separate class periods and will take approximately one-half hour on each session, for a total of 2 hours of your time. You will also be asked to complete questionnaires before the study begins, before and after each writing session, and one month after the writing sessions take place. These questionnaires will ask questions about such things as your experience of general psychological symptoms, your feelings about the process of writing about a stressful experience, and your experience of physical symptoms of illness.

**Foreseeable Risks:**
The potential risks involved in this study are that you may feel depressed and experience physiological symptoms of arousal or anxiety immediately after writing about a stressful experience.

**Benefits to the Subjects or Others:**
We expect the project to benefit you by helping you to better understand the stressful experience, reduce the stress associated with the memory, reduce physical symptoms of illness, and reduce general psychological symptoms.

**Compensation for Participants:**

You will receive one (1) hour of psychology course credit for being enrolled in the course and you will receive a grade for the class that will be figured into your grade point average. Your grade will be based on attendance and your completion of assigned tasks.

**Procedures for Maintaining Confidentiality of Research Records:**

Your essays and completed questionnaires will remain completely anonymous. Once you complete and sign this consent form, you will be assigned a confidential numerical code that will be used on all essays and questionnaires you complete. Your name will not be attached to that numerical code in any way. The only pieces of information that will be attached to the numerical code are your demographic characteristics, such as age, gender, ethnicity, years of education, etc. Furthermore, signed consent forms will be kept in locked filing cabinets in a separate location from your essays, which will also be kept in locked filing cabinets. Also, the confidentiality of your individual information will be maintained in any publications or presentations regarding this study.

**Questions about the Study**

If you have any questions about the study, you may contact *Daniel A. Tomczyk* at telephone number (940) 382-0154 or *Kenneth W. Sewell, Ph.D.,* UNT Department of Psychology at telephone number XX.

**Review for the Protection of Participants:**

This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

**Research Participants' Rights:**

Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- *Daniel A. Tomczyk* has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You have been told you will receive a copy of this form.

_____ _____

Signature of Participant Date

**For the Principal Investigator or Designee:**

I certify that I have reviewed the contents of this form with the participant signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the participant understood the explanation.

_____ _____

Signature of Principal Investigator or Designee Date

APPENDIX L

LIWC WORD DIMENSIONS AND CATEGORIES (WITH EXAMPLES IN PARENTHESES)

**I. STANDARD LINGUISTIC DIMENSIONS**
Word Count
Words per sentence
Sentences ending with ?
Unique words (type/token ratio)
% words captured, dictionary words
% words longer than 6 letters
Total pronouns
1st person singular
1st person plural
Total first person
Total second person
Total third person
Negations
Assents
Articles
Prepositions
Numbers
**II. PSYCHOLOGICAL PROCESSES**
**Affective or Emotional Processes**
Positive Emotions (happy, pretty, good)
    Positive feelings (happy, joy, love)
    Optimism and energy (certainty, pride, win)
Negative Emotions (hate, worthless, enemy)
    Anxiety or fear (nervous, afraid, tense)
    Anger (hate, kill, pissed)
    Sadness or depression (grief, cry, sad)
**Cognitive Processes**
Causation (because, effect, hence)
Insight (think, know, consider)
Discrepancy (should, would, could)
Inhibition (block, constrain)
Tentative (maybe, perhaps, guess)
Certainty (always, never)
**Sensory and Perceptual Processes**
Seeing (view, saw, look)
Hearing (heard, listen, sound)
Feeling (touch, hold, felt)
**Social Processes**
Communication (talk, share, converse)
Other references to people
Friends (pal, buddy, coworker)
Family (mom, brother, cousin)
Humans (boy, woman, group)
**III. RELATIVITY**
**Time**

Past tense verb (walked, were, had)
Present tense verb (walk, is, be)
Future tense verb (will, might, shall)
**Space**
Up (up, above, over)
Down (down, below, under)
Inclusive (with, and, include)
Exclusive (but, except, without)
**Motion**
**IV. PERSONAL CONCERNS**
**Occupation**
School (class, student, college)
Job or work (employ, boss, career)
Achievement (try, goal, win)
**Leisure activity**
Home (house, kitchen, lawn)
Sports (football, game, play)
Television and movies (TV, sitcom, cinema)
Music (tunes, song, cd)
**Money and financial issues**
**Metaphysical issues**
Religion (God, church, rabbi)
Death and dying (dead, burial, coffin)
**Physical states and functions**
Body states (symptoms, ache, heart, cough)
Sex and sexuality (lust, penis, fuck)
Eating, drinking, dieting (eat, swallow, taste)
Sleeping, dreaming (asleep, bed, dreams)
Grooming (wash, bath, clean)
**EXPERIMENTAL DIMENSIONS**
Swear words (damn, fuck, piss)
Nonfluencies (uh, rr*)
Fillers (you know, I mean)

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