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Evaluating the Pennebaker Paradigm with Bereaved Emerging Adults: Applications of Text Analysis

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EVALUATING THE PENNEBAKER PARADIGM WITH BEREAVED EMERGING
ADULTS: APPLICATIONS OF TEXT ANALYSIS

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of
Philosophy at Virginia Commonwealth University

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Abstract

EVALUATING THE PENNEBAKER PARADIGM WITH BEREAVED EMERGING
ADULTS: APPLICATIONS OF TEXT ANALYSIS

By Elizabeth A. Collison, M.S.

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of
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Major Director: Sandra E. Gramling, Ph.D.
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Bereavement is an important research area as it can result in grief reactions that lead to

serious psychological and health consequences, particularly for the at-risk group of emerging

adults (Arnett, 2000; Balk, Walker, & Baker, 2010; Fisher, Murray, & Frazer, 1985; Stroebe,

Schut, & Stroebe, 2007). Expressive writing is a well-researched intervention for trauma and

adjustment, yet research repeatedly has revealed null results with the classic Pennebaker

paradigm as a bereavement intervention (Stroebe et al., 2002; Stroebe, Schut, & Stroebe, 2006).

It may be premature, however, to conclude expressive writing is ineffective for the bereaved due

to limitations in extant research. For example, Pennebaker's paradigm is based on the premise

that participants *freely choose* the stressful topic to write about, whereas expressive writing

bereavement studies have *required* participants to write about their loss (Collison & Gramling,

manuscript in preparation).

The present study reports on data from a larger study (Konig, Eonta, Dyal, & Vrana, 2014; *N*=246) that assessed psychological and physiological outcomes in college students who wrote about a traumatic stressor using Pennebaker's paradigm. This provided the opportunity to rigorously test it with bereavement and compare death loss to other forms of trauma. Analyses examined the impact of expressive writing with the bereaved who *freely identified* death loss as the traumatic stressor (*n*=69) and were randomly assigned to either emotional disclosure or control writing on outcome measures of physical symptoms (PILL), event-related distress (DTS), and depression (CES-D). Linguistic Inquiry and Word Count (LIWC; Pennebaker, Mayne, & Francis, 1997) and Latent Semantic Analysis (LSA; Campbell & Pennebaker, 2003) results were also used to compare these groups. Exploratory analyses investigated potential differences between the bereaved and those who endorsed a non-bereavement trauma ("other trauma"; *n*=71) using outcome measures and text analytic techniques (i.e., PILL, DTS, CES-D; LIWC, LSA). Results were consistent with findings from previous expressive writing studies with the bereaved, in that the intervention resulted in no detectable benefits when compared with control writing. No remarkable differences between the bereaved and "other trauma" participants emerged. Researchers' time may be better spent examining more clinically relevant writing exercises for bereavement interventions.

Evaluating the Pennebaker Paradigm with Bereaved Emerging Adults:

Applications of Text Analysis

Though interest in bereavement, grief, and loss has spanned human history, psychological

research in these areas is much more recent (Granek, 2010). Research on bereavement

traditionally has focused on childhood loss, parents who have lost a child, and spousal loss in

middle-aged and older adults (Wimpenny et al., 2006), leaving adolescents, emerging adults, and

young adults relatively unexamined. Researchers have shown that emerging adults experience a

surprisingly high number of losses, are an at-risk group for negative outcomes, and have

relatively few resources for support (Arnett, 2000; Balk, Walker, & Baker, 2010; Servaty-Seib &

Hamilton, 2006; Servaty-Seib & Taub, 2010; Taub & Servaty-Seib, 2008). This lack of

bereavement research with younger groups therefore needs addressing in order to better

understand and develop resources for these individuals.

One form of intervention that frequently is recommended for the bereaved is sharing

about the loss and feelings associated with it, either verbally or in writing (e.g., Neimeyer, van

Dyke, & Pennebaker, 2009). Pennebaker's expressive writing paradigm is a writing intervention

that has been researched extensively, particularly in the stress and coping and trauma literature

(Frattaroli, 2006; Pennebaker, 1997). However, among the bereaved, the Pennebaker paradigm

often has failed to demonstrate effectiveness. Thus, researchers have begun to conclude it is

ineffective with bereaved individuals (Stroebe et al., 2002; Stroebe, Schut, & Stroebe, 2006). We

have argued that this decision was made too early, based on the numerous methodological issues and inconsistencies in existing expressive writing research with the bereaved (Collison & Gramling, manuscript in preparation).

A previous study (Konig, Eonta, Dyal, & Vrana, 2014) on expressive writing with emerging adults will help to address this gap in the literature. In this dataset, a substantial portion of participants (72 out of 246) identified the loss of a loved one as their traumatic stressor and wrote about it in the context of Pennebaker's expressive writing paradigm. Thus, this dataset provides the unique opportunity to examine Pennebaker's paradigm with bereaved individuals who freely identified their loss as a stressor, as opposed to being selected for the study on the basis of their being bereaved (e.g., Lichtenthal & Cruess, 2010; Stroebe et al., 2002). It also allows the chance to compare the bereaved to others who have suffered a non-bereavement trauma in a methodologically sound study. Unlike other intervention and expressive writing studies with the bereaved, Konig et al.'s (2014) study evidenced strong intervention adherence, had an active control group, randomly assigned participants to conditions, and used Pennebaker's traditional instructions (Pennebaker, 1997).

The present study aimed to contribute to the expressive writing, bereavement, and emerging adulthood literatures in several ways. First, it explored the effectiveness of Pennebaker's paradigm in a well-controlled study that addressed some of the methodological limitations of previous studies with the bereaved. Second, it compared bereaved writers across conditions (emotional disclosure, control) and to trauma writers using quantitative outcomes and

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text analytic techniques (e.g., Linguistic Inquiry and Word Count, Latent Semantic Analysis) that hold promise in this area of research (Campbell & Pennebaker, 2003; Pennebaker, Mayne, & Francis, 1997). Linguistic Inquiry and Word Count (LIWC) and Latent Semantic Analysis (LSA) both previously have been tested with expressive writing samples and provided interesting results. Namely, the types of words used during writing as well as the flexibility of writing style predicted physical and psychological outcomes (Campbell & Pennebaker, 2003; Pennebaker et al., 1997). Even so, only two published studies have so far examined bereaved individuals' writings using LIWC (Baddeley & Singer, 2008; Pennebaker, Mayne, & Francis, 1997) and LSA has yet to be applied to bereaved individuals' writings (Campbell & Pennebaker, 2003).

In order to investigate the impact of expressive writing on physical and psychological health outcomes with bereaved emerging adults, relevant literature is presented. The literature review begins with the discussion of the necessity for further research with bereaved emerging adults, based on their unique circumstances that render them vulnerable to negative outcomes. Next, literature on attempts to intervene with the bereaved and methodological issues in this area of research is summarized. Pennebaker's expressive writing paradigm is then introduced as an example of a well-known technique that more recently has been examined as a potential bereavement intervention. A more detailed look at the development of Pennebaker's paradigm and relevant theory is provided. Existing empirical studies on expressive writing with the bereaved is then presented, with various methods of analysis discussed. Specifically, the usefulness of quantitative methods and text analytic techniques (LIWC, LSA) and examples of

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their applicability to expressive writing with the bereaved are highlighted.

Review of the Literature

Bereavement and Emerging Adulthood

Bereavement is a nearly universal experience with potentially serious and wide-ranging negative physical and psychological health consequences (Stroebe, Schut, & Stroebe, 2007). Losing a loved one has been associated with increased mortality (Stroebe & Stroebe, 1993), a wide array of physical symptoms (Stroebe, Hansson, Schut, & Stroebe, 2008), psychological symptoms (Stroebe et al., 2008), and psychiatric diagnoses (Raphael, Minkov, & Dobson, 2001). Research on bereavement traditionally has focused on childhood loss, parents who have lost a child, and spousal loss in middle-aged and older adults (Wimpenny et al., 2006). Other populations have received much less attention, due to a lack of recognition or disenfranchisement (e.g., Price, 2006). Though some research has been conducted on bereaved adolescents and young adults, historically there has been much less focus on these age groups (Balk, 1991; Balk, 1997; Ewalt & Perkins, 1979; Lagrand, 1985). This began to change following Arnett's seminal paper in the American Psychologist (2000) that defined emerging adulthood as a stage of development encompassing the late teens through the twenties, focusing on ages 18 through 25. Arnett (2000) and others (Balk, Walker, & Baker, 2010; Mathews & Servaty-Seib, 2007) report that emerging adults suffer a surprisingly high rate of death loss. Emerging adulthood since has been a rapidly growing area of inquiry (Fowler, Toro, & Miles, 2011; Gomez, Miranda, & Polanco, 2011; Jensen, 2011; Tanner & Arnett, 2009; Wenzel et al., 2011) and bereavement

during this developmental stage has garnered increased attention (Balk et al., 2010).

In proposing emerging adulthood as a new stage of development, Arnett (2000) borrowed from components from well-known developmental models (i.e., Erikson, 1979; Keniston, 1971; Levinson, 1978) and incorporated modern research on societal changes in order to update these earlier models. He described emerging adulthood as a stage of transition distinct from the dependency of adolescence and the later enduring responsibilities of young adulthood (Arnett, 2000). Thus, it is characterized by a relative independence without long-term consequences. Jensen (2011) highlighted several aspects of emerging adulthood, such that he considers it "the age of identity explorations, instability, feeling in-between, possibilities, and being self-focused." Emerging adults uniquely explore their identity through making crucial choices (often for the first time) for themselves in the areas of love, work, and worldviews. It is an unstable period of time, as these individuals often are experiencing a variety of changes in their relationships, jobs, education, and living situations. The "feeling in-between" expresses the transition between adolescence and adulthood they are caught in, with many exciting possibilities for the future not yet realized. Thus, this time of possibilities is a very hopeful time for them with many future goals and few failures. As a period with few obligations and an increased amount of independent decision-making, emerging adulthood is quite focused on the self (Jensen, 2011).

Though there are many positive aspects to this stage of development, the many changes that occur leave these individuals quite vulnerable. Emerging adults are away from their primary social support, adjusting to a different lifestyle, and transitioning into a different societal role

(Pennebaker, Colder, & Sharp, 1990), which leaves them at risk for poor physical and psychological health outcomes following a significant life stressor (Fisher, Murray, & Frazer, 1985). Bereavement researchers thus have begun to pay more attention to this population, at least with respect to emerging adults who attend college, in order to better recognize how their stage of development contributes to their grief (Balk et al., 2010; Servaty-Seib & Hamilton, 2006). The recent loss of a loved one is a stressor that a surprisingly high number of college students within this stage of development endorse. Balk et al. (2010) found a substantial portion (i.e., 39%) of their college student sample suffered a loss within the previous two years. This is consistent with findings of other researchers examining the prevalence of bereavement within a college student sample (Currier, Holland, Coleman, & Neimeyer, 2006; Smyth, Hockemeyer, Heron, Wonderlich, & Pennebaker, 2008). Some examples of negative consequences that bereaved emerging adults experience at a higher rate than their non-bereaved peers include insomnia (Hardison, Neimeyer, & Lichstein, 2005) and decreased academic performance (Servaty-Seib & Hamilton, 2006). Bereaved college students have also reported challenges such as increased substance use, social isolation, financial difficulties, somatic symptoms, religious struggle, and depressive symptoms (Lord, Gramling, Collison, & Weiskittle, 2014). Researchers also have brought awareness to the lack of resources for students, as students themselves have responded to this need by developing grief support groups (Fajgenbaum, Chesson, & Lanzi, 2012; Servaty-Seib & Taub, 2010; Taub & Servaty-Seib, 2008). Thus, bereavement research with emerging adults particularly is warranted, as they represent an under-studied group within the literature,

are at-risk for negative outcomes, and have few resources for support (Fajgenbaum et al., 2012; Neimeyer, Laurie, Mehta, Hardison, & Currier, 2008).

Intervening with the Bereaved

As recognition of bereavement and its potential impact on physical and psychological health has grown, researchers have noticed the occurrence of problematic grief reactions. This led a subset of bereavement experts to conduct research and establish a suggested set of criteria for disordered grief to be included in the DSM-5 (Prigerson et al., 1995; Prigerson et al., 2009; Shear et al., 2011). Prolonged grief disorder was included as a disorder warranting further research for the DSM-5 and research on "complicated" grief and potential interventions for it has continued to build. Other researchers have taken issue with the concept of grief as pathology or instead chosen to focus on resiliency and positive outcomes that can occur following the loss of a loved one (Bonanno, Westphal, & Mancini, 2011; Foote & Frank, 1999; Granek, 2010; Stroebe et al., 2000). A third, less partial, approach has been to research grief with a focus on the varieties of grief reactions and coping styles that can occur post-loss (Bonanno et al., 2002; Lord, Gramling, & Auerbach, 2012). This trajectories approach encourages researchers to differentiate the factors predictive of various patterns of grief and associated coping methods used, rather than to determine the "best" or "worst" ways to grieve.

Models of Grief Processes. In addition to the trajectories approach of understanding grief processes, a variety of grief models have been proposed over the years including stage models, task models, the Dual Process Model, and the meaning making model. Meaning making

theory was developed out of the stress and coping and cognitive appraisal literature (Janoff-Bulman, 1992; Lazarus & Folkman, 1984) and later applied to bereavement (Park, 2008; Park, 2010; Park & Folkman, 1997). Meaning making is the process by which one seeks to reduce discrepancies between one's global beliefs and situational appraisals (e.g., "Why do bad things happen to good people?"). When the process is complete, it is said that the individual has achieved "meanings made," (e.g., an impression of having "made sense" of the stressor, acceptance, reattributions of the event, perceptions of growth, benefits, or positive life changes). It is generally held that meaning making is an active process often associated with distress, whereas meanings-made represents completed meaning making processes and successful adjustment to the stressor (Park, 2010). Researchers and clinicians support the importance of meaning reconstruction through meaning making processes for grief adaptation and grief therapy, particularly through "making sense" of the loss or "finding benefit" in one's circumstances following the loss (Davis & Nolen-Hoeksema, 2001; Gillies & Neimeyer, 2006; Holland, Currier, & Neimeyer, 2006). Though research on meaning making processes remains limited, their role in coping with grief has been empirically supported. Specifically, one's ability to "make sense" of a loss has been associated with positive adjustment to bereavement (Holland et al., 2006).

A second major theory is the Dual Process Model of Coping with Bereavement (Stroebe & Schut, 1999; Stroebe & Schut, 2010). It was developed to more accurately conceptualize and portray the bereavement coping process on a more daily basis by describing two styles of coping

(i.e., loss-oriented and restoration-oriented) and the natural oscillation that occurs between them. Loss-oriented coping focuses on dealing with processing an aspect of the loss experience, typically focused on the deceased person. Restoration-oriented coping instead is directed at what needs to be dealt with following the loss, such as attending to life changes, beginning new activities or returning to old ones, distracting oneself from grief, or taking on new roles, identities, or relationships without the deceased (Stroebe & Schut, 1999). Oscillation is said to occur between the two coping styles in a dynamic pattern of confrontation-avoidance. This ability to switch between different coping styles is deemed theoretically important for optimal adjustment, though this has yet to be sufficiently empirically studied (Stroebe & Schut, 1999).

Evaluating Bereavement Interventions. Alongside the development of grief theories, clinicians and researchers have produced and examined bereavement interventions (e.g., writing, support groups, supportive psychotherapy) to assist with coping processes, enhance positive outcomes, and reduce negative symptomatology. Unfortunately, many of these interventions have struggled to establish efficacy for a variety of reasons (Currier, Neimeyer, & Berman, 2008; Schut, Stroebe, den Bout, & Terheggen, 2001).

In their book chapter, "The efficacy of bereavement interventions: Determining who benefits," Schut et al. (2001) review the literature on bereavement interventions. They discuss the many major methodological and statistical issues found in these studies. The primary problems in this area of research are the lack of control groups, poor participant assignment procedures, nonresponse and attrition, and low adherence to treatment. Though several early

studies did not include control groups, it is now well known that they particularly are needed in bereavement research since the grief process is expected to change and typically improve over time. Without an active control group for comparison, it is problematic to make claims about an intervention's impact (Schut et al., 2001). The lack of appropriate participant assignment procedures (e.g., random or matched assignment) is another pitfall in much of grief research. In a review by Currier et al. (2008), grief intervention studies that used nonrandom assignment exhibited almost five times as much variability in post-treatment effect sizes as RCTs, potentially compromising the reliability of these studies' results. A third major issue is the systematic bias that can occur in bereaved participants' choice to participate (nonresponse) or drop out of (attrition) an intervention study (Stroebe & Stroebe, 1989). With the growing knowledge regarding the variability of grief processes between and within individuals, assessing and accounting for how these variables (e.g., level of distress) impact participant nonresponse or attrition is important. Lastly, low adherence to treatment (e.g., attending all group sessions) is common in this population and hurts power unless statistically controlled for or managed (Schut et al., 2001).

One example of a loss-focused intervention that commonly is used in clinical work with the bereaved is sharing about the loss through verbal or written emotional disclosure (Furnes & Dysvik, 2010; Neimeyer, van Dyke, & Pennebaker, 2009; Rynearson, 2006; Shear, Frank, Houck, & Reynolds, 2005). The Pennebaker expressive writing paradigm stands in stark contrast to the multiplicity of little researched writing exercises (e.g., poetry, journaling, story-writing,

epitaph writing) suggested for the bereaved in clinical contexts (Neimeyer, 1999; Thompson &

Neimeyer, 2014). Pennebaker's expressive writing paradigm is a well-researched and controlled

technique that allows the opportunity to better evaluate the effectiveness of emotional disclosure

as a bereavement intervention. It was first established as beneficial in the stress and coping and

trauma literature and subsequently was applied to bereavement.

Pennebaker's Expressive Writing Paradigm

      Paradigm development. Pennebaker and Beall initiated research on expressive writing

beginning with their original study nearly three decades ago (Pennebaker & Beall, 1986). They

noted that previous research had discovered an association between failure to confide in others

about traumatic events and stress-related disease. To further explore this link and possibly

provide an intervention for emotional inhibition, they developed a writing task intended to assist

with emotional disclosure. Healthy undergraduates were assigned to one of four groups to write

their feelings, facts, or both about a personally traumatic life event (trauma-related feelings,

trauma-related facts, or both) or trivial topics (varying from day to day) on four consecutive days

in order to investigate how writing about a traumatic event would impact short-term

physiological reactivity and measures of long-term health outcomes. What they found was

remarkable: those who wrote about their emotions and facts surrounding the traumatic event for

15 minutes on four consecutive days led to short-term increases in blood pressure and negative

mood and a long-term decrease in health center visits in the six months following the

experimental task. Pennebaker and Beall (1986) took these results as preliminary support for the

importance of self-disclosure and catharsis, which helped substantiate the general theory of psychosomatics based on behavioral inhibition.

Pennebaker and colleagues continued to explore the relationship between emotional disclosure and health through expressive writing (e.g., Pennebaker & Francis, 1996; Pennebaker, Kiecolt-Glaser, & Glaser, 1988; Pennebaker et al., 1990). In 1997, Pennebaker published one of his seminal papers in Psychological Science, summarizing his methods and research findings. He noted a growing number of studies that supported expressive writing's impact on physical and mental health symptoms. From his summary, the typical intervention in a laboratory setting involved randomly assigning participants to a control or experimental group. All groups were instructed to write about an assigned topic for three to five consecutive days for 15 to 30 minutes each day. Those in the control group were typically asked to write about a superficial topic whereas participants in the experimental group were encouraged to disclose their deepest emotions surrounding the writing topic. The standard instructions sometimes vary, but usually involve writing about one's "very deepest thoughts and feelings about an extremely important emotional issue," and sometimes to consider tying the topic to one's "relationships with others including parents, lovers, friends, or relatives," to one's "past, present, or future," or to who one has "been, would like to be, or is now," (Pennebaker, 1997, p. 162). Sometimes the participants were encouraged to write about the same topic each day or to switch topics. Participants were often told that their writing is confidential, not to worry about spelling, sentence structure, or grammar, and to continue writing for the entirety of the allotted time (Pennebaker, 1997).

Effectiveness of the Pennebaker paradigm. Since its development, hundreds of research studies have employed or examined Pennebaker's expressive writing paradigm (Frattaroli, 2006). It has been evaluated with a number of methodological variations (e.g., length of writing time, number of writing sessions, writing topic, etc.) as well as with samples of numerous age groups from both clinical and nonclinical populations (e.g., Frattaroli, 2003; Gidron, Peri, Connolly, & Shalev, 1996; Kliewer et al., 2011; Lepore, 1997; Lepore & Greenberg, 2002; Lotze, 2009). As research examining the Pennebaker paradigm has proliferated, a number of meta-analytic studies have been published (i.e., Frattaroli, 2006; Frisina, Borod, & Lepore, 2004; Meads & Nouwen, 2005; Mogk, Otte, Reinhold-Hurley, & Kröner-Herwig, 2006; Smyth, 1998). The results of these meta-analysis and their varied approaches are briefly summarized below.

Most of the meta-analysis researchers (Frisina et al., 2004; Meads & Nouwen, 2005; Mogk et al., 2006; Smyth, 1998) used a fixed effects model, which assumes a "true effect size" for the intervention regardless of moderators. Meads and Nouwen (2005), Mogk et al. (2006), and Frattaroli (2006) made use of a random effects approach, which better accounts for variation between studies by allowing for varying effect sizes for each study based on the possible moderators. The benefit of the fixed effects method is that it is more a powerful approach, though it tends to be less generalizable to other findings. The random effects method, conversely, is a more conservative approach and requires a larger number of included studies, though its results can then more easily be generalized to future research. The latter is likely a more

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appropriate method to apply to this area of research due to the amount of variability between study methodology and intervention implementation procedures (Frattaroli, 2006; Sloan & Mark, 2004b).

One of the earliest meta-analyses was conducted by Smyth (1998). He included studies (n=13) that used physically and psychologically healthy participants. Using a fixed effects model, he found a significant effect size (Cohen's d=0.47, p<0.001) across all studies and outcomes (e.g., reported health, psychological well-being, physiological functioning, general functioning, and health behaviors) and concluded that expressive writing consistently leads to positive long-term outcomes.

Frisina et al., (2004) used Smyth's (1998) meta-analysis as a template, though distinguished theirs by focusing solely on RCTs with clinical populations (n=9). They evaluated the impact of self-reported physical health and psychological well-being in their analysis. A fixed effects model revealed a significant effect size overall (d=0.19, p<0.05) and for physical health outcomes (d=0.21, p=0.01), though only a trend toward significance for psychological health outcomes (d=0.07, p=0.17).

Meads and Nouwen (2005) sought to update Smyth's (1998) findings with the additional RCTs published since his meta-analysis. They separated their included studies (n=61) into three categories based on population (people with pre-existing physical conditions, individuals with psychosocial stressors, and healthy volunteers) and assessed the effect size of emotional disclosure (written or verbal) on five outcome categories (objective health measures, health

center visits, subjective health measures, performance, and psychological outcomes). Using both a fixed effects and random effects approach, they concluded that emotional disclosure did not demonstrate significant effects for most physical or psychological outcomes. It did demonstrate effects, however, on positive mood (*SMD*=0.56), negative mood (*SMD*=0.51), and health center visits (*WMD*=-0.95).

Mogk et al. (2006) revisited the meta-analysis of Smyth and updated it with the newly available literature. They included RCTs (*n*=30) with no limits on populations studied and published the findings in an open access journal. They used a fixed effects model to examine the baseline differences between experimental and control group effect sizes based on its smaller confidence interval and found a nonsignificant effect size overall (Hedges' *g*=-0.07, σ^2=0.00) as well as for the analyzed subcategories (i.e., somatic health, *g*=0.05, σ^2=0.00; psychological health *g*=-0.12, σ^2=0.00). They chose to use a random effects model to calculate the effect sizes for the intervention across all health related variables, but this produced similar findings (overall *g*= 0.04, σ^2=0.003; psychological health *g*=0.01, σ^2=0.01; somatic health *g*=0.07, σ^2=0.00). They concluded Pennebaker's expressive writing paradigm does not lead to beneficial effects. They acknowledged that their results likely differed from previous researchers' based on their use of a more conservative analysis for effect size (Hedges' *g*). Mogk et al. (2006) additionally noted that their results might have differed due to their particular study selection criteria and inclusion of studies with primarily non-clinical populations.

Frattaroli (2006) also recognized the need for an update with inclusion of more studies

and critiqued Smyth's (1998) and Frisina et al.'s (2004) use of only a fixed effects model. She additionally acknowledged the problematic use of meta-analysis on an intervention with so much methodological variation between studies, a concern highlighted by Sloan and Marx (2004b). In order to address this, she included a much larger number of randomized studies ($n=146$) and examined numerous moderator variables that might have contributed to the intervention's effectiveness. Frattaroli (2006) coded effect sizes into one of six outcome types. These outcome types included psychological health (e.g., depression, anxiety), physiological functioning (e.g., heart rate, immune parameters), reported health (e.g., doctor's visits, self-reported physical symptoms), health behaviors (e.g., eating behaviors, medication adherence), general functioning (e.g., school outcomes, work outcomes, interpersonal relationship outcomes), and subjective impact of the intervention (e.g., ratings of study enjoyment, perceived effectiveness of disclosure), with five of the outcome types chosen in order for results to be comparable to those of previous meta-analyses. Her results were published in Psychological Bulletin and established an overall significant mean r-effect size ($r=0.075$). All outcome types except health behaviors also produced significant effect sizes.

In the present paper, the Frattaroli (2006) meta-analysis is considered the strongest of these meta-analyses for several reasons. Not only is it published in the most rigorous psychological journal (compared to the other meta-analyses), but also used the more appropriate random effects model (Sloan & Marx, 2004b) and is by far the most comprehensive with its inclusion of expressive writing studies and evaluation of numerous methodological parameters.

A review of the meta-analyses over time suggests that Pennebaker's paradigm has gone from demonstrating robust findings to more modest effect sizes. Frattaroli (2006) argues that the Pennebaker paradigm nevertheless can be considered a valuable tool. As she indicates, when examining an effect size it is important to keep the research domain in mind. That is, one common outcome examined for expressive writing is physical health, where the r-effect size of 0.034 for taking a daily aspirin to prevent a second heart attack (Rosenthal, 1994, as cited in Frattaroli, 2006) is regarded as quite valuable (Frattaroli, 2006). Frattaroli (2006) additionally argues the importance of considering effect sizes in the educational literature, as scholastic achievement is often a targeted outcome in expressive writing research. According to Lanahan, McGrath, McLaughlin, Burian-Fitzgerald, and Salganik (2005), an r-effect size of 0.050, though small, is considered reasonable and important in the realm of academic achievement (as cited in Frattaroli, 2006). Thus, the effect size of expressive writing more than doubles that of a well-accepted physical health treatment and surpasses an acceptable effect size in the educational literature. Finally, taking the methodological variability in expressive writing research into account, Frattaroli highlighted that "when delivered under optimal conditions (e.g., high dosage, privacy during sessions, specific disclosure instructions), the average effect size…was 0.200…considered halfway between small and medium," (Frattaroli, 2006, p. 853). Though few studies (n=8) delivered the intervention in this manner, it points to the need for more rigorous research.

Furthermore, many clinicians and researchers alike (e.g., Frattaroli, 2006; Neimeyer &

Pennebaker, 2009) are convinced that writing is a clinically useful tool with the bereaved. A cursory look at materials available for grief support reveals numerous workbooks, websites, and treatment manuals that recommend writing in a variety of forms as a coping strategy or as part of a treatment plan. Blogs, discussion boards, and other tools have been developed solely for the purpose of people expressing their grief and writing through their loss, some with the added feature of sharing journal posts with a family member, friend, or therapist (Bogatin & Lynn, 2014). Due to overwhelming support on the usefulness of writing for bereavement from the clinical community among others, it is therefore important to continue to investigate the conditions under which emotional disclosure is helpful.

Theoretical mechanisms. King concisely explained what is known regarding expressive writing when she stated, "Two strong conclusions can be made with regard to the benefits of writing. First, expressive writing has health benefits. Second, no one really knows why," (King, 2002, p.119). Although Pennebaker developed his writing intervention based in the theoretical constructs of emotional inhibition and disclosure, since there have been several other models that have been used to explain the mechanism of expressive writing: emotional inhibition theory, cognitive adaptation (or cognitive processing) theory, self-regulation theory, exposure or emotional processing theory, and social integration theory (Frattaroli, 2006; Sloan & Marx, 2004b). Numerous research studies have tested various aspects of these proposed theories, though even in the present day the actual mechanisms remain unclear. In many cases, these theories are not mutually exclusive and combinations of models might require consideration to

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fully explain expressive writing's short- and long-term effects (Sloan & Marx, 2004b).

Emotional inhibition theory, cognitive adaptation/processing theory, and exposure/emotional

processing theory represent the major theoretical mechanisms relevant to the present study.

   Emotional inhibition theory. Pennebaker's initial studies were designed based on the

theory of inhibition rooted in the psychosomatic literature. He proposed active inhibition occurs

when an individual experiences a stressful life event and withholds sharing details about it and

their emotional experience. From previous research on the psychophysiology of animals,

Pennebaker suggested active inhibition would function as a long-term, low-level stressor and

thus require physiological work in the form of autonomic and central nervous system activity. In

the long-term, this work takes a slow toll on the body, increasing the risk of illness and other

adverse outcomes. Disclosure of emotions and details about the stressor, however, ought to

reverse this process through reducing the stress of inhibition. This expression and catharsis then

presumably leads to improved long-term health functioning and outcomes (Pennebaker, 1997).

Research has supported the theory that inhibition was related to worse health, such that

individuals who were described by others as inhibited or shy, concealed their homosexuality, or

hid past traumatic experiences demonstrated poorer physical health compared with individuals

who were less inhibited (Pennebaker, 1997). Pennebaker's earliest research studies also appeared

to support the latter part of model, namely that disclosure about a traumatic event improved long-

term health theoretically due to the release of this inhibition (Pennebaker, 1986; Pennebaker et

al., 1988). Degree of disclosure was also found to positively correlate with long-term physical

outcomes in holocaust survivors, further supporting this model (Pennebaker, Barger, & Tiebout, 1989).

Continued research on expressive writing, however, has been unsupportive of predictions based on this theory. For example, Pennebaker et al. (1990) found that subjects' ratings of their essays on emotionality and number of emotional words used in the essay (as measures of level of emotional disclosure) were uncorrelated with changes in illness outcomes. Francis and Pennebaker (1992) hypothesized that level of constraint (ones' natural tendency to inhibit behavior) would mediate the positive physical health outcomes of expressive writing, though this was not the case. Greenberg and Stone (1992) also found individuals benefitted equally from writing about traumas previously undisclosed as traumas previously disclosed. These results led Pennebaker and others to recognize that emotional inhibition processes could not solely account for research findings (e.g., Bootzin, 1997; Kloss & Lisman, 2002; Lepore, Greenberg, Bruno, & Smyth, 2002; Pennebaker, 1997; Sloan & Marx, 2004b; Smyth, True, & Souto, 2001). Several additional theoretical mechanisms have since been proposed, though cognitive adaptation/processing and exposure/emotional processing theories are currently the best established and supported (Frattaroli, 2006; Sloan & Marx, 2004b).

Cognitive adaptation theory. CAT, also known as cognitive processing theory, posits that individuals must alter their existing cognitive schemas in order to process and incorporate experienced traumatic events. Pennebaker first considered this mechanism after surveying participants about why they found expressive writing beneficial. Most noted that it allowed them

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to "achieve a better understanding of their own thoughts, behaviors, and moods," (Pennebaker et al., 1990, p. 536). Expressive writing may play a role in assisting this process by providing a medium through which the individual is able to develop structure, organization, and cohesion to the traumatic event memory. This may in turn allow the individual to develop insight regarding the event and be better able to achieve cognitive assimilation. Successfully incorporating the traumatic event into one's cognitive schemas ought to then result in decreased stress and consequently improve one's physical health (Sloan & Marx, 2004b). Though it is difficult to empirically evaluate this theory due to the complexity of the proposed processes involved, research has provided some support. Pennebaker and Francis (1996) attempted to examine this process through measuring the change in percentage of insight-related, causation-related, negative emotion, and positive emotion words in writings over time. They found an association between increased use of causation-related and insight-related words and improved long-term physical health, which they took as indicative of possible cognitive adaptation processes (Pennebaker & Francis, 1996). They cautioned, however, that these results might be separate from, or occur in addition to, the underlying mechanism by which expressive writing leads to benefits (Pennebaker & Francis, 1996). Though researchers have also found that writing about a trauma results in a decrease of intrusive thoughts, disentangling the underlying mechanism, whether it be cognitive processing or an alternative mechanism (e.g., exposure/emotional processing), has proved difficult (Klein & Boals, 2001; Schoutrop, Lange, Hanewald, Davidowich, & Salomon, 2002).

Exposure/emotional processing theory. Another proposed mechanism of change for expressive writing involves exposure and emotional processing. The roots of this theoretical mechanism lie in learning theories, such as Mowrer's two-factor (or two-stage) theory (e.g., Mowrer, 1947; 1960). With this theory, Mowrer proposed that learning occurs through a feared stimulus becoming paired with a neutral stimulus, such that the neutral stimulus begins to elicit the same response as the feared one. Mowrer suggested that escape or avoidance of these stimuli occurs to reduce the anxiety. This reduction in anxiety thus reinforces and maintains the fear response (Mowrer, 1947; 1960).

Exposure therapy serves to expose an individual to the feared stimulus until the fear response habituates and learning occurs that avoidance of the neutral stimulus is not essential. Expressive writing across multiple writing sessions is theorized as one method through which someone can be exposed safely and repeatedly to the feared stimuli in the absence of the aversive stimulus to reduce the fear response. The emotional processing component of this mechanism came about as researchers combined learning and cognitive theories regarding stressful and traumatic experiences (Sloan & Marx, 2004b). Foa & Kozak (1986) proposed that cognitive processes mediate the changes in fear response that occur during exposure therapy. Exposure therapy is thought to activate fear structures that become altered as the individual cognitively incorporates corrective information about the feared stimuli, responses, and their meanings. Expressive writing may encourage emotional processing through the individual's activation of fear structures as they recall emotions and facts about the traumatic event and access corrective

information as they write (Sloan & Marx, 2004b).

Generally, findings related to the exposure/emotional processing theory mechanism for expressive writing have been mixed. Methodological inconsistencies within studies looking at changes in posttraumatic symptoms (e.g., intrusive thoughts, avoidance behavior) have resulted in findings that range from supporting to rejecting these theories as expressive writing mechanisms. To address this, Sloan, Marx, and Epstein (2005) conducted a study with college students with a trauma history who were assigned to write about the same traumatic event, different traumatic events, or a neutral topic. Those who repeatedly wrote about the same traumatic event revealed the greatest reductions in physical and psychological symptoms. Sloan et al., (2005) took these results as supportive of the exposure model. In a recent study, college students received training (response, stimulus, or none) before engaging in an expressive writing task (Konig et al., 2014). Response training has been shown to enhance physiological responding, whereas stimulus training has not, thus it provided an active comparison condition. Konig et al. (2014) found that response training (unlike the other trainings) amplified the physiological reactivity to the emotional disclosure task. Furthermore, this physiological reactivity was associated with larger long-term reductions in event-related distress, depression, and physical illness symptoms. These results provide perhaps the strongest support yet for the exposure mechanism in expressive writing.

Pennebaker Paradigm and Bereavement

A review of the extant literature reveals six studies that sought to test the effectiveness of

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the Pennebaker paradigm with bereaved participants compared with a control group. In spite of the beneficial effects of expressive writing that have been established overall and for a variety of populations, research on the Pennebaker paradigm and bereavement consistently has failed to produce better outcomes for expressive writers compared to control writers (e.g., Frattaroli, 2006). Though results reveal improvement in physical and psychological functioning over time for all study participants, these improvements tend to occur regardless of assigned condition (Bower, Kemeny, Taylor, & Fahey, 2003; Kovac & Range, 2000; O'Connor, Allen, & Kaszniak, 2005; Range, Kovac, & Marion, 2000; Stroebe et al., 2002). These improvements therefore cannot be attributed to the expressive writing intervention. It is known from the typical grief trajectories that the majority of bereaved individuals steadily improve over time (Bonanno, 2004; Bonanno et al., 2002). Thus, for expressive writing to be considered effective, it would have to speed up or enhance the typical course of grief or improve the atypical grief trajectories.

Though a limited number of studies have focused on expressive writing and bereavement, several prominent thanatology researchers have noted the consistent null effects and generally consider the Pennebaker paradigm ineffective for bereaved participants (Stroebe et al., 2002; Stroebe, Schut, & Stroebe, 2006). "Although social sharing and emotional disclosure can be regarded as helpful, they do not seem to accelerate the grieving process," (Stroebe et al., 2002, p. 177). Some researchers have been more emphatic in their opinions by expressing that their results "do not allow one to recommend the procedure of expressive writing to individuals having experienced stressful or traumatic experiences to avert negative consequences on their

health," (Mogk et al., 2006). Other researchers since have attempted to augment the writing paradigm through the use of tailored writing prompts to enhance the benefits of the Pennebaker paradigm for the bereaved (Lichtenthal & Cruess, 2010). They compared several writing prompts (i.e., benefit-finding, sense-making, traditional Pennebaker, control writing). Lichtenthal and Cruess (2010) suggest a "benefit-finding" writing prompt may enhance the effects of expressive writing for bereavement based on data trends, though results were not statistically significant.

We have argued that it is too early to consider Pennebaker's traditional expressive writing paradigm ineffective with bereavement since it has not yet been adequately tested (Collison & Gramling, manuscript in preparation). A review of the literature reveals a number of methodological weaknesses in expressive writing studies with the bereaved, which may have precluded positive findings. Of particular note is the procedure in previous studies of selecting participants based on their bereavement status. Once recruited based on bereavement status, participants were "forced" to write about bereavement issues contrary to the usual Pennebaker instructions where participants freely choose their writing topic. In addition to the "forced choice" of topic, other issues comprise the failure to include the typical Pennebaker assessment of physical health (i.e., PILL) or measure positive processes (e.g., meaning-making, continuing bonds, growth) and high rates of attrition. An existing dataset (Konig et al., 2014) will allow us to address the "forced choice" issue as well as several of these limitations.

Addressing the Limitations

Forced choice of topic. From our review (Collison & Gramling, manuscript in

preparation), it was noted that expressive writing bereavement studies (Bower, Kemeny, Taylor, & Fahey, 2003; Kovac & Range, 2000; Lichtenthal & Cruess, 2010; O'Connor, Allen, & Kaszniak, 2005; Range, Kovac, & Marion, 2000; Stroebe et al., 2002) consistently sample from bereaved individuals and require participants to write about their loss. Thus, these individuals were not granted the choice to identify their "most traumatic experiences" as in traditional Pennebaker paradigm research (Pennebaker & Francis, 1996; Pennebaker et al., 1988). Previous bereavement researchers have noted this as a possible study limitation (Bower et al., 2003). In Konig et al.'s (2014) study participants were asked to identify "the trauma which is most disturbing" to them. A substantial portion of participants (72 out of 246) *freely chose* the loss of a loved one as their traumatic event and wrote about it in the context of Pennebaker's expressive writing paradigm. This dataset therefore allows the chance to study the bereaved using procedures that were similar to traditional expressive writing research, unlike any of the previous expressive writing studies that have been conducted with this population.

Assessment measures. A review of existing literature on Pennebaker's paradigm with bereaved samples revealed that the majority of the outcome measures chosen were well-established and well-validated (Collison & Gramling, manuscript in preparation). Measures in these studies were typically used to assess grief, depression symptom severity, physical health, and state affect. One measure commonly used in expressive writing research that has yet to be applied to bereavement studies, however, is the Pennebaker Inventory of Limbic Languidness (PILL; Pennebaker, 1982). Konig et al.'s (2014) dataset includes the PILL and, thus, will provide

the first test of how the Pennebaker paradigm influences PILL scores among bereaved writers.

Text analysis. Results from previous research on expressive writing with the bereaved have failed to identify any significant improvements on outcome measures. Items that assessed participants' subjective reactions to their writings, however, consistently indicate those in the experimental group found the experience to be significantly more personal, meaningful, and helpful than those in control groups who completed neutral writings (e.g., Kovac & Range, 2000; Lichtenthal & Cruess, 2010; Range et al., 2000). Though these positive impacts have yet to be assessed using empirically validated outcome measures, text analyses have helped shed some light on beneficial processes that might occur for the bereaved during writing.

A few years after the original development of his paradigm, Pennebaker began to be interested in the themes and content in participants' writings. Initial "superficial content analyses of the overall topics" did not reveal any links between writing topics chosen and health or behavioral outcomes (Pennebaker, 1993, p. 541). A closer look at the essays using a computer program (Linguistic Inquiry and Word Count) developed by Pennebaker and colleagues instead provided a much richer depiction of writing processes (Pennebaker, 1993). Linguistic Inquiry and Word Count (LIWC; Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007; Tausczik & Pennebaker, 2010) is a text analysis program that has been frequently applied in expressive writing research; however, only two bereavement studies have analyzed the written narratives with LIWC (Baddeley & Singer, 2008; Pennebaker, Mayne, & Francis, 1997). Another text analytic technique, Latent Semantic Analysis (LSA; Foltz, Kintsch, & Landauer, 1998; Landauer

& Dumais, 1997; Landauer, Foltz, & Laham, 1998) has revealed promising results from analyzing expressive writing samples more contextually (Campbell & Pennebaker, 2003). LSA has not yet been applied to studies with the bereaved, however.

Linguistic Inquiry and Word Count (LIWC). Linguistic Inquiry and Word Count is a computer-based text analysis tool designed to provide word counts in a variety of categories for a given set of text (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007; Pennebaker, Francis, & Booth, 2001; Tausczik & Pennebaker, 2010). LIWC was devised with the purpose of tapping into psychological processes as well as the content of what people wrote or talked about (Tausczik & Pennebaker, 2010). During the early stages of its development, its creators noticed that words in the English language fell into the two broad categories of content words and style/function words. Content words generally convey what a person is saying through the use of nouns, verbs, adjectives, and adverbs, whereas style/function words are how people functionally communicate via pronouns, prepositions, articles, and conjunctions (Tausczik & Pennebaker, 2010). LIWC contains both a processing component (the program itself) and a set of dictionaries (a text file used for comparison with the set of text chosen for analysis). The dictionaries contain the collections of words (e.g., articles, positive emotion words, insight-related words, health-related words) that make up a particular category. Word categories have been organized theoretically into linguistic processes (e.g., total word count, personal pronouns, articles, common verbs, past/present/future tense, etc.), psychological processes (e.g., social, affective, cognitive, perceptual, and biological processes), personal concerns (e.g., work, achievement,

etc.), and spoken categories (e.g., assent, fillers) (see Tausczik & Pennebaker, 2010 for further detail).

There are some limitations to text analysis, since it is unable to account for context, irony, sarcasm, or idioms. Nevertheless, research has indicated LIWC to be quite useful in revealing psychological processes that occur during speech and writing (for a summary of the research findings to which LIWC has been linked see Tausczik and Pennebaker, 2010). Though little research yet exists with LIWC as a method to explore bereaved individuals' narratives, two studies (i.e., Baddeley & Singer, 2008; Pennebaker, Mayne, & Francis, 1997) have been published and provide some indication for LIWC's particular applicability to expressive writing research with the bereaved.

LIWC and expressive writing with the bereaved. Pennebaker, Mayne, and Francis (1997) applied LIWC to existing data from six previous expressive writing studies with varied samples including college students, medical students, maximum security male inmates, and unemployed male professionals (total n=177), in order to test their theories of cognitive change, differential emotion, and summed emotion as predictors of outcomes. Cognitive change was defined as "the use of words in two general text dimensions: self-reflective thinking and causal thinking," (p. 864, Pennebaker et al., 1997) and was significantly correlated with decreased number of physician visits, decreased physical symptoms, improved GPA, and finding new jobs faster for unemployed engineers. Differential emotion (the use of more negative emotion words than positive) predicted worse outcomes (e.g., physical symptoms and illness). They concluded that

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the use of positive emotion words was related to better adjustment. Summed emotion (frequency of more positive and negative emotion words combined) was unrelated to outcomes.

Pennebaker et al. (1997) then applied these models to transcribed interviews with bereaved men who lost their partners to AIDS. Interviews were selected from a larger sample (*n*=253) of a separate study based on the criteria that the caretaking partner was HIV-negative and had been interviewed four separate times (once prior to the partner's death, twice within about one month following the partner's death, and 12 months following the partner's death). This resulted in a sample of 30 bereaved men with an average relationship involvement of 6.27 years, median education level at college graduate, and predominantly (97%) Caucasian. The researchers focused on LIWC word counts in the insight, causal, positive emotion, negative emotion, death, past tense, and unique words categories. Based on the previously-tested models, they used four approaches (i.e., cognitive change, differential emotion, summed emotion, and empirical model) to predict outcomes in the sample of bereaved men. The cognitive change model used the change in insight (e.g., think, know, consider) and causal (e.g., because, effect, hence) words from the first to last interview to predict outcomes. The differential and summed emotion models were defined similarly as in their previous analyses. Lastly, the empirical model was developed by capturing beta weights from the regression equation of word count categories that were predictive of outcomes (i.e., mean number of death words, past-tense verbs, change in positive emotion words, and change in unique words). This resulted in a computed variable to predict greater distress. Pennebaker et al. (1997) found the cognitive change model significantly

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predicted positive affect in the bereaved male partners, while the derived empirical model significantly predicted both depression scores and positive affect at the follow-up. These results provided the first support for usefulness of computer-based text analysis techniques with bereavement narratives.

The only other application of LIWC to bereaved participants' writings was repeated over a decade later by Baddeley and Singer (2008). They used LIWC analyses to evaluate personality correlates (e.g., extraversion, conscientiousness, etc.) and the impacts on social relationships relative to structures used in bereavement narratives. However, this study did not use the Pennebaker paradigm. Rather, they recruited (n=133) participants from grief support groups and had them complete online surveys. Participants were predominantly White (89.5%) women (92.5%) with a mean age of 39.4 years, median level of education of some college, and were married (57.8%), widowed (17.3%), divorced/separated (9.8%), or single (14.3%). The participants' losses had occurred an average of 3.34 years prior to the study, were "very close" relationships using a one-item 5-point scale, a variety of types of relationship (43% loss of child, 18% spouse/partner, 16.8% parent loss, 10.6% sibling loss, 11.8% close friend or non-nuclear family member), and a variety of causes of death (27% illness, 24.1% accidents, 19.5% miscarriage or neonatal loss, 8.3% due to war or terrorism, 7.5% suicide, and 13.3% miscellaneous causes including homicide, drug/alcohol-related deaths, or unclear from narrative). Though the researchers did not make use of Pennebaker's paradigm, they used a narrative prompt requesting participants to type "the story of [their] loss as [they] might tell it to

someone who wants to get to know [them] better," (Baddeley & Singer, 2008, p. 427). They used

LIWC to calculate the length of each narrative and the portion of words that belonged to

categories similar to Pennebaker et al.'s (1997) analyses (e.g., past, present, and future verb

tense; first-, second-, and third-person, singular and plural pronouns; positive and negative affect

words, cognitive processing [i.e., insight and causal] words, and death words). They found that

bereaved individuals high in Conscientiousness told shorter narratives and used fewer first-

person pronouns, present tense verbs, and insight words. Individuals higher in Conscientiousness

or Openness used more death words than others. They did not use LIWC word counts as

predictors of psychological outcomes assessed, however, due to their focus on personality and

social interactional functions (Baddeley & Singer, 2008; 2009).

Latent Semantic Analysis (LSA). Latent Semantic Analysis is both a theory and method

for analyzing blocks of text using statistical techniques that account for contextual features of the

text (Landauer & Dumais, 1997; Landauer, Foltz, & Laham, 1998; Landauer, McNamara,

Dennis, & Kintsch, 2013). LSA has been applied in a variety of ways involving either measuring

processes behind the acquisition of knowledge or extracting and representing the meaning of

words within a particular context. The creators of LSA purport that through its computations,

LSA goes beyond simple correlations between words or frequency of words used with each

other, and instead infers deeper relations between words in a given passage. Thus, it is better able

to predict "human meaning-based judgments and performance" than more superficial analytic

programs (Landauer et al., 1998, p. 260-261). Unlike LIWC, LSA does not make use of any

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word dictionaries, but instead uses raw text to build the "training corpus," a body of text that it can then reference (Landauer et al., 1998). It then organizes the text into a matrix so any one word can be weighted to represent its importance in the passage and degree to which it carries information (Landauer et al., 1998). A form of factor analysis ("singular value decomposition") is then applied in which the matrix is dimensionally reduced to estimate the likelihood of each entered word appearing within a given context across the text. LSA produces word-word, word-passage, and passage-passage relations that research has shown reliably connect to human cognitive phenomena (Landauer et al., 1998). Through its sophisticated analytic approach to contextual features of text, LSA provides a distinctive approach to assessing quality of writing, and can be applied to evaluate amount of coherence or verbal flexibility within a selected portion of text.

Latent Semantic Analysis and expressive writing. Campbell and Pennebaker (2003) noted the inconsistent and modest results obtained from word-count (e.g., LIWC) analyses previously applied to expressive writing. In order to bolster knowledge of processes that occur during expressive writing, they chose to apply the LSA technique to writings already collected from three separate samples. Participants included first-year undergraduate students in an introductory psychology course (*n*=74, 52.7% female, mean age 17.9 years) who wrote about coming to college or nonemotional descriptions of daily activities, undergraduate students (*n*=50, 72% female, mean age 19.8 years) who wrote about "the most traumatic events of their lives" or superficial topics, and male psychiatric prison inmates (*n*=59, 100% male, mean age 35.4 years,

mean education 12.3 years) who wrote about traumatic experiences of superficial topics. LSA better allowed Campbell and Pennebaker (2003) to evaluate the impact of content and style (e.g., particles, prepositions, conjunction articles, auxiliary verbs, and pronouns) used during expressive writing on health outcomes. They found that participants who showed similarity in their overall writing style across each of the essays were more likely to visit physicians for illness compared with participants who changed their writing style over the course of the essays. The latter participants instead demonstrated health improvements. This result was particularly notable as it was the strongest effect size found compared with any other previous analytic strategy. A closer look at the particular style words that contributed to this effect revealed that particle words, namely the use of pronouns, accounted for these health improvements. Thus, the participants who varied most from essay to essay in their use of particles, especially pronouns, showed health improvements in the coming months, as indicated by fewer physician visits for illness. Content did not account for any changes, such that participants writing about a traumatic stressor did not benefit any more or less if they wrote about very similar or different topics from day to day.

LSA thus appears to be a powerful text analytic strategy heretofore not applied to bereaved participants in the Pennebaker paradigm. In the context of the present study, we predict that bereaved participants in the emotional disclosure condition will demonstrate greater change in use of pronouns across writings relative to control writers. LSA may prove useful even if the emotional disclosure condition does not yield differential effects on this or other outcome

measures. Specifically, LSA analysis may help disentangle cognitive processes that may account for those who benefit from the Pennebaker paradigm intervention.

Statement of the Problem and Hypotheses

Bereavement is a common human experience with potential for adverse physical and psychological effects, particularly in the at-risk group of emerging adults (Arnett, 2000; Fisher et al., 1985; Stroebe et al., 2007). Though not currently considered a psychological disorder, bereaved individuals commonly seek out additional support through psychological intervention during this difficult time of their lives (Neimeyer et al., 2009; Shear et al., 2005). Nevertheless, bereavement interventions are only beginning to be examined in the research literature and limited empirical support exists (Currier, Neimeyer, & Berman, 2008; Schut, Stroebe, van den Bout, & Terheggen, 2001). Disclosing about one's loss story or writing about the loss are common clinical interventions used with the bereaved (Furnes & Dysvik, 2010; Neimeyer et al., 2009; Rynearson, 2006; Shear et al., 2005). Pennebaker's expressive writing paradigm is a well-validated and controlled intervention often used in stress and trauma research (Frattaroli, 2006; Pennebaker, 1997). It provides an opportunity to operationalize and measure the therapeutic impact of emotional disclosure and writing on bereavement. Several studies have examined the impact of Pennebaker's paradigm (verbal and written emotional disclosure) on bereavement and research repeatedly has shown null results leading researchers to view it as ineffective (Stroebe et al., 2002; Stroebe, Schut, & Stroebe, 2006). After reviewing the literature, we have argued that

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this decision was perhaps made prematurely based on methodological limitations in each of the studies (Collison & Gramling, manuscript in preparation).

An existing dataset provided the opportunity to address several of the limitations in previous expressive writing research with the bereaved. The present study made use of this dataset that examined the impact of expressive writing (along with response and stimulus training) in undergraduate students (Konig et al., 2014). A substantial portion of participants identified the loss of a loved one as their most distressing event. This dataset uniquely provided the opportunity to examine the impact (measured by the CES-D, DTS, and PILL) of expressive writing on bereaved emerging adults who *freely chose* their writing topic. It was a methodologically strong study (e.g., active control group, random assignment procedures) and included an objective measure (i.e., PILL) common to expressive writing research that had yet to be used with the bereaved.

Qualitative data from those in the expressive writing condition were examined for use of particular language that may be related to coping with bereavement and compared across groups (bereaved versus other traumas). Two different text analytic programs (Linguistic Inquiry and Word Count and Latent Semantic Analysis) applied previously in expressive writing literature (Baddeley & Singer, 2008; Campbell & Pennebaker, 2003; Pennebaker, Mayne, & Francis, 1997) were used to assess narratives of the bereaved. Using Linguistic Inquiry and Word Count (LIWC), the insight (e.g., "think," "know," "consider") and causal (e.g., "because," "effect," "hence") words were compared across groups in order to elaborate on and complement existing

literature. Using Latent Semantic Analysis (LSA), the content and style of essays were analyzed to compare bereaved individuals' emotional disclosure writings to control condition writings and differentially predict outcomes (Campbell & Pennebaker, 2003).

With these quantitative and text analytic methods, several specific hypotheses and exploratory analyses were proposed:

Primary Test of the Classic Pennebaker Paradigm: Hypothesis 1

Hypothesis 1. It was predicted that the bereaved in the written emotional disclosure condition evidenced reduced event-related distress (DTS), depression (CES-D), and physical illness symptoms (PILL) from baseline to one-month follow-up compared with the bereaved in the control writing condition. This prediction was made based on this study's adherence to the traditional Pennebaker paradigm instructions of writing about one's "most traumatic experiences," (Pennebaker et al., 1988).

Test of the Pennebaker Paradigm with LIWC: Hypotheses 2 and 3

Hypothesis 2. The bereaved in the emotional disclosure condition were predicted to have used more insight- and causal-related words (each measured by LIWC) averaged across the three writings compared with the bereaved in the control writing condition. This was conducted in order to replicate findings from previous research (Pennebaker et al., 1997).

Hypothesis 3. The use of insight- and causal-related words in essays, as measured by LIWC, were each predicted to be negatively associated with levels of event-related distress (DTS), depression (CES-D), and physical illness symptoms (PILL) for participants in the

emotional disclosure condition. This was proposed based on the findings of Pennebaker et al. (1997). The use of insight (e.g., think, know, consider) and causal (e.g., because, effect, hence) words were each considered indicative of meaning making processes, which have been connected to positive adjustment in bereavement (Holland et al., 2006).

Test of the Pennebaker Paradigm with LSA: Hypotheses 4 and 5

Hypothesis 4. From the LSA analyses, it was predicted that the bereaved in the emotional disclosure condition evidenced less pronoun similarity across the three essays compared with the bereaved in the control writing condition. Specifically, the bereaved emotional disclosure participants were anticipated to have demonstrated greater variation in pronoun use (measured by mean of the "similarity coefficients in the Pronoun semantic space" or pronoun use similarity coefficients; refer to Campbell & Pennebaker, 2003) from one essay to another compared with control writers. Consistent with previous findings (Campbell & Pennebaker, 2003), it was anticipated that time would not be important for this effect, such that it would not be based on directional change (first to third writing or vice versa).

Hypothesis 5. Lastly, the pronoun use similarity across essays among the bereaved emotional disclosure group was tested as a predictor of quantitative outcomes. It was predicted that the similarity of pronoun use (measured by the mean of the pronoun use similarity coefficients) across essays was positively correlated with event-related distress (DTS), depression (CES-D), and physical illness symptoms (PILL). This was expected based on previous findings that less similarity in pronoun use across essays was related to better health

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outcomes (Campbell & Pennebaker, 2003).

Bereaved Writers Combined Analyses: Hypotheses 6 and 7

In the case that significant effects were not found in hypotheses two through five, subsequent analyses were planned, combining bereaved emotional disclosure and bereaved control writers. Specifically, if the pattern of results obtained mirrored those of previous bereavement studies that have evaluated the Pennebaker paradigm (i.e., improvement in both groups) exploratory analyses were planned to examine the extent to which text analysis variables (e.g., insight words, causal words, pronoun use similarity coefficient) were predictive of outcomes (i.e., physical symptoms, event-related distress, and depression).

Hypothesis 6. The summed total of insight- and causal-related words (each measured by LIWC) across the three writing sessions were predicted to be negatively associated with levels of event-related distress (DTS), depression (CES-D), and physical illness symptoms (PILL) for bereaved writers (emotional disclosure and control writers combined).

Hypothesis 7. The pronoun use similarity across essays among the bereaved writers (emotional disclosure and control writers combined) was tested as a predictor of quantitative outcomes. It was predicted that the similarity of pronoun use (measured by the average of the pronoun use similarity coefficients) across essays was positively correlated with event-related distress (DTS), depression (CES-D), and physical illness symptoms (PILL).

Bereaved Writers Versus Other Trauma Writers: Exploratory Analyses 1 and 2

Exploratory Analysis 1. An analysis was conducted with both bereaved and other

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trauma participants within the emotional disclosure condition and included type of trauma (bereavement versus other trauma) as a predictor of change in outcome measures (DTS, CES-D, PILL) from baseline to follow-up. Thus, this analysis explored whether the intervention had a differential impact based on traumatic event identified (bereavement versus other trauma).

Exploratory Analysis 2. In the emotional disclosure group only, the bereaved were compared to other trauma writers on use of insight- and causal-related words (each measured by LIWC) averaged across the three writing sessions. From the meaning making literature, it was anticipated that the bereaved used more total insight- and causal-related words compared with the other trauma writers.

Positive CES-D subscale: Exploratory Analyses 3 and 4

Exploratory Analysis 3. An analysis was conducted with bereaved comparing those in the emotional disclosure condition with control writers on the CES-D Positive Affect subscale. Positively worded items from the CES-D (items on the Positive Affect factor; Radloff, 1977) were summed together to build the "Positive Affect" subscale.

Exploratory Analysis 4. In the emotional disclosure group only, the bereaved writers were compared to other trauma writers on the CES-D Positive Affect subscale. As with Exploratory Analysis 3, positively worded items from the CES-D (items on the Positive Affect factor; Radloff, 1977) were summed together to build the "Positive Affect" subscale.

Method

Experimental Overview

The proposed study consisted of secondary data analyses of an existing dataset (Konig et al., 2014). The purpose of the original study was to determine whether response or stimulus training could enhance psychological and physiological responses to expressive writing using the Pennebaker paradigm. Participants were undergraduate students from a large, urban, public university in the southeastern United States who were at least 18 years of age. They participated for research credit in undergraduate introductory psychology courses. Data collection involved their attending three lab sessions (approximately 120, 30, and 45 minutes, respectively) and completing questionnaires for a one-month follow-up by mail. Participants were randomly assigned to one of six groups in a 3 Training (response, stimulus, no training) X 2 Writing Topic (expressive writing, control) design. The first lab session consisted of participants first completing questionnaires assessing their demographic information, post-traumatic symptom severity and frequency, depression symptoms, and physical illness symptoms. Participants were then provided training (response, stimulus, or none) and asked to write for 20 minutes about a personal traumatic event or neutral topic, respective to their assigned condition. During the writing, heart rate (HR) and skin conductance (SC) levels were recorded. Sessions two and three occurred within a two-week period of session one. During sessions two and three, participants

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completed their assigned writing and the same measure of post-traumatic symptom severity and frequency used in session one. After session three's writing exercise was complete, heart rate and skin conductance were again recorded. One month afterward, the follow-up survey packets were mailed to participants that assessed post-traumatic symptom severity and frequency, depression symptoms, and physical illness symptoms.

The present study focused on bereaved participants from this dataset for hypotheses one through seven and exploratory analysis three. The scope of the present study and issues of power precluded an examination of the impact of training conditions. Appendix E provides further detail on assigned conditions for the bereaved participants. Since both emotional disclosure writers and control writers received either response, stimulus, or no training in equal numbers, any effects we observed from the Pennebaker paradigm were not attributed to the various training conditions employed in the Konig et al. (2014) study. Furthermore, the training was designed to enhance the impact of Pennebaker's intervention effects, such that omitting it from analyses should not have prevented us from capturing the intervention effects themselves. Thus, the impact of training condition was not assessed in the present study.

Participants

Participants were recruited from a public, urban university in the southeastern United States with a large minority population and portion of first generation college students. The initial sample consisted of 246 undergraduate students who reported experiencing various traumas. Based on Arnett's (2000) general age guidelines for emerging adulthood, participants

who did not report their age or were outside of the emerging adult age range (ages 18-29) were excluded from data analyses ($n=12$). As a component of data collection, participants were asked to "identify the trauma which is most disturbing" to them. These responses were recorded and coded into one of 13 categories: death of a loved one; divorce/separation/conflict between parents or own divorce; serious problems of close other; romantic issues; physical or sexual abuse/attack; illness; car accident or other accident; problems in relationship with friends, peers or family members; difficulty with school or job; abortion/pregnancy/miscarriage; personal problems such as self-harm; legal problems, or other personal stressful situations; harassment or bullying; and other (multiple traumas) (Konig et al., 2014). Of the 234 remaining participants, a substantial portion (30%) identified themselves as bereaved after combining the "death of a loved one" ($n=64$) and "abortion/ miscarriage" ($n=5$) categories. As a function of the random assignment of the larger participant pool, these 69 bereaved participants were assigned to either the emotional disclosure ($n=36$) or control ($n=33$) writing conditions. The remaining 165 "other trauma" participants were also randomly assigned to either emotional disclosure ($n=71$) or control ($n=94$) writing conditions. Therefore, analyses with the bereaved included $n=69$ participants and analyses comparing the bereaved to the other trauma participants within the emotional disclosure condition included $n=107$ participants ($n=36$ bereaved and $n=71$ other trauma participants).

A power analysis using 0.80 power, a writing effect size of partial eta squared 0.12 (depression) and 0.18 (PTSD) (Lichtenthal & Cruess, 2010), and an alpha level of 0.05 found

that 32 bereaved participants per group was sufficient to find an effect, resulting in a total recommended sample size of 64 (Cohen, 1992).

Self-Report Measures

Demographic Questionnaire. (Appendix A) Participants completed a survey of general demographic information including age, gender, race, class rank, native language, current psychotherapy treatment, current prescription medications used, and recent tobacco products used that would impact physiological measurements.

Pennebaker Inventory of Limbic Languidness (PILL). (Pennebaker, 1982). (Appendix D) The PILL was developed to measure the frequency of a variety of common physical symptoms and sensations. It contains 54 items and allows respondents to choose from a 5-point scale for frequency of symptoms over the past year (*1 = have never experienced the symptom* to *5 = more than once every week*). Pennebaker (1982) developed two methods for scoring the scale, the original scoring approach (the summed method) and the binary scoring technique. These two approaches are strongly correlated (Cronbach's alpha = 0.96). The summed method (used in the present study) involves summing the scores, resulting in a range from 0 to 216 (*M*=59, *SD*=25) with higher scores indicating greater symptomatology. The binary scoring technique is more often used and considered "much simpler" (p. 171, Pennebaker, 1982). It requires summing only items that participants respond to with a three or higher ("every month or so" to "more than once every week"). The total score using this scoring method results in a range of 0 to 54 (*M*=17, *SD*=6.9), with higher scores representative of more symptoms. Although the

factor structure is relatively unstable, the PILL demonstrated both good internal consistency (Cronbach's alpha = 0.88 and 0.91, respective to the scoring technique used) and test-retest reliability over a two-month period (Cronbach's alpha = 0.83 and 0.79, respective to the scoring technique used). Researchers in the area of expressive writing have commonly used this scale since its development to assess for frequency of physical symptoms.

Davidson Trauma Scale (DTS). (Davidson, Book, Colket, Tupler, Roth, David, et al., 1997). (Appendix B) The DTS was designed to map onto PTSD symptoms defined by the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV) (American Psychiatric Association, 1994) and evaluate PTSD symptoms in individuals with a trauma history. It contains 17 items that correspond to each of the 17 symptoms listed in the DSM-IV. Using a five-point scale, it measures both frequency (0 = *Not at all* to 4 = *More than 6 times*) and severity (0 = *Not at all distressing* to 4 = *Extremely distressing*) for each symptom experienced by the respondent over the week prior. Items are summed together to result in an overall score ranging from 0 to 136 as well as subscale scores for frequency and severity, each ranging from 0 to 68. The DTS demonstrated excellent internal consistency (overall: Cronbach's alpha = 0.99, frequency items subscale: Cronbach's alpha = 0.97, severity items subscale: Crohnbach's alpha = 0.98) when evaluated with 241 patients recruited from three studies with rape victims, war veterans, and Hurricane Andrew victims. The DTS also performed well for two-week test-retest reliability (Cronbach's alpha = 0.86). The scale exhibited concurrent validity and was evaluated on its sensitivity, specificity, efficiency, and predictive value relative to a SCID-based diagnosis

of PTSD. With the use of other well-known trauma scales and one personality scale, convergent and discriminant validity were established for the DTS.

Center for Epidemiological Studies - Depression Scale (CES-D). (Radloff, 1977). (Appendix C) The CES-D was developed to measure depression symptoms in community adults. It contains 20 items that assess various aspects of depression including depressed mood, feelings of guilt or worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance. It measures the frequency of each symptom over the past week using a four-point scale (0 = *Rarely or none of the time (less than 1-2 days)*, 3 = *Most or all of the time (5-7 days)*) and items are summed to provide a total score than ranges from 0 to 60. A cutoff score of 16 or greater is recommended for identifying individuals at-risk for clinical depression (Lewinsohn, Seeley, Roberts, & Allen, 1997). The CES-D has demonstrated high internal consistency (Cronbach's alpha = 0.85), concurrent validity, and construct validity. Though it is not recommended for use as a screening or diagnostic tool for clinical or major depression, it has been shown to detect individual differences in nonclinical populations (Beck, Ward, Mendelsohn, Mock & Erlbaugh, 1961; Roberts, Vernon, & Rhoades, 1989).

Procedure

In the original study (Konig et al., 2014), participants were randomly assigned to one of six groups in a 3 Training Condition (response, stimulus, none) x 2 Writing Topic (expressive writing, control) design. Participants were invited to attend three lab sessions (approximately 120, 30, and 45 minutes, respectively) and complete a one-month follow-up survey packet.

During the first lab session, participants were first asked to read and sign the consent form. They then completed survey questionnaires (demographic information, CES-D, DTS, and PILL) for about 30 minutes. This allowed all groups time to physiologically adapt to the laboratory environment before baseline physiological data were collected.

All participants were then taught diaphragmatic breathing to assist them in relaxation and to establish a consistent physiological baseline. Participants then received training (response, stimulus, or none) based on their assigned condition. All trainings were conducted by the principal investigator of the study or a trained research assistant and lasted about 45 minutes. These trainings followed procedures established in the extant literature (Lang, Kozak, Miller, Levin, & McLean Jr., 1980; Lang, Levin, Miller, & Kozak, 1983; Miller, Levin, Kozak, Cook III, McLean Jr., & Lang, 1987). The trainer read four scripts that lacked reference to emotion but contained descriptive detail and either referenced behavioral and physiological responding (for the response training group) or stimulus detail (for the stimulus training group). Participants were asked to imagine the script and describe their imagery after each script was read. Based on their assigned condition, participants were systematically praised for describing either active physiological and behavioral involvement (response training condition) or focusing on sensory detail (stimulus training condition). Response training has been shown to increase physiological responding during emotional imagery, whereas stimulus training has been found to not increase physiological responding during imagery (Lang et al., 1980; Miller et al., 1987). For the no training group, the participants received no imagery training. This provided a control group

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based on traditional expressive writing paradigm procedures, whereas the stimulus training group provided a comparison group to the response training condition.

After training was completed, electrodes were attached to participants and heart rate (HR) and skin conductance (SC) baseline data were then collected for ten minutes. Participants were told the electrodes would record their bodily reactions and were instructed to relax by focusing their breathing and clearing their mind of thoughts (Epstein et al., 2005). Though research most often defines the baseline as the mean of baseline minutes one through five, during this data collection it was defined as the mean of baseline minutes six through ten. This allowed the researchers to use patterns during minutes one through five to determine whether participants were still habituating to the laboratory conditions.

Following procedures of previous writing paradigm studies (Epstein, Sloan, & Marx, 2005; Sloan & Marx, 2004a; 2004b), participants were asked to write on three separate days for 20 minutes within a two-week period. The first writing session began after the collection of baseline physiological data. During writing sessions one and three, physiological data continued to be collected during the writing. No physiological data were collected during writing session two to streamline the data collection process. As a manipulation check, the Self-Assessment Manikin (SAM; Bradley & Lang, 1994) was administered before and after each writing session. A short-form of the DTS (McCleron, Beckham, Mozley, Feldman, Vrana, Rose, 2005) was administered following each writing session. Participants in the trauma condition were asked to write about the same traumatic experience during each session. Writing instructions based on

Pennebaker (1997) were adapted to additionally instruct participants to "use the techniques you were taught earlier (or in the first session) in order to more fully involve yourself in your writing," (Konig et al., 2014). Based on Pennebaker's (1997) instructions, participants were asked to write about the most traumatic/distressing experience of their lives with as much emotion and feeling as possible. Consistent with expressive writing literature (Pennebaker, 1997; Sloan & Marx, 2004b), participants in the neutral topic (control) condition were instead asked to write about the details of how they spend a typical day without including any emotion or opinions.

After all three writing sessions were completed, participants were told they would receive follow-up surveys by mail in one month and a debriefing would occur via e-mail after the completion of all data collection. Participants were then mailed the follow-up surveys (CES-D, DTS, and PILL) one-month following their third writing session and asked to complete and return them.

Data Analyses

The present study aimed to examine the impact of expressive writing on event-related distress, depression, and physical illness symptoms in a sample of bereaved emerging adults compared with control and other trauma participants. Both quantitative and text analytic (i.e., LIWC, LSA) methods were used to test study hypotheses.

Preliminary data screening. Descriptives on the bereaved and other trauma participants in both expressive writing and control conditions were run on demographic characteristics (i.e.,

age, gender, class rank, race, English as the first language, and psychotherapy status) and outcome measures (i.e., CES-D, DTS, PILL) at baseline. Associations between demographic characteristics and outcome measures were analyzed in order to later control for significant covariates in the statistical models.

Hypothesis testing and exploratory analyses. Hypothesis 1 was investigated using a 2 Writing Condition (emotional disclosure, control writing) x 2 Session (baseline, one month follow up) Mixed Factorial MANOVA with the PILL, DTS, and CES-D total scores as dependent measures. This analytic approach is commonly used in expressive writing studies with the bereaved (Lichtenthal & Cruess, 2010).

Hypothesis 2 was tested using two t-tests to assess between group (emotional disclosure, control writing) differences in average use of insight words and causal words across the three writing sessions. A Bonferroni correction was used to control for the altered familywise error rate due to the use of multiple comparisons. LIWC data provide a mean percentage score for various word categories for each individual writing session. These data were used to calculate the mean percentages for insight- and causal-related words averaged across the three writing sessions.

Hypothesis 3 was assessed within the bereaved emotional disclosure writers by calculating Pearson's r correlations between the change scores for insight- and causal-related words and outcomes (PILL, DTS, and CES-D) at follow-up. LIWC data were used to calculate the change scores for insight- and causal-related words by subtracting the mean percentages from

session one from the session three. This analytic strategy follows that of Pennebaker et al. (1997). If any of these correlations are significant and relevant covariates emerge in the preliminary analyses, then three separate hierarchical regression analyses were used to predict each of the outcome measures (PILL, DTS, and CES-D) in order to substantiate the findings using a more conservative statistical test.

Hypothesis 4 was investigated using a One Way ANOVA to assess between-group (emotional disclosure, control writers) differences in pronoun use similarity across writings. Consistent with Campbell and Pennebaker's (2003) method for computing a similarity coefficient within their Pronoun semantic space, the LSA package within the statistical computing software R was used to compute a "pronoun use similarity coefficient" based on pronoun use. The "pronoun use similarity coefficient" is the average of similarity coefficients for adjacent pairs of essays determined by LSA. This similarity coefficient is computed within the Pronoun semantic space built by the researchers using expressive writing samples provided by Pennebaker and the pronoun list provided by Campbell and Pennebaker (2003).

Hypothesis 5 was tested within the bereaved emotional disclosure writers by calculating Pearson's *r* correlations between the average pronoun use similarity coefficient (calculated using pronoun use coefficients between essays provided by LSA) and outcomes (PILL, DTS, and CES-D). This analytic strategy follows that of Campbell and Pennebaker (2003). If any of these correlations are significant and relevant covariates emerge in the preliminary analyses, then three separate hierarchical regression analyses were used to predict each of the outcome measures

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(PILL, DTS, and CES-D) in order to substantiate the findings using a more conservative statistical test.

Hypothesis 6 was assessed with all bereaved writers (emotional disclosure and control writers combined) by calculating correlations between the change scores for insight- and causal-related words and outcomes (PILL, DTS, and CES-D). LIWC data were used to calculate the change scores for insight- and causal-related words. If any of these correlations are significant and relevant covariates emerge in the preliminary analyses, then three separate hierarchical regression analyses were used to predict each of the outcome measures (PILL, DTS, and CES-D) in order to substantiate the findings using a more conservative statistical test.

Hypothesis 7 was tested with all bereaved writers (emotional disclosure and control writers combined) by calculating correlations between the average pronoun use similarity coefficient (calculated using pronoun use coefficients between essays provided by LSA) and outcomes (PILL, DTS, and CES-D). If any of these correlations are significant and relevant covariates emerge in the preliminary analyses, then three separate hierarchical regression analyses were used to predict each of the outcome measures (PILL, DTS, and CES-D) in order to substantiate the findings using a more conservative statistical test.

Exploratory Analysis 1 was investigated with a 2 Population (bereaved, other trauma) x 2 Time (baseline, follow-up) Mixed Factorial MANOVA with the PILL, DTS, and CES-D total scores as dependent measures using only emotional disclosure condition participants.

Exploratory Analysis 2 was tested with two t-tests to examine the between-group

differences (bereaved, other traumas) in average use of insight words and causal words across the three writing sessions. A Bonferroni correction was used to control for the altered familywise error rate due to the use of multiple comparisons. LIWC data were used to calculate the mean percentages for insight- and causal-related words averaged across the three writing sessions.

Exploratory Analysis 3 was investigated with only bereaved participants using a 2 Condition (emotional disclosure, control) x 2 Time (baseline, follow-up) Repeated Measures ANOVA with the CES-D Positive Affect subscale as the dependent measure.

Exploratory Analysis 4 was examined with emotional disclosure writings only and use a 2 Group (bereaved, other trauma) x 2 Time (baseline, follow-up) Repeated Measures ANOVA with the CES-D Positive Affect subscale difference score (follow-up minus baseline) as the dependent measure.

<center>**Results**</center>

Demographic Data

  Descriptives. Descriptive statistics were calculated with the full sample (*N*=234) for the continuous demographic variable of age. The age of participants ranged from 18 to 29 with a mean of 20.5 years (*SE*=0.16, *SD*=2.50, Skewness=1.20, Kurtosis=1.10; Bereaved *M*=20.38, *SD*=2.16, *SE*=0.26, Skewness=1.44, Kurtosis=2.51; Other Trauma *M*=20.53, *SD*=2.60, *SE*=0.20, Skewness=1.16, Kurtosis=0.73) based on the inclusion criteria chosen for the study sample. The bereaved participants were relatively evenly divided across class ranks, thus the present sample is considered relatively representative of the emerging adult population.

  Frequencies. Frequencies were calculated for each of the categorical demographic variables gathered in this study. Frequencies are presented in the form of percentages calculated from the final sample size (*N*=234) included in the analyses. These variables included gender, race, class rank, and English as the native language, and current psychotherapy status. These frequency data are presented in Table 1 below.

  The sample predominantly consisted of women (71.8%) who identified as White (47.4%) or Black/African American (27.8%) with fewer participants identifying as Asian (11.5%), Hispanic (2.1%), Native Hawaiian or other Pacific Islander (1.3%), or Other (9.8%). Freshmen were the largest class rank group (38.5%), with a similar number of students from the remaining class ranks (Sophomore 20.1%, Junior 17.5%, Senior 23.9%) represented in the study. Most

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participants endorsed English as a native language (85.9%) and were not currently in

psychotherapy (97.0%).

Table 1
Frequencies and Percentages for Demographic Variables

Variable	Total Frequency (% of Total)	Bereaved Frequency (% of Bereaved)	Other Trauma Frequency (% of Other Trauma)
Gender			
Male	66 (28.2%)	16 (23.2%)	50 (30.3%)
Female	168 (71.8%)	53 (76.8%)	115 (69.7%)
Race			
White	111 (47.4%)	27 (39.1%)	84 (50.9%)
Black/African American	65 (27.8%)	27 (39.1%)	38 (23.0%)
Asian	27 (11.5%)	5 (7.2%)	22 (13.3%)
Hispanic	5 (2.1%)	1 (1.4%)	4 (2.4%)
Native Hawaiian/Other Pacific Islander	3 (1.3%)	1 (1.4%)	2 (1.2%)
Other	23 (9.8%)	8 (11.6%)	15 (9.1%)
Class Rank			
Freshman	90 (38.5%)	20 (29.0%)	70 (42.4)
Sophomore	47 (20.1%)	17 (24.6%)	30 (18.2%)
Junior	41 (17.5%)	12 (17.4%)	29 (17.6%)
Senior	56 (23.9%)	20 (29.0%)	36 (21.8%)

Note: Calculation of percentages are based on the full sample of *N=234*, Bereaved sample *n=69*,

and Other Trauma sample *n=165*. There were no missing data present for the frequencies above.

Missing Data

An examination of the individual item responses of participants revealed that only two

participants partially completed a measure with greater than 5% of the items left blank. Listwise

deletion was used to remove these participants' data from analyses for the corresponding

measure. In cases where other participants had fewer than 5% of items missing from measures,

missing data were imputed using the last observation carried forward. In cases where a baseline value was not available, a mean substitution was used in place of the missing value (Tabachnick & Fidell, 2007).

Attrition/Retention Rates

Attrition/retention rates were first calculated for the bereaved and other trauma writers who completed the three writing tasks and again for those who also completed the one-month follow-up. As with many studies that focus on the bereaved (Schut et al., 2001), a high (>20%; Frattaroli, 2006) attrition rate occurred in the present study from the time of entry into the study to the one-month follow-up in both the bereaved and other trauma groups. Attrition rates did not differ between the groups (χ^2(1, N=234)=0.46, p=0.496).

Table 2 *Retention/Attrition Rates*

n (Retention% / Attrition%)	Entered Study	Completed Three Writing Tasks	Completed Three Writing Tasks & Follow-Up
Bereaved	69 (100% / 0%)	65 (94.2% / 5.8%)	52 (75.4% / 24.6%)
Other Trauma	165 (100% / 0%)	155 (93.9% / 6.1%)	131 (79.4% / 20.6%)

To further examine the effect of the experimental manipulation on attrition within the bereaved writers, further comparisons were made. Table 13 below presents the retention/attrition rates for bereaved participants assigned to the two different writing tasks. Attrition rates did not differ between the conditions (χ^2(1, N=234)=2.86, p=0.091).

Table 3 *Retention/Attrition Rates for Bereaved Participants*

n (Retention% / Attrition%)	Entered Study	Completed Three Writing Tasks	Completed Three Writing Tasks & Follow-Up
Emotional Disclosure	36 (100% / 0%)	34 (94.4% / 5.6%)	28 (77.8% / 22.2%)
Control	33 (100% / 0%)	31 (93.9% / 6.1%)	24 (72.7% / 27.3%)

To determine whether participants who dropped out of the study were systematically different from those who were retained within the study, differences at baseline on outcome measures were examined following methods of Lichtenthal & Cruess (2010). Three One Way MANOVAs (a One Way MANOVA each with full sample, bereaved subsample, and other trauma subsample) examining differences between study completers and non-completers for outcome measures (PILL, DTS, CES-D) revealed no significant differences on outcome measures at baseline between participants within each group who were lost to follow-up versus participants who completed three writing exercises and follow-up measures (bereaved and other trauma combined: $F(3, 229)=0.08$, $p=0.973$, bereaved participants only: $F(3, 65)=0.22$, $p=0.886$, other trauma participants only: $F(3, 160)=0.39$, $p=0.762$).

Hypothesis Testing and Exploratory Analyses

Evaluation of assumptions. To assess the extent to which random assignment led to equivalent groups with respect to writing conditions at baseline, a One Way MANOVA was conducted with the full sample. A 2 Writing Condition (emotional disclosure, control writing) One Way MANOVA with the PILL, DTS, and CES-D total scores as dependent measures was used to examine whether there were significant baseline differences between participants randomized to the emotional disclosure and control writing groups and on measures of physical

illness symptoms (PILL), trauma symptoms (DTS), and depression symptoms (CES-D) across the entire sample. The overall MANOVA indicated there were baseline differences between conditions ($F(3, 229)=6.81$, $p<0.001$). Further examination of univariate tests revealed that there were no significant baseline differences found for physical symptoms (PILL: $F(1, 231)=0.80$, $p=0.373$). There were, however, significant baseline differences found for trauma symptom scores ($F(1, 231)=11.95$, $p=0.001$), such that participants in the emotional disclosure writing condition had lower scores at baseline relative to those in the control writing condition (emotional disclosure $M=30.82$, control writing $M=42.60$). Also, significant baseline differences were found for depression symptoms ($F(1, 231)=8.23$, $p=0.005$), such that participants in the emotional disclosure writing condition had lower scores at baseline than those in the control writing condition (emotional disclosure $M=12.99$, control writing $M=16.37$). Due to these baseline differences, change scores (follow-up minus baseline) were calculated for the CES-D (full scale and positive affect subscale) and DTS measures and used for data analysis (Exploratory Analysis 1, Exploratory Analysis 4), replacing the use of baseline and follow-up scores with full sample analyses.

To test for possible baseline differences between groups, a 2 Group (bereaved, other trauma) One Way MANOVA with the baseline PILL, DTS, and CES-D baseline total scores as dependent measures was used. The MANOVA revealed no between groups differences between the bereaved and other trauma participants on baseline measures (PILL, DTS total, CES-D).

An additional One Way MANOVA was conducted in order to determine whether

baseline differences between writing conditions existed within just the bereaved sample. The overall MANOVA indicated there were baseline differences between conditions ($F(3,65)=3.81$, $p=0.014$). Further examination of univariate tests revealed that there were no significant baseline differences found for depression symptoms (CES-D; $F(1, 67)=2.15$, $p=0.147$) or physical illness symptoms ($F(1, 67)=3.12$, $p=0.082$). There were, however, significant baseline differences found for trauma symptom scores ($F(1, 67)=9.23$, $p=0.003$), such that participants in the emotional disclosure writing condition had lower scores at baseline relative to those in the control writing condition (emotional disclosure $M=30.69$, control writing $M=49.18$). Due to baseline differences in DTS scores, change scores (follow-up minus baseline) were calculated and used for hypothesis testing (Hypotheses 1, 3, 5, 6, and 7), replacing the use of baseline and follow-up scores with bereaved sample analyses.

Additional assumptions were checked according to the criteria checklist for ANOVA and MANOVA analyses provided by Tabachnick and Fidell (2013). Descriptive statistics (i.e., minimum, maximum, mean, mean standard error, standard deviation, skewness, skewness standard error, kurtosis, kurtosis standard error, and z-scores) were calculated for all continuous outcome variables analyzed in the current study. The continuous outcome variables included physical symptoms (PILL), trauma symptoms (DTS total), and depression severity (CES-D). Few univariate outliers (PILL baseline=1 outlier, DTS follow-up=2, DTS frequency baseline=1, CES-D baseline=2, CES-D follow-up=1) were detected though these are considered acceptable due to the large sample size in the present study (Tabachnick & Fidell, 2013). There were no

multivariate outliers detected for any of the predictor variables (group, condition, average insight word use, change from session one to three in insight word use, average causal word use, and change from session one to three in causal word use). All variables were within acceptable range for skewness and kurtosis, except for the baseline PILL within the bereaved subsample. For analyses including both the bereaved and other trauma participants, no transformations were used based on the recommendation of Tabachnick and Fidell (2013) due to the large (i.e., over 200 cases) sample size. For analyses with just the bereaved sample, a log correction on the PILL data was used to correct for the exhibited kurtosis on the baseline PILL and used instead of the baseline and follow-up PILL data. Descriptive data for these variables at baseline and follow-up are reported in Table 5.

Table 4

Descriptive Statistics on Outcome Variables for Full Sample

Outcome Variables	N	Min	Max	Mean		SD	Skewness		Kurtosis	
				Stat.	SE		Stat.	SE	Stat.	SE
PILL (baseline)	234	11.0	147.0	57.28	1.61	24.61	0.62	0.16	0.29	0.32
PILL (follow-up)	183	8.0	120.0	51.12	1.81	24.51	0.47	0.18	-0.39	0.36
DTS (baseline)	234	0.0	112.0	37.12	1.73	26.51	0.71	0.16	-0.15	0.32
DTS (follow-up)	187	0.0	111.0	21.23	1.76	24.09	1.38	0.18	1.41	0.35
CES-D (baseline)	234	0.0	47.0	14.78	0.60	9.12	1.17	0.16	1.44	0.32
CES-D (follow-up)	184	0.0	52.0	14.56	0.72	9.76	1.00	0.18	1.02	0.36
CES-D Positive Affect (baseline)	234	0.0	12.0	9.27	0.18	2.68	-1.11	0.16	0.83	0.32
CES-D Positive Affect (follow-up)	184	0.0	12.0	8.89	0.21	2.79	-0.82	0.18	0.16	0.36
LIWC – Insight (W1)	232	0.0	5.7	1.90	0.08	1.17	0.71	0.16	0.16	0.32
LIWC – Insight (W2)	224	0.0	8.2	2.13	0.10	1.56	0.93	0.16	0.67	0.32
LIWC – Insight (W3)	208	0.0	6.9	2.03	0.12	1.72	0.76	0.17	-0.45	0.34
LIWC – Insight (change)	208	-3.6	4.8	0.06	0.10	1.37	0.53	0.17	0.59	0.34
LIWC – Insight (mean %)	232	0.0	6.2	2.00	0.08	1.29	0.74	0.16	-0.01	0.32
LIWC – Causal (W1)	232	0.0	4.7	1.27	0.05	0.77	1.11	0.16	2.22	0.32
LIWC – Causal (W2)	224	0.0	4.4	1.45	0.06	0.91	0.76	0.16	0.23	0.32
LIWC – Causal (W3)	208	0.0	5.1	1.45	0.06	0.91	0.90	0.17	1.01	0.34
LIWC – Causal (change)	208	-3.2	4.1	0.16	0.06	0.94	0.36	0.17	1.64	0.34
LIWC – Causal (mean %)	232	0.0	4.2	1.90	0.08	1.17	0.71	0.16	0.16	0.32
LSA – Pronoun Correlation Coefficient	234	0.0	1.0	0.98	0.01	0.09	-9.92	0.16	100.98	0.32

Table 5
Descriptive Statistics on Outcome Variables for Bereaved Sample

Outcome Variables	N	Min	Max	Mean		SD	Skewness		Kurtosis	
				Stat.	SE		Stat.	SE	Stat.	SE
PILL (baseline)	69	14.0	147.0	53.13	2.91	24.21	1.17	0.29	2.61	0.57
logPILL (baseline)	69	1.2	2.2	1.69	0.02	0.20	-0.27	0.29	-0.02	0.57
PILL (follow-up)	52	10.0	103.0	46.98	3.27	23.59	0.78	0.33	0.22	0.65
logPILL (follow-up)	52	1.1	2.0	1.63	0.03	0.23	-0.44	0.33	-0.03	0.65
PILL change	52	-49.0	27.0	-6.87	2.32	16.72	-0.41	0.33	0.39	0.65
DTS total (baseline)	69	0.0	107.0	39.54	3.22	26.73	0.79	0.29	-0.08	0.57
DTS total (follow-up)	55	0.0	84.0	19.71	3.16	23.42	1.38	0.32	0.83	0.63
DTS change	46	-58.0	21.0	-15.17	2.64	17.91	-0.23	0.35	-0.20	0.69
CES-D (baseline)	69	1.0	44.0	13.55	1.10	9.11	1.26	0.29	1.44	0.57
CES-D (follow-up)	52	0.0	52.0	14.65	1.49	10.76	1.12	0.33	1.31	0.65
CES-D (change)	52	-30.0	17.0	1.15	1.13	8.12	-0.86	0.33	3.26	0.65
CES-D Positive Affect (baseline)	69	2.0	12.0	9.64	0.29	2.38	-1.29	0.29	1.61	0.57
CES-D Positive Affect (follow-up)	52	0.0	12.0	8.79	0.39	2.84	-0.78	0.33	0.26	0.65
LIWC – Insight (W1)	69	0.0	5.7	2.01	0.14	1.15	0.47	0.29	0.12	0.57
LIWC – Insight (W2)	68	0.0	6.2	2.28	0.19	1.55	0.76	0.29	0.01	0.57
LIWC – Insight (W3)	62	0.0	6.3	2.25	0.22	1.71	0.50	0.30	-0.72	0.60
LIWC – Insight (change)	62	-2.0	3.7	0.20	0.15	1.18	0.77	0.30	0.55	0.60
LIWC – Insight (mean %)	69	0.2	5.9	2.17	0.16	1.32	0.46	0.29	-0.45	0.57
LIWC – Causal (W1)	69	0.2	4.7	1.26	0.09	0.79	1.57	0.29	4.50	0.57
LIWC – Causal (W2)	68	0.0	3.4	1.37	0.10	0.82	0.57	0.29	-0.01	0.57
LIWC – Causal (W3)	62	0.2	4.3	1.42	0.10	0.82	0.85	0.30	1.42	0.60
LIWC – Causal (change)	62	-2.0	2.0	0.15	0.10	0.76	-0.08	0.30	0.08	0.60
LIWC – Causal (mean %)	69	0.3	4.2	1.35	0.08	0.64	1.30	0.29	4.11	0.57
LSA – Pronoun Correlation Coefficient	69	0.67	1.0	0.99	0.01	0.04	-7.17	0.29	54.84	0.57

Table 6

Descriptive Statistics on Outcome Variables for Other Trauma Sample

Outcome Variables	N	Min	Max	Mean		SD	Skewness		Kurtosis	
				Stat.	SE		Stat.	SE	Stat.	SE
PILL (baseline)	165	11.0	127.0	59.02	1.92	24.65	0.42	0.19	-0.32	0.38
PILL (follow-up)	131	8.0	120.0	52.76	2.16	24.76	0.36	0.21	-0.49	0.42
DTS total (baseline)	165	0.0	112.0	36.10	2.06	26.43	0.68	0.19	-0.17	0.38
DTS total (follow-up)	132	0.0	111.0	21.86	2.13	24.42	1.39	0.21	1.66	0.42
CES-D (baseline)	165	0.0	47.0	15.29	0.71	9.10	1.16	0.19	1.56	0.38
CES-D (follow-up)	132	0.0	46.0	14.52	0.82	9.38	0.94	0.21	0.84	0.42
CES-D Positive Affect (baseline)	165	0.0	12.0	9.11	0.22	2.79	-1.03	0.19	0.58	0.38
CES-D Positive Affect (follow-up)	131	1.0	12.0	8.93	0.24	2.78	-0.84	0.21	0.18	0.42
LIWC – Insight (W1)	163	0.0	5.3	1.85	0.09	1.18	0.81	0.19	0.28	0.38
LIWC – Insight (W2)	156	0.0	8.2	2.07	0.13	1.56	1.02	0.19	1.06	0.39
LIWC – Insight (W3)	146	0.0	6.9	1.94	0.14	1.72	0.88	0.20	-0.24	0.40
LIWC – Insight (change)	146	-3.6	4.8	0.00	0.12	1.44	0.53	0.20	0.54	0.40
LIWC – Insight (mean %)	163	0.0	6.2	1.92	0.10	1.28	0.87	0.19	0.31	0.38
LIWC – Causal (W1)	163	0.0	4.3	1.28	0.06	0.76	0.91	0.19	1.28	0.38
LIWC – Causal (W2)	156	0.0	4.4	1.49	0.08	0.94	0.79	0.19	0.18	0.39
LIWC – Causal (W3)	146	0.0	5.1	1.46	0.08	0.94	0.90	0.20	0.88	0.40
LIWC – Causal (change)	146	-3.2	4.1	0.16	0.08	1.00	0.43	0.20	1.64	0.40
LIWC – Causal (mean %)	163	0.0	3.5	1.38	0.05	0.69	0.74	0.19	0.48	0.38
LSA – Pronoun Correlation Coefficient	165	0.0	1.0	0.98	0.01	0.11	-8.90	0.19	78.72	0.38

Bivariate correlations. Correlations were calculated on demographic characteristics (age, gender, race) and outcome measures (PILL, DTS, CES-D) at baseline for the full sample (bereaved and other trauma participants in both expressive writing and control conditions). Significant associations between demographic characteristics and outcome measures were used to control for significant covariates in the statistical models. For the full sample, only age was significantly negatively correlated with the baseline PILL scores (r=-0.18, p<0.01), such that participants who were younger had higher physical symptom scores at baseline than older participants. However, for the bereaved subsample, there were no significant correlations between the demographic variables and the outcome measures.

Table 7
Bivariate Correlations Among Study Variables for the Bereaved Sample (n=69)

	Variable	1	2	3	4	5	6	7	8
1	Age	-							
2	Gender	0.07	-						
3	Race	-0.08	0.06	-					
4	Psychotherapy	-0.05	-0.10	0.12	-				
5	English	0.00	-0.11	0.43**	0.05	-			
6	PILL (baseline)	-0.13	0.19	-0.15	-0.27*	-0.24*	-		
7	DTS (baseline)	-0.20	0.13	0.05	0.06	-0.01	0.16	-	
8	CES-D (baseline)	-0.20	0.07	0.03	-0.35**	0.01	0.42**	0.17	-
9	CES-D positive affect (baseline)	0.08	0.02	-0.62	0.38**	-0.10	-0.21	-0.08	-0.74**

Note: All correlations are Pearson's r. *indicates significance at the .05 level (2-tailed) **indicates significance at the .01 level (2-tailed).

Primary test of the classic Pennebaker paradigm: Hypothesis 1.

Hypothesis 1. A 2 Writing Condition (emotional disclosure, control writing) x 2 Session (baseline, one month follow up) Repeated Measures MANOVA was used to test the hypothesis that the bereaved in the written emotional disclosure condition would evidence reduced depression (CES-D), and physical illness symptoms (logPILL) from baseline to one-month follow-up compared with the bereaved in the control writing condition. Results for the overall MANOVA revealed no significant between-groups difference ($F(2, 49)=0.44$, $p=0.648$). A main effect for time occurred ($F(2, 49)=7.47$, $p=0.001$), but the interaction term between time and group was not significant ($F(2, 49)=1.08$, $p=0.347$). A separate One Way ANOVA was used to determine whether expressive writing led to a reduction in event-related distress symptoms (DTS) using DTS change scores. Results revealed no significant difference between groups ($F(1, 45)=0.031$ $p=0.861$), seen in Table 8 below. Thus, hypothesis 1 was not supported, as emotional disclosure did not benefit the bereaved.

Table 8 *Means for One Way ANOVA* on DTS

Outcomes	Emotional Disclosure Mean (*SD*)	Control Writing Mean (*SD*)
DTS change	-15.63 (20.34)	-14.68 (15.28)

Test of the Pennebaker paradigm with LIWC: Hypotheses 2 and 3.

Hypothesis 2. Consistent with Pennebaker et al. (1997), two t-test analyses were used to assess the prediction that the bereaved in the emotional disclosure condition would use more insight- and causal-related words (each measured by LIWC) averaged across the three writings

compared with the bereaved in the control writing condition. Results indicated that the bereaved in the emotional disclosure condition used significantly more insight-related words on average compared with the bereaved in the control writing condition ($t(67)$=-11.41, $p<0.001$; emotional disclosure M=3.19, control M=1.06). The bereaved in the emotional disclosure condition also used significantly more causal-related words on average compared with the bereaved in the control writing condition ($t(67)$=-5.30, $p<0.001$; emotional disclosure M=1.68, control M=0.99). Thus, hypothesis two was supported.

Hypothesis 3. It was predicted that the change from writing session one to writing session three in insight words and causal words (each measured by LIWC) would each be negatively associated with physical illness symptoms (PILL), event-related distress (DTS), and depression symptoms (CES-D) for bereaved participants in the emotional disclosure condition. See Table 5 for means. This was tested with Pearson's r correlations (or hierarchical regression models if significant covariates existed for the specific outcome). This data analytic strategy is similar to that used by Pennebaker et al. (1997). No outcomes within the bereaved sample had significant covariates (i.e., age, gender, race), thus Pearson's r correlations were used for examining Hypothesis 3. DTS change was used to control for baseline differences between emotional disclosure and control bereaved participants. Results indicate that the change in insight words were significantly positively correlated with change in DTS scores at the $p<0.05$ level. Thus, the greater the increase in use of insight words from writing session one to writing session three, the smaller the decrease in DTS symptoms from baseline to follow-up. Causal words were not found

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to be significantly correlated with DTS change scores. Results also indicate that change in

insight and causal words were not significant predictors of physical illness symptoms or

depression symptoms, as the Pearson's *r* correlations revealed no significant relationship

between the predictors and these outcomes. Based on the results that change in insight and causal

words were not found to correlate with improved outcomes (PILL, DTS, CES-D), there was no

substantiation for hypothesis three.

Table 9 *Hypothesis 3 Pearson's r Correlations*

Outcomes	Insight Words Change	Causal Words Change
PILL follow-up	-0.09	-0.00
logPILL follow-up	-0.14	-0.06
PILL change	0.22	0.10
DTS follow-up	0.02	0.38
DTS change	0.43*	0.28
CES-D follow-up	-0.14	-0.10
CES-D change	-0.14	-0.10

Note: All correlations are Pearson's *r*. *indicates significance at the .05 level (2-tailed)

**indicates significance at the .01 level (2-tailed). *N*s for the PILL, DTS, and CES-D were 28,

26, and 28, respectively.

Test of the Pennebaker paradigm with LSA: Hypotheses 4 and 5.

Hypothesis 4. A One Way ANOVA was used to assess the hypothesis that the bereaved

emotional disclosure participants would demonstrate greater variation in pronoun use (measured

by mean of the pronoun use similarity coefficients; Campbell & Pennebaker, 2003) from one

essay to another compared with bereaved control writers. Results demonstrate no between-group

(bereaved emotional disclosure versus control writers) differences in pronoun use similarity across writings ($F(1, 67)=0.02$, $p=0.884$). Thus, hypothesis four is unsupported.

Table 10 Hypothesis 4 *Means for One Way ANOVA*

Outcome (*n*=69)	Emotional Disclosure Mean (*SD*)	Control Writing Mean (*SD*)
Pronoun Use Correlation Coefficient	0.988 (0.017)	0.986 (0.056)

Hypothesis 5. Pearson's *r* correlations were used to test the prediction that the similarity of pronoun use (measured by the mean of the pronoun use similarity coefficients) across essays would be positively correlated with event-related distress (DTS), depression (CES-D), and physical illness symptoms (PILL), within the bereaved emotional disclosure participants. Correlations calculated between the pronoun use similarity coefficients and outcomes (PILL, DTS change, CES-D) indicate no significant relationship between the variability in pronoun use and dependent measures at follow-up (PILL: Pearson's *r*=0.12, DTS change: Pearson's *r*=0.28, CES-D: Pearson's *r*=0.17). Thus, there is no support for hypothesis five.

Bereaved writers combined analyses: Hypotheses 6 and 7. As all but one of the hypotheses were unsupported subsequent analyses were conducted combining bereaved emotional disclosure and bereaved control writers. Otherwise, these hypotheses and analyses mirrored those of Hypothesis 3 and 5. They examined the extent to which text analysis variables (e.g., insight words, causal words, pronoun use similarity coefficient) were predictive of outcomes (i.e., physical symptoms, event-related distress, and depression) using writings from the bereaved participants within both the emotional disclosure and control groups.

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Hypothesis 6. The prediction that the summed total of insight- and causal-related words (each measured by LIWC) across the three writing sessions would be negatively associated with outcomes (physical symptoms, event-related distress, and depression) for all bereaved writers (emotional disclosure and control writers combined) was tested using Pearson's *r* correlations between the change scores for insight- and causal-related words and outcome measure scores (PILL, DTS change, and CES-D). LIWC data was used to calculate the change scores for insight- and causal-related words. Though the change scores for insight- and causal- related words were significantly correlated to each other (*r*=0.36, *p*=0.01), correlations between the predictors and outcomes were not significant.

Table 11
Bivariate Correlations Among Insight- and Causal-word Change Scores and Outcomes

Predictor Variable	PILL	DTS change	CES-D
Insight-word change	-0.01	0.25	0.00
Causal-word change	-0.16	0.09	-0.12

Note: All correlations are Pearson's *r*. No correlations were significant at the 0.05 level (2-tailed).

Hypothesis 7. Pearson's *r* correlations were used to evaluate the hypothesis that the similarity of pronoun use (measured by the average of the pronoun use similarity coefficients calculated with LSA) across all bereaved writers' essays would be positively correlated with event-related distress (DTS), depression (CES-D), and physical illness symptoms (PILL). Results indicate that none of the correlations between the mean pronoun use similarity

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coefficient and outcomes were significant (PILL: Pearson's r=0.07, DTS change: Pearson's r=0.20, CES-D: Pearson's r=0.08).

Bereaved writers versus other trauma writers: Exploratory analyses 1 and 2.

Exploratory analyses one and two were run to examine potential differences in writing content between the other trauma and bereaved participants and explore whether the writing intervention had a differential impact on outcomes based on the type of traumatic event identified (bereavement versus other trauma). Exploratory analyses one and two map respectively onto the analyses used for Hypotheses one and two, however compare the bereaved writers to other trauma writers within the emotional disclosure group only.

Table 12
Bivariate Correlations Among Study Variables for the Full Sample

Variable	1	2	3	4	5	6
1 Age	-					
2 Gender	-0.02	-				
3 Race	-0.05	-0.07	-			
4 PILL (baseline)	-0.18**	0.12	-0.10	-		
5 DTS total (baseline)	-0.02	-0.02	0.07	-0.01	-	
6 CES-D (baseline)	-0.12	0.01	0.05	0.33**	0.03	-

Note: All correlations are Pearson's r. *indicates significance at the .05 level (2-tailed) **indicates significance at the .01 level (2-tailed).

Exploratory analysis 1. Exploratory analysis 1 explored whether the emotional disclosure intervention had a differential impact based on traumatic event reported by the emotional disclosure participants. A 2 Group (bereaved, other trauma) x 2 Time (baseline, follow-up) Repeated Measures ANOVA with the PILL total score as a dependent measure was

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conducted. Results revealed a significant main effect for time ($F(1,86)=5.28$, $p=0.024$), such that physical symptoms overall decreased over time for both the bereaved and other trauma participants. There was no between-groups main effect for group, nor was there a significant interaction between time and group. Thus, the intervention did not appear to have any differential impact based on traumatic event reported.

Based on the differences between groups on DTS and CES-D scores at baseline, exploratory analysis 1 was additionally tested using a 2 Group (bereaved, other trauma) One Way MANOVA and difference scores (baseline subtracted from follow-up) for each outcome measure (DTS change, CES-D change) as dependent variables. This revealed no significant differences between emotional disclosure and control writing conditions on the trauma or depression symptom change scores. Thus, exploratory analysis 1 revealed no differences between bereaved and other trauma participants within the emotional disclosure condition.

Exploratory analysis 2. In the emotional disclosure group only, the bereaved were compared to other trauma writers on use of insight- and causal-related words (each measured by LIWC) across the three writing sessions using two t-tests to examine between-group differences in average use of insight words and causal words across the three writing sessions. LIWC data were used to calculate the mean percentages for insight- and causal-related words averaged across the three writing sessions. Results indicate no significant difference between the two groups for either average use of insight-related words ($t(103)= -0.74$, $p=0.459$; bereaved $M=3.19$, other trauma $M=3.03$) or causal-related words ($t(103)=1.38$, $p=0.170$; bereaved $M=1.68$, other

trauma *M*=1.87). As a manipulation check, a third t-test was run to analyze between-group differences in average use of death-related words across the three writing sessions, provided by LIWC. Results revealed that the bereaved used significantly more death-related words averaged across the writing sessions compared with the other trauma participants ($t(103)$= -9.18, $p<0.001$; bereaved *M*=0.92, other trauma *M*=0.13), as expected.

Positive CES-D subscale: Exploratory Analyses 3 and 4.

Exploratory analysis 3. Exploratory analysis 3 examined whether the emotional disclosure intervention had a differential impact within the bereaved participants on positive affect, measured by the CES-D Positive Affect subscale. A 2 Group (bereaved, other trauma) x 2 Time (baseline, follow-up) Repeated Measures ANOVA with the CES-D Positive Affect subscale score as a dependent measure was conducted. Results revealed a significant main effect for time ($F(1,50)$=5.82, p=0.020), such that positive affect scores decreased over time for both the bereaved and other trauma participants. There was no between-groups main effect for group, nor was there a significant interaction between time and group. Thus, the intervention did not appear to have any differential impact on positive affect based on traumatic event reported.

Exploratory analysis 4. Based on the differences between groups on the CES-D Positive Affect subscale scores at baseline, exploratory analysis 4 was tested using a 2 Group (bereaved, other trauma) One Way ANOVA and CES-D Positive Affect subscale difference scores (baseline subtracted from follow-up) as the dependent variable. This analysis revealed no significant differences between groups on positive affect scores. Thus, exploratory analysis 4 revealed no

differences between bereaved and other trauma participants within the emotional disclosure

condition on positive affect, as measured by the Positive Affect factor of the CES-D.

Discussion

This project set out to examine the impact of the Pennebaker expressive writing paradigm on college students who freely identified the "loss of a loved one" as their most traumatic stressor. Previous expressive writing studies with the bereaved (n=6) almost exclusively recruit participants based on their bereavement status, rather than follow the standard Pennebaker procedure of having participants identify and write about their most traumatic stressor (Pennebaker & Francis, 1996; Pennebaker et al., 1988). In the present study, participants were recruited and asked to write about "the trauma which is most disturbing to them," and those who freely identified the loss of a loved one were found to make up a substantial subset of participants. Thus, the present study was able to explore how participants who identified bereavement as their most disturbing trauma compared with those participants who identified another, non-death loss form of trauma (e.g., physical or sexual abuse, car accident or other accident, relationship conflict, etc.) as the most disturbing. Moreover, the present study employed objective outcome measures (i.e., Pennebaker Inventory of Limbic Languidness, Center for Epidemiological Studies – Depression Scale, Davidson Trauma Scale) and data analysis methods (i.e., Linguistic Inquiry and Word Count, Latent Semantic Analysis) not previously applied to expressive writing samples from the bereaved.

Results generally indicated that the expressive writing intervention failed to benefit the bereaved participants to any greater extent than that observed in the control writing condition.

Moreover, on a measure of distress (DTS), while both groups improved over time, the bereaved within the emotional disclosure group benefited less. Expressive writing, on some measures, may have a deleterious effect on bereaved participants. That is, whatever the natural healing process that occurs may be hindered by emotional disclosure among the bereaved.

Descriptive Results

The following discussion will place the results from the present study on bereaved emerging adults who completed an emotional disclosure writing task in the context of the broader literature. Of the expressive writing studies with the bereaved that sample from college students (i.e., Campbell & Pennebaker, 2003; Kuiken, Dunn, & LoVerso, 2008; Kovac & Range, 2000; Lichtenthal & Cruess, 2010; Pennebaker et al., 1990; Pennebaker et al., 1988; Pennebaker & Francis, 1996; Range et al., 2000), participants generally tend to be female, first-year college students, with a majority who identify as racially white. The present study's sample was comparable for gender and age, in that it comprised mostly female (71.8% female within the full sample, 76.8% female within the bereaved) participants with an average age of 20.5 years (20.4 years of age within the bereaved) with a slight majority belonging to the freshmen class rank (38.5% within the full sample, 29.0% within the bereaved). For race, though the majority of the sample identified as White (47.4% within the full sample, 39.1% within the bereaved), there was a greater portion of African Americans (27.8% within the full sample, 39.1% within the bereaved) compared with other similar studies. The racial makeup of the sample was representative of the university and region (southeastern United States) where the campus is

located. Though these demographic characteristics were not found to be significant correlates with the studied outcomes in the present study, they may impact the generalizability of the present findings to the larger population of bereaved university students.

As is typical with studies that involve bereaved participants (Schut et al., 2001), a high (>20%; Frattaroli, 2006) attrition rate occurred from the time of entry into the study to the one-month follow-up (Schut et al., 2001). This was particularly pronounced among the subset of bereaved participants, who had an attrition rate of 24.6%, compared with those who endorsed a non-loss form of trauma with an attrition rate of 20.6%. Nearly all studies that included bereaved college students and published their attrition rates (Kovac & Range, 2000; Lichtenthal & Cruess, 2010; Pennebaker et al., 1990; Pennebaker & Francis, 1996; Pennebaker et al., 1988; Range et al., 2000) also reported high rates of attrition (25%, 40%, 51.5%, 25%, 4%, 31.25%, respectively). This is uncharacteristic of the majority of expressive writing studies, based on Frattaroli's (2006) finding that 75% of studies in her meta-analysis had less than 20% attrition. Unlike the findings of Lichtenthal and Cruess (2010), in the present study, distress at baseline did not appear to be associated with likelihood of dropout from the study.

Hypothesis Testing

Results from the present study revealed improvement in outcomes (physical symptoms and event-related distress) over time, consistent with previous expressive writing research with the bereaved. No beneficial effects were attributable to the expressive writing intervention, however, such that there were no notable differences on outcome measures for the bereaved in

the emotional disclosure condition when compared with the control writing condition. Means on the CES-D (depression symptom severity) from the present study appear comparable to those found in similar research with bereaved college students (Lichtenthal & Cruess, 2010). Furthermore, they are lower than those in an expressive writing study with adults with an identified mood disorder, as would be expected (Baikie, Geerligs, & Wilhelm, 2012). This suggests that the present sample of bereaved participants is comparable to other same-age samples of bereaved participants on levels of depression symptom severity. There have been no published studies that have used the PILL to measure physical symptoms with the bereaved. Means on the PILL from the present study were substantially lower (less than half) than those found in Baikie et al.'s (2012) study with adults with mood disorders, whereas they were in a similar range to means from non-bereaved first-year undergraduates from Australia (Patchenko, Lawson, & Joyce, 2003). This demonstrates that the bereaved from the present study may be more similar to non-bereaved peers than those with a mood disorder on frequency of physical symptoms. The DTS also does not appear to have been studied with the bereaved in any published research, particularly within the context of expressive writing studies. In a study with trauma-exposed undergraduates, means on the DTS decreased significantly from 28.2 to 24.4 for the sample over a one-week period whereas in the present study they decreased from 37.1 to 21.2 for the full sample and from 39.5 to 19.7 within the bereaved over a one month period (Adkins, Weathers, McDevitt-Murphy, & Daniels, 2008). These means seem to indicate that the present study's sample is relatively unremarkable when compared with similar samples within the

literature, yet are worth highlighting, as they provide the first opportunity for this comparison.

LIWC data indicated that the bereaved in the emotional disclosure condition used significantly more insight-related and causal-related words in their writings compared with the bereaved control writers. This is considered as indicative of higher levels of cognitive processing during writing for the emotional disclosure writers around their loss compared with the bereaved control writers. It was anticipated that this difference would be predictive of improvement in outcomes (physical symptoms, depression, event-related distress) based on the extant literature on bereavement and meaning-making literature, however this was not the case. Conversely, results suggested that cognitive processing with an increase in use of insight words from writing one to writing three may hinder the bereaved from the typical grief trajectory of reduced distress over time. Even after combining all bereaved writers (emotional disclosure and control) into one group to strengthen power, there were no significant correlations found between the use of insight and causal words and outcomes. Means for the insight- and causal-related words averaged across writings were similar between groups (full sample, bereaved subsample, other trauma subsample) as well as within two standard deviations of those previously found in the literature with bereaved adults (Pennebaker, Mayne, & Francis, 1997).

These data call into question the power of cognitive adaptation/cognitive processing as an explanatory theory for the mechanism of action behind expressive writing. In spite of the greater use of words that ought to represent these processes, individuals' apparent level of cognitive processing was not correlated or associated with standard expressive writing outcomes (e.g.,

physical symptoms, depression) in a significant way. This is consistent with findings from a methodologically-similar study. Ullrich and Lutgendorf (2002) sampled from undergraduate psychology students and asked them to freely identify "a trauma or stressor that continues to be a source of distress," (p. 246). As with the present study, a sizeable portion (24%) chose the loss of a loved one as their "most distressing" topic for their journal. Unlike the present study, however, researchers did not focus on this subset of participants in their analyses. Their participants were assigned to one of three journaling groups (i.e., emotional expression writing about identified event, cognitive processing and emotional expression writing about identified event, or factual writing about media events) with modified versions of Pennebaker's traditional writing prompt and wrote an average of 8.2 journal entries over the course of four weeks. LIWC analyses were conducted to assess change in mean use of cognitive processing, positive emotion, and negative emotion words from the first half of journal entries to the second half of journal entries. From their results, greater change in use of cognitive processing words from the first two weeks to the latter two weeks was not found to be associated with physical health outcomes (i.e., illness episode frequency or illness symptoms severity). The change in use of cognitive processing words was, however, significantly correlated with positive growth, measured by the Posttraumatic Growth Inventory (PTGI). Though this does not explain the lack of association between cognitive processing and decrease in physical or psychological symptoms, as seen in their study or the present study, it does have important implications for future directions of expressive writing research with bereaved emerging adults.

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From the LSA analyses, there were no differences between conditions (emotional disclosure, control) detected within the bereaved writers. Unlike the findings of Campbell and Pennebaker (2003), results from LSA analyses within the present study were not predictive of outcomes (physical symptoms, depression, event-related distress). As with the LIWC analyses, after combining all bereaved writers, there was still no relationship discovered between pronoun use variability and outcomes. Thus, it was not possible to replicate Campbell and Pennebaker's result that variation in pronoun use from writing to writing was predictive of improved outcomes. It is also unknown how the pronoun correlation coefficient means from the present study compare with Campbell and Pennebaker's (2003) study, as they did not report descriptive results for the pronoun correlation coefficient itself, but only correlations between it and analyzed outcomes.

In spite of using multiple approaches drawn from expressive writing research, there was no indication that the expressive writing intervention was effective or beneficial in any way for the bereaved, other than the use of more insight- and causal-related words in their writings. This study aimed to serve as a thorough test for Pennebaker's expressive writing paradigm with this population in several ways, based on its having been written off too quickly by previous researchers. It appeared that there were potential gaps in the research that needed addressing, including: the use of the PILL as a commonly used outcome measure in expressive writing that had not yet been used with the bereaved; the inclusion of participants who freely chose their topic for writing, as in traditional expressive writing research, rather than having been selected

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based on their bereaved-status; the assessment of meaning-making processes to determine if the intervention was impactful in a way beyond the reduction of physical or psychological symptoms; and the use of the LSA technique, which Pennebaker has previously employed and found to link to health outcomes. Results from testing the hypotheses within the present study supported those from previous research findings (e.g., Stroebe et al., 2002; Stroebe, Schut, & Stroebe, 2006), such that the classic Pennebaker expressive writing intervention appears to be ineffective as a bereavement intervention on psychological and physical health outcomes.

Taken within the context of Ullrich and Lutgendorf's (2002) and Lichtenthal and Cruess' (2010) findings, it seems that a more structured writing prompt encouraging meaning-making processes is necessary for expressive writing to be beneficial. Furthermore, assessment of constructs such as post-traumatic growth may need to be included in order to capture intervention effects beyond subjective outcomes. It is unclear whether the findings of Ullrich and Lutgendorf (2002) would be replicable within just the bereaved, however, as they did not parse out grief loss from other trauma, as in the present study.

Exploratory Results

Further exploration into the study's dataset comparing the emotional disclosure group bereaved participants to the non-bereaved "other trauma" participants also resulted in a main effect for time, such that physical symptoms (assessed with the PILL) decreased over time for all participants. No between-groups main effects were significant, nor was there a significant interaction between time and group. No between-groups differences were revealed on measures

of event-related distress (DTS), depression symptoms (CES-D), or positive affect (CES-D Positive Affect subscale).

These groups (emotional disclosure bereaved versus emotional disclosure "other trauma" participants) were also analyzed using LIWC to explore whether there were any differences in use of words representing meaning making processes (i.e., causal-related, insight-related). A difference was found for the use of death-related words, such that the bereaved used significantly more death-related words on average compared with the other trauma participants (who used next to none), which served as a manipulation check. No difference on use of insight- or causal-related words was found between these two groups, however.

Thus, no significant differences between the bereaved and those who suffered a non-bereavement trauma ("other trauma") were revealed. This lack of differences between the bereaved and other trauma participants is somewhat surprising, given Kuiken, Dunn, and Loverso's (2008) research that would suggest otherwise. Perhaps the expressive writing paradigm is simply not powerful enough to capture the distinctions between these two groups.

Summary of Contributions and Future Directions

The findings from the present study lend additional support to the extant literature on expressive writing with bereaved individuals. Though the potential of expressive writing was considered from a variety of not-yet-explored methods as an intervention for the bereaved, there was no indication that it differentially impacted writers in the intervention group compared with those in the control group on outcome measures. Furthermore, when examining the bereaved

compared with the non-bereaved "other trauma" participants, surprisingly few differences emerged. Thus, although the Pennebaker paradigm appears to have been an effective intervention for trauma writers in reducing psychological distress and improving physical outcomes in other studies, it did not appear so in the present study. Furthermore, it did not seem helpful for the bereaved participants. The absence of significant results for the bereaved or for any differential effect between the bereaved and other trauma participants limits the study's contribution to better understanding the theoretical underpinnings for expressive writing's effectiveness as an intervention. The lack of association between words presumed to represent cognitive processing (i.e., insight- and causal-related words) with commonly used Pennebaker paradigm study outcomes (e.g., physical symptoms, depression) does suggest that the theory of cognitive adaption/cognitive processing may be an insufficient model for capturing the mechanism of expressive writing.

Speculation as to why Pennebaker's paradigm was ineffective with the bereaved in the study may be that bereavement is qualitatively unique from other traumas, such that emotional exposure or cognitive processing of one's loss may require more structured intervention than expressive writing. From Lichtenthal and Cruess' (2010) study, those who showed the most promise with improvement were those in the benefit-finding condition that had a more structured writing prompt rooted in theory. This was also seen in Ullrich and Lutgendorf's (2002) study that added cognitive processing instructions to the traditional Pennebaker prompt. They measured participants' change in use of cognitive processing words over the course of their journaling and

found it was significantly correlated with positive growth in undergraduates who endorsed experiencing a traumatic event they found currently distressing at the onset of the study. Strength-based or resiliency outcomes, such as posttraumatic growth, might also be a useful way to capture the intervention's impacts, as seen in Ullrich and Lutgendorf's (2002) study.

Another possible explanation may be that only a particular subset of bereaved, namely those experiencing complicated grief and, by definition, higher baseline distress, would experience more benefit compared with a control condition, as suggested by Schut et al. (2001). Per van der Houwen et al.'s (2010) study that included expressive writing as a component to an internet-based self-help intervention for the bereaved who self-identified as "significantly distressed by the loss" (p. 361), however, this was not the case. While those who participated in the intervention condition did experience a change in rumination, decreased emotional loneliness, and increased positive mood, there was no impact revealed for grief or depressive symptoms when compared with the control condition. Furthermore, effects were found to not be dependent on baseline distress or risk profile.

Though the anticipated results from the text analyses did not come to fruition, LIWC provides a number of other word categories to be explored in writing research. Specific to the population of interest, LIWC has several categories, beyond those used in this study, that are relevant to themes often found in writings by those who are bereaved. Based on the Ullrich & Lutgendorf's (2002) research, negative emotion and cognitive processing word categories warrant further exploration. LSA as a research methodology, however, is conceptually

challenging, difficult to implement, and considered to be a "swamp of complexities from which [one] might never emerge," (J. Pennebaker, personal communication March 22, 2015). Nevertheless, it has great potential as a text analysis methodology for writing research and may yet prove useful in future studies.

Taken within the context of this and prior studies that have failed to find beneficial effects with the Pennebaker expressive writing paradigm with the bereaved, perhaps it is time to "throw in the towel" for this particular writing intervention in bereavement research. Yet some interesting questions remain to be asked regarding the benefits of writing for the bereaved. Clinicians routinely "prescribe" for bereaved clients to journal about their loss, and there is a great deal of evidence that clinicians are attached to the belief that these exercises are helpful (Thompson & Neimeyer, 2014). Could it be that less structured writing exercises are more conducive to meaning-making and the benefit therein? Should the relatively unstructured writing exercises (e.g., journaling) encouraged for bereaved clients by clinicians be studied in a more ecologically relevant way? There are numerous loss-related variables (e.g., first loss versus multiple losses, history of trauma, cause of death) that may be worth further exploration as moderators for coping process and outcomes with a larger sample. Also, using a linear methodology, we recognize that it is difficult to fully capture the complexity of the grief experience along with what is engendered by the writing process without measures of meaning making, growth, and self-report. It remains possible that this and other studies have failed to capture what occurs with bereaved processes during expressive writing. On the other hand, since

those researchers who have found promise with the Pennebaker expressive writing paradigm (e.g., Lichtenthal & Cruess, 2010; Ullrich & Lutgendorf, 2002) have done so with added structure to the writing prompt, perhaps further research should advance along those lines? Of course, each of these lines of investigation has merit. However, given this particular form of expressive writing is unlikely to be recommended by clinicians, researchers' energy may be better spent with the investigation of writing prompts that are actually used in clinical settings.

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Appendix A

Demographic Questionnaire

ID Number:

Name _____

1) Age _____
2) Gender _____
3) What is your Race? Please check all that apply:

American Indian/Alaska Native	
Asian	
Black or African-American	
Hispanic	
Native Hawaiian or Other Pacific Islander	
White	
Other	

4) What year are you in school? Please check one of the following:

Freshman	
Sophomore	
Junior	
Senior	

5) Is English your native language? _____
    If not, what is your native language? _____
6) Are you currently receiving psychotherapy? _____
7) Have you smoked cigarettes in the last 6 hours?_____
8) Have you used any other tobacco products in the last 6 hours? _____
    If yes, what kinds?_____
9) Have you used any prescription medications?
    If yes, please list: _____
10) Please include your **e-mail address** to receive your Follow-Up Packet **one
    month from now**: _____

Appendix B

The Pennebaker Inventory of Limbic Languidness (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 experience each symptom. For all

items, use the following scale:

1	2	3	4	5
Have never or almost never experienced the symptom	Less than 3 or 4 times per year	Every month or so	Every week or so	More than once every week

1	Eyes Water		28	Swollen joints
2	Itchy eyes or skin		29	Stiff or sore muscles
3	Ringing in ears		30	Back pains
4	Temporary deafness or hard of hearing		31	Sensitive or tender skin
5	Lump in throat		32	Face flushes
6	Choking sensations		33	Tightness in chest
7	Sneezing spells		34	Skin breaks out in rash
8	Running nose		35	Acne or pimples on face
9	Congested nose		36	Acne/pimples other than face
10	Bleeding nose		37	Boils
11	Asthma or wheezing		38	Sweat even in cold weather
12	Coughing		39	Strong reactions to insect bites
13	Out of breath		40	Headaches
14	Swollen ankles		41	Feeling pressure in head
15	Chest pains		42	Hot flashes
16	Racing heart		43	Chills
17	Cold hands or feet even in hot weather		44	Dizziness
18	Leg cramps		45	Feel faint
19	Insomnia or difficulty sleeping		46	Numbness or tingling in any part of body
20	Toothaches		47	Twitching of eyelid
21	Upset stomach		48	Twitching other than eyelid
22	Indigestion		49	Hands tremble or shake
23	Heartburn or gas		50	Stiff joints
24	Abdominal pain		51	Sore muscles
25	Diarrhea		52	Sore throat
26	Constipation		53	Sunburn
27	Hemorrhoids		54	Nausea

In the last month, how many:

_____ _____ Visits have you made to the student health center or private physician for illness?

_____ _____ Days have you been sick?

_____ Days has your activity has been restricted due to illness?

Appendix C

Davidson Trauma Scale

Please identify the trauma which
 is most disturbing to you: _____

A. In the past week, how much trouble have you had with the following, keeping in mind the
event described above.

Frequency	Severity
0= Not at all	0= Not at all distressing
1= Once only	1= Minimally distressing
2= 2-3 times	2= Moderately distressing
3= 4-6 times	3= Markedly distressing
4= more than 6 times	4= Extremely distressing

1) Have you had painful images, memories or thoughts of the event?

2) Have you had distressing dreams of the event?

3) Have you felt as though the event was re-occurring?

4) Have you been upset by something which reminded you of the event?

5) Have you been avoiding any thoughts or feelings about the event?

6) Have you been avoiding doing things or going into situations which remind you about the event?

7) Have you found yourself unable to recall important parts of the event?

8) Have you had difficulty enjoying things?

9) Have you felt distant or cut off from other people?

10) Have you been unable to have sad or loving feelings?

11) Have you found it hard to imagine having a long life span fulfilling your goals?

12) Have you had falling asleep or staying asleep?

13) Have you been irritable or had outbursts of anger?

14) Have you had difficulty concentrating?

15) Have you felt on the edge, been easily distracted, or had to stay on guard?

16) Have you been jumpy or easily startled?

17) Have you been physically upset by reminders of the event?

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Appendix D

Center for Epidemiological Studies – Depression Scale

Below is a list of the ways you might have felt or behaved. Please check the appropriate box to tell how often you have felt this way during the past week.

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that don't usually bother me.	☐	☐	☐	☐
2. I did not feel like eating; my appetite was poor.	☐	☐	☐	☐
3. I felt that I could not shake off the blues even with help from my family or friends.	☐	☐	☐	☐
4. I felt I was just as good as other people.	☐	☐	☐	☐
5. I had trouble keeping my mind on what I was doing.	☐	☐	☐	☐
6. I felt depressed.	☐	☐	☐	☐
7. I felt that everything I did was an effort.	☐	☐	☐	☐
8. I felt hopeful about the future.	☐	☐	☐	☐

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
9. I thought my life had been a failure.				
10. I felt fearful.				
11. My sleep was restless.				
12. I was happy.				
13. I talked less than usual.				
14. I felt lonely.				
15. People were unfriendly.				
16. I enjoyed life.				
17. I had crying spells.				
18. I felt sad.				
	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)

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19. I felt that people disliked me.

☐ ☐ ☐ ☐

20. I could not get "going".

☐ ☐ ☐ ☐

Appendix E

Writing Instructions

Overview of Writing Instructions Given to All Participants

This study is an extremely important project looking at writing. During the next three lab sessions, you will be asked to write about one of several different topics for 20 minutes each day.

The only rule we have about your writing is that you write continuously for the entire time. If you run out of things to say, just repeat what you have already written. In your writing, don't worry about grammar, spelling, or sentence structure. Just write. Different people will be asked to write about different topics. Because of this, I ask that you not talk with anyone about the experiment. Because we are trying to make this a tight experiment, I can't tell you what other people are writing about or anything about the nature or predictions of the study. Once the study is complete, however, we will tell you everything. Another thing is that sometimes people feel a little sad or depressed after writing. If that happens, it is completely normal. Most people say that these feelings go away in an hour or so. If at any time over the course of the experiment you feel upset or distressed, please tell your experimenter or contact Dr. Vrana immediately. [Note: All participants will receive a sheet with contact information for Dr. Vrana.]

Another thing. Your writing is completely anonymous and confidential. Your writing is coded with an ID number. Please do not include your name in your writing. Some people in the past have felt that they didn't want anyone to read them. That's OK, too. If you don't feel comfortable turning in your writing samples, you may keep/delete them. We would prefer if you turned them in, however, because we are interested in what people write. I promise that none of the experimenters, including me, will link your writing to you. The one exception is that if your writing indicates that you intend to harm yourself or others, we are legally bound to match your ID with your name. Above all, we respect your privacy. Do you have any questions at this point? Do you still wish to participate?

Experimental Condition Instructions
(Do Not state the next sentence to participants in the no training group) I would like you to use the imagination techniques you were just taught in order to more fully involve yourself in recalling and writing about your experiences.

What I would like to have you write about for the next three days is the most traumatic, upsetting experience of your entire life—the same experience that you identified when you filled out a questionnaire earlier about posttraumatic symptoms. In your writing, I want you to really let go and explore your very deepest emotions and thoughts. It is critical that you really delve into your deepest emotions and thoughts. Ideally, we would like you to write about significant experiences or conflicts that you have not discussed in great detail with others. Remember that you have three days to write. You might tie your personal experiences to other parts of your life. How is it related to your childhood, your parents, people you love, who you are, or who you want to be. Again, in your writing, examine your deepest emotions and thoughts and remember to use the techniques you were just taught in order to more fully involve yourself in your writing.

On the Second Day of Writing

How did yesterday's writing go? Today, I want you to continue writing about the most traumatic experience of your life using the techniques you were taught in the first session in order to more fully involve yourself in your writing. While you are recalling your experience, remember to [actually do in your recollection what you were doing in the actual situation] or [involve yourself fully in the sights, sounds, and smells of the actual situation]. I really want you to explore your very deepest emotions and thoughts...and remember to use the techniques you were taught in the first session in order to more fully involve yourself in your writing.

On the Third Day of Writing

Today is the last writing session. In your writing today, I again want you to explore your deepest thoughts and feelings about the most traumatic experience of your life using the techniques you were taught in the first session in order to more fully involve yourself in your writing. While you are recalling your experience, remember to [actually do in your recollection what you were doing in the actual situation] or [involve yourself fully in the sights, sounds, and smells of the actual situation]. Remember that this is the last day and so you might want to wrap everything up. For example, how is this experience related to your current life and your future? But feel free to go in any direction you feel most comfortable with and delve into your deepest emotions and thoughts...and remember to use the techniques you were taught in the first session in order to more fully involve yourself in your writing.

Control Condition Instructions
(Do Not state the next sentence to participants in the no training group) I would like you to use the imagination techniques you were just taught in order to more fully involve yourself in recalling and writing about your experiences.

What I would like you to write about over the next three days is how you use your time. Each day, I will give you different writing assignments on the way you spend your time. In your writing, I want you to be as objective as possible. I am not interested in your emotions or opinions. Rather I want you to try to be completely objective. Feel free to be as detailed as possible. In today's writing, I want you to describe what you did yesterday from the time you got up until the time you went to bed. For example, you might start when your alarm went off and you got out of bed. You could include the things you ate, where you went, which buildings or objects you passed by as you walked from place to place. The most important thing in your writing, however, is for you to describe your days as accurately and as objectively as possible and remember to use the techniques you were just taught in order to more fully involve yourself in your writing.

On the Second Day of Writing

How did your writing go yesterday? Today, I would like you to describe what you have done today since you woke up using the techniques you were taught in the first session in order to more fully involve yourself in your writing. While you are recalling your experience, remember to [actually do in your recollection what you were doing in the actual situation] or [involve yourself fully in the sights, sounds, and smells of the actual situation]. Again, I want you to be as objective as possible to describe exactly what you have done up until coming to this experiment... and remember to use the techniques you were taught in the first session in order to more fully involve yourself in your writing.

On the Third Day of Writing

This is the last day of the writing sessions. In your writing today, I would like you to describe what you will be doing over the next week and remember to use the techniques you were taught in the first session in order to more fully involve yourself in your writing. While you are recalling your experience, remember to [actually do in your recollection what you were doing in the actual situation] or [involve yourself fully in the sights, sounds, and smells of the actual situation].

Appendix F

Additional Tables

Table 1 *Bereaved Participant Ns for Training x Writing Condition*

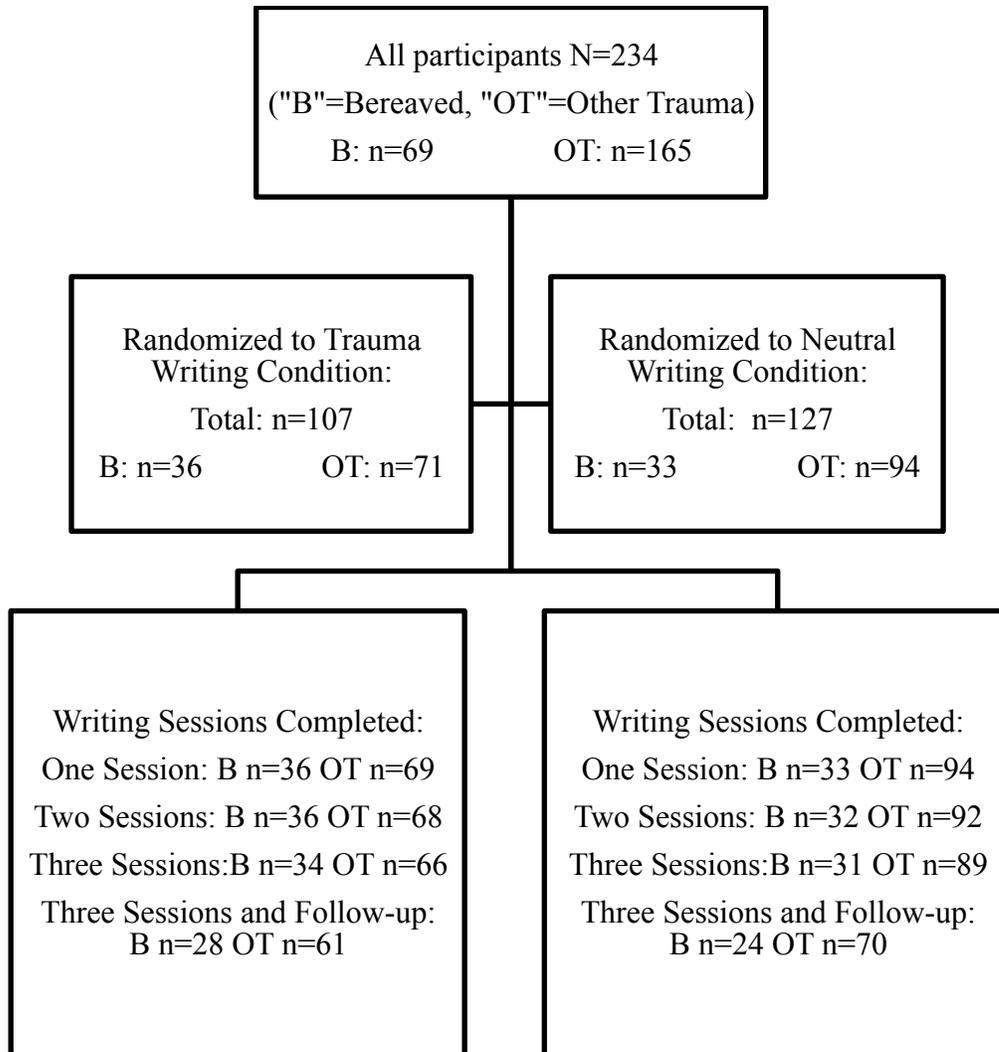| Bereaved Writers	Response Training	Stimulus Training	No Training	Total
Expressive Writing	13	14	9	36
Control Writing	12	11	10	33

Figure 1. Compliance Rates

Vita

Elizabeth Anne Collison was born on April 21, 1987, in Portland, Oregon, and is an American citizen. She graduated from Shawnee Mission Northwest High School, Shawnee, KS in 2005. She received her Bachelor of Arts in Psychology from University of Kansas, Lawrence, KS in 2009. She received her Master of Arts in Clinical Psychology from Virginia Commonwealth University in 2013. She is currently a Doctoral Candidate in Clinical Psychology with a concentration in Behavioral Medicine at Virginia Commonwealth University, Richmond, VA. While completing her coursework, she worked as a teaching assistant, a student therapist at the Center for Psychological Services and Development, a graduate assistant for the Virginia Commonwealth University Medical Center Primary Care Psychology Service, and a trainee clinician at Central State Hospital in Virginia. She has also presented posters at several conferences and given an oral presentation at the Association for Death Education and Counseling annual meeting. She is currently completing her Predoctoral Psychology Internship at the VA Palo Alto Health Care System on the Behavioral Medicine Track. She will then complete a post-doctoral fellowship in Palliative Care Psychology at the Milwaukee VA Medical Center.