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EMOTIONAL DISCLOSURE: DOES WRITING DIFFER FROM SPEAKING?

by

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A Thesis

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

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## **Acknowledgments**

Thanks to Dr. Jeffrey Berman for pushing me to finish this. Thanks to my wife, Brandi Newton, for all of the support over the past few years.

## **Abstract**

Newton, Kevin Michael. M.S. The University of Memphis. May 2015. Emotional Disclosure: Does Writing Differ from Speaking? Major Professor: Jeffrey S. Berman, Ph.D.

Writing and speaking about a traumatic event have been shown to produce physiological and psychological benefits. However, there is evidence to suggest that the mechanisms of change may differ between the mediums. The current study examines the language used (i.e., causal, insight, conjunction, tentative, positive and negative emotional words) as a possible indicator of why the disclosures are helpful. The results indicate that those who speak are initially more coherent than those who write and that this coherency is negatively related to distress for those in the spoken comparison group. However, by the second session of disclosure the relation to distress was no longer evident. A variation of the analysis was completed excluding emotion words, and similar results were achieved. The author discusses possible reasons for these findings and suggests having clients of psychotherapy speak about a traumatic event before completing a writing assignment about it for an increased benefit.

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## **Chapter 1**

### **Introduction**

Writing about traumatic or difficult experiences in journals has been the subject of research for several decades. Studies have shown that writing about emotions surrounding a traumatic experience can be associated with various psychological and physiological benefits (e.g., Pennebaker & Beall, 1986; Sloan & Marx, 2004) with a variety of traumas from having cancer (Zakowski, Ramati, Morton, Johnson, & Flanigan, 2004) to experiencing psychosis (Bernard, Jackson, & Jones, 2006). Overall, written emotional expression is consistently associated with improved physical health, psychological well being, and general functioning (Smyth, 1998).

Much of the research on written emotional disclosure has involved individuals submitting their writings to the researcher. Interestingly, One study pointed out that this participant action of turning in writings to the researchers is a critical aspect in reducing depression and interpersonal sensitivity through written emotional disclosures (Radcliffe, Lumley, Kendall, Stevenson, & Beltran, 2007). When the writings were not turned into the researcher, the levels of depression and interpersonal sensitivity did not differ from individuals who either wrote about time management or did no writing at all. These findings may be understood to mean that knowing someone will read disclosures expressed in writing is a necessary component if the writings are to be beneficial. Other research has also found that public disclosures provide more benefits psychologically than private ones including public disclosure of secrets (Frijns, Finkenauer, & Keijsers, 2013) and personal stories (MacReady, Cheung, Kelly, & Wang, 2011).

This issue has potential implication for psychotherapy treatments. A major component of the psychotherapy process involves oral emotional expression. Psychotherapy has been consistently associated with favorable outcomes for adults who have experienced traumatic events (Martself & Draucker, 2005) as well as traumatized children (Rosner, Kruse, & Hagl, 2010). Greater levels of emotional disclosure within a

psychotherapy session are seen as having more depth (Kahn, Vogel, Schneider, Barr, & Herrell, 2008), and greater depth is believed to produce more favorable outcomes (Stiles, et al., 1994). Psychotherapy is a dynamic interaction and inherent in this process, much like the individuals handing in their writings, is the expectation that someone will be paying attention to the emotional expressions. In reality, the therapist may not even have to be present at the time of disclosure. When individuals disclose the emotions surrounding traumas while alone into a voice recorder, a benefit equal to psychotherapy is achieved (Segal & Murray, 1994). However unlike the effect found when turning in one's writings, the knowledge that someone will listen to a recording of what one is saying about a traumatic experience fails to produce a consistent effect on distress levels above that realized through simply speaking out loud with no intentions of being heard (Newton, 2013). This suggests the process of change when speaking about a traumatic experience may differ from the process that is active when writing.

There appear to be only a few comparisons between writing and speaking about a traumatic experience. However, such comparisons could be useful and potentially beneficial to formal psychotherapy, psychotherapy supplemented with writing assignments, self-help avenues, and everyday self-management of certain psychological symptoms associated with traumatic events. One examination of expressive disclosure of traumatic events through both writing and speaking failed to find differences in the amount of health center visits between the mediums of disclosure, however any disclosure about the trauma led to fewer health center visits than those who disclosed about their future schedule (Harrist, Carlozzi, McGovern, & Harrist, 2006). Although studies have failed to find a difference in positive outcome measures between writing and speaking, they have found benefits for both mediums of disclosure beyond any benefits seen in control groups (Lyubomirsky, Sousa, & Dickerhoof, 2006; Slavin-Spenny, Cohen, Oberleitner, & Lumley, 2011). Regardless of whether or not the level of symptom

change is reliably different, the mechanism through which this change occurs may differ, and these mechanisms may be detectable through language patterns.

Theories of how changes in distress occur when writing about a traumatic experience have changed over time (e.g., see L'Abate, 2007). An initial belief was that an emotional release from a previously inhibited experience was responsible for the improved wellbeing (Pennebaker, 1997). However, the current understanding of the written disclosure literature seems to advocate for a type of cognitive processing, namely cohesion, indicated by the use of certain language (Graybeal, Sexton, & Pennebaker, 2002; Pennebaker & Seagal, 1999; Smyth, True, & Souto, 2001).

The use of certain word categories when writing about a traumatic experience, such as the use of cognitive mechanisms and emotional words, has been associated with improved health outcomes. One understanding of why writing may be helpful is the idea of creating coherent narratives. Conjunction words (e.g., and, but, whereas, etc.) seem to be important for coherent narratives (Graesser, McNamara, Louwerse, & Cai, 2004), and increases in cognitive mechanistic words, specifically causal (e.g., because, effect, hence, etc.) and insight (e.g., think, know, consider, etc.) words, may be indicators of more organized thought (Boals & Klein, 2005).

An additional category important to understanding meaning and possibly the quality of narrative seems to be tentative language (e.g., maybe, perhaps, guess, etc.). A disclosure with less tentative word usage should indicate a more established narrative (Pasupathi, 2007). Given that it is difficult to determine the subjective level of coherence found in a given piece of writing even with highly trained raters (Ramírez-Esparza & Pennebaker, 2006) more objective standards such as measuring the percentages of the language indicators mentioned above should be adopted.

The language patterns examined above relate to the writings of a traumatic experience, but there has been little examination of word use within spoken disclosures. Therefore, the mechanism through which change occurs when speaking about a traumatic

event as indicated by language use has been understudied. Nevertheless, the level of cohesion in the written disclosure literature seems to be an important place to start.

One goal of the current study is to determine whether or not the mechanism for change when speaking about a traumatic event is similar to that found when one writes about one. It could be that the level of coherency – indicated by the use of causal and insight words, conjunctions, tentative, and emotional words – is the mechanism used when writing, but not when speaking; or the level of cohesion could play an important role in both mediums of disclosure.

The current study used data from two previous studies in which participants were asked either to write or speak about a traumatic or everyday experience and complete measures of distress. The following language variables were thought to be important factors in distress reduction and were utilized as a potential measure of cohesion: causal, insight, conjunction, tentative, positive emotional, and negative emotional words (Boals & Klein, 2005; Graesser et al., 2004; Pasupathi, 2007; Ramírez-Esparza & Pennebaker, 2006). Interestingly, positive and negative emotional words are not negatively correlated and as such some researchers (Pennebaker & Francis, 1996; Pennebaker, Mayne, & Francis, 1997) have suggested these be treated as two exclusive categories. The language in these sessions was analyzed using the Linguistic Inquiry and Word Count (LIWC), which is a computer program that determines what percentage of a given text consists of a particular word category (Pennebaker, Francis M., & Booth R., 2001). Additionally, an examination of the relationship between the language patterns and levels of distress was performed.

The current study used previously written and spoken emotional disclosures and distress scores to test the following: Does the language use when one writes differ from the language use when speaking based on the subject matter of disclosure? Are particular patterns of language use during disclosure reliably related to the level of distress?

## Chapter 2

### Method

#### Participants

A total of 189 college students were recruited from undergraduate psychology classes in two previous studies (Newton, 2012; Stapleton, 2009). Within this sample, 116 individuals (65% female) participated in a writing experiment and 73 individuals (71% female) participated in a speaking experiment. However because of technical complications during data collection and storage, 10 participants in the speaking condition did not have a recording for the first or second session and two did not have a recording for the third session. Additionally, one participant in the writing condition did not have a journal entry for the second session. This resulted in 178 participants for the first session and 177 participants for the second session.

#### Procedure

**Writing procedure.** In the two previous experiments utilized for the current study (Newton, 2012; Stapleton, 2009), participants were asked to identify traumatic experiences that were currently causing them distress and rate the present level of distress on a scale from 1 to 10 with 10 being the most extreme. Those individuals who identified events and rated their current distress at 4 or more on average were invited to participate in these previous studies. Stapleton (2009) chose a score of 4 to ensure participants felt actively distressed about their traumatic event. Newton (2012) modeled his selection criteria after Stapleton.

Those who provided writings ( $n = 116$ ) were randomly assigned to write about either a distressing experience or an everyday experience for 10 min. They were then given a 10-min break, after which they were asked to write again about the same topic for another 10 min. Those who wrote about an everyday experience were given instructions analogous to those in the experimental groups. That is, they were asked to focus on the same emotional aspects during disclosure.

**Speaking procedure.** Those who provided spoken recordings ( $n = 73$ ) were randomly assigned to speak about either an identified traumatic event or an everyday experience for 20 min in a room by themselves approximately every other day on three separate occasions. Those who spoke about their traumatic experience did so under the impression that either no one would hear what they said (i.e., private condition) or the researcher would listen to a recording of what was said (i.e., shared condition). Initial analyses below were conducted to indicate whether or not these experimental conditions should be considered separate in terms of language use. Those who wrote about an everyday experience were given instructions analogous in length to those in the experimental groups. However, they were asked not to focus on the emotions or opinions of the experiences but rather to stick to the facts. All participants completed the Impact of Event Scale as a measure of distress immediately after completing the disclosures.

**Current procedure.** In preparation for the current study, the participants' two handwritten journals were typed into electronic documents and the participants' three spoken sessions were transcribed. The combined files produced 426 total transcripts from the 189 participants; the breakdown of the transcripts was 178 for the first session, 177 for the second session and 71 for the third (speaking-only) session. From these transcripts the percentage of language categories was calculated using a computer program, the Linguistic Inquiry Word Count (LIWC; Pennebaker et al., 2001). The LIWC program determines the percentage of a given text that consists of a particular word category (e.g., causal, insight, positive emotion, etc.). The LIWC program identifies linguistic categories of words and provides a percentage of use for over 80 categories.

Based on previous research six language variables were identified as representative of cohesion – causal, insight, conjunction, tentative, positive emotion and negative emotion words – were isolated. It was determined that these language variables, both all six and a subscale not including the emotion words, were measurements of cohesion.

Therefore, the language percentages were aggregated in to a measure of cohesion and the subscale aggregated into a measure of cohesion without emotion words.

## **Measures**

**Cohesion.** A determination was made about whether or not the six language variables (i.e., causal, insight, conjunctions, tentative, positive emotional and negative emotional words) were independent observations. The six language variables were found to form a relatively reliable scale for the writing sample, Cronbach's  $\alpha = .5$ , and speaking samples, Cronbach's  $\alpha = .75$ . Therefore, all six variables were aggregated as a single measure of cohesion.

**Cohesion without emotion words.** The focus of the current study was on cohesion as it is measured by six language variables (i.e., causal, insight, conjunction, tentative, positive emotional and negative emotional). However, to address any possible concerns surrounding the written placebo control instructions asking participants to focus on emotions and the spoken placebo control asking participants to avoid emotions additional analyses were conducted on a measure of cohesion without emotion words (i.e., causal, insight, conjunction and tentative words). The four remaining language variables were found to form a relatively reliable scale for the writing sample, Cronbach's  $\alpha = .5$ , and speaking sample, Cronbach's  $\alpha = .75$ . Therefore, these four variables were aggregated as a single measure of cohesion without emotion words.

**Impact of Event Scale.** The 15-item Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979; see appendix) was used in the previous studies to evaluate overall distress related to avoidance and cognitive intrusions associated with a specific stressor. Items were categorized from 0 (Not at All) to 3 (Often) for how often they occurred in the recent past. The IES should be completed in relation to a specific stressor. Therefore, in the previous studies, all participants were told explicitly that the questions were referring to the traumatic experience identified in the prescreen survey.

Because of technical difficulties, this distress measure was not available for all participants: For the writing study, this distress measure was available only for the first session ( $n = 116$ ); for the speaking study, this distress measure was available for the first and second sessions ( $n = 146$ ).

### **Initial Analyses**

**Creating analogous transcripts.** The initial analysis began with an investigation into whether or not there was a substantial difference between the participant's language used in the first and last 10 min of the spoken sessions. A bivariate correlation was conducted with the percentage of use for each of the six identified language variables (i.e., causal, insight, conjunctions, tentative, positive emotional, and negative emotional words) as factors. This test indicated no substantial difference between any of the factors. This was represented by moderate correlations all of which were statistically significant,  $r_s \geq .64$ ,  $p_s < .01$ ; therefore the two sections were aggregated.

**Transformation of cohesion measure.** Given that the LIWC data is calculated as percentages based on count data (i.e., the ratio of  $x$  category of words to total number of words), the scores underwent an arcsine transformation to better normalize the data. Once statistically significant findings were found, the relevant means underwent a back transformation for interpretation. Therefore, the inferential statistics were reported on the arcsine transformation while the descriptives (i.e., means) were reported as back-transformed percentages.

**Private versus shared disclosures.** An investigation of whether or not the level of cohesion was statistically significantly different for those in the spoken conditions of private (i.e., believed no one would hear what they said) and shared (i.e., understood they were being recorded). A one-way repeated measures analysis of variance with the condition (private/shared) as the between subject variable, time as the within subject variable and cohesion at time point and cohesion at time point two as the dependent variables. This analysis indicated that any difference between the private and shared

conditions was likely because of chance in the first session,  $F(1,33) = 3.75, p = .06$ , and the second session,  $F(1,33) = 1.84, p = .2$ . Therefore, the private and shared participants' scores were aggregated for both sessions into a single condition of speaking about a traumatic event.

**Change over time.** An analysis was conducted to assess whether cohesion varied over time for either writing or speaking participants. A Condition (write/speak)  $\times$  Topic (trauma/everyday) repeated measures analysis of variance was conducted with time as the repeated measure and the arcsine transformed cohesion score as the dependent measure. This analysis for cohesion indicated only a main effect of time with no dependency on the condition or topic of disclosure,  $F(1,164) = 10.61, p = .001$ . The writing participants who addressed an everyday experience were asked to focus on their emotions while the speaking participants who addressed an everyday experience were asked to avoid their emotions. To address this difference the analysis was conducted for cohesion without emotion words. This analysis also indicated only a main effect of time with no dependency on the condition or topic of disclosure,  $F(1,164) = 6.75, p = .01$ . Therefore, the analysis of cohesion was focused on the first session and second session each in isolation for analyses including the measure cohesion without emotion words the same approach was taken.

## Chapter 3

### Results

#### Cohesion, Condition, and Topic

The main analysis focused on whether or not individuals systematically vary their level of cohesion while writing or speaking about a traumatic or everyday experience. This analysis was carried out through a Condition (writing/speaking)  $\times$  Topic (trauma/everyday) analysis of variance, which included the arcsine transformed cohesion variable as the outcome measure. This allowed for the comparison between writing and speaking, disclosing about a traumatic event versus an everyday experience, and the possible interaction. This analysis was conducted for both the first and second session.

For the first session, the analysis on cohesion indicated a statistically significant interaction between the experimental conditions and the topics of disclosure, interaction  $F(1,174) = 6.83, p = .01$ . As shown in Figure 1, further analysis of the first session interaction indicated that the effect differed for the condition of disclosure depending on whether the participant was disclosing about a trauma or an everyday experience: For those disclosing about a trauma, the difference between the average word use contributing to cohesion was statistically significant,  $F(1,174) = 5.61, p = .02$ . The average cohesion indicated that those who wrote about a trauma were less cohesive (back-transformed  $M = 2.72\%$ ) than those who spoke about a trauma (back-transformed  $M = 3.02\%$ ). However for those disclosing about an everyday experience, the difference in cohesion was not statistically significant,  $F(1,174) = 2.40, p = .1$ .

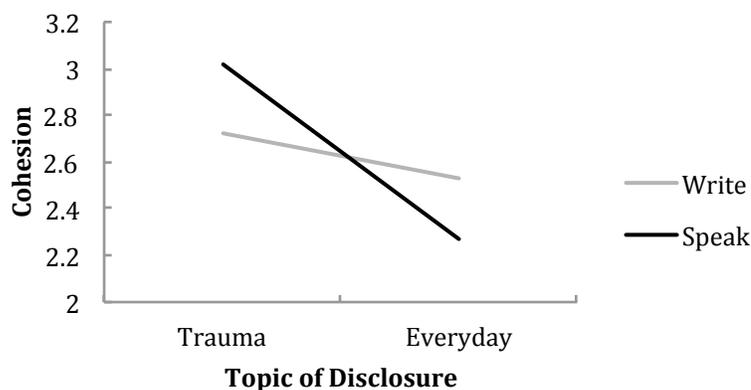


Figure 1. Mean word use contributing to cohesion when writing and speaking about a traumatic or everyday experience.

For the second session this interaction failed to be statistically significant, and there was instead only a main effect for topic,  $F(1,173) = 25.72, p < .001$ . The average cohesion indicated those who either wrote or spoke about a trauma (back-transformed  $M = 3.16\%$ ) were more cohesive than those who either wrote or spoke about an everyday experience (back-transformed  $M = 2.57\%$ ).

Importantly, the focus of the current study was on cohesion as it is measured by six language variables (i.e., causal, insight, conjunction, tentative, positive emotional and negative emotional). However, to address any possible concerns surrounding the written placebo control instructions asking participants to focus on emotions and the spoken placebo control asking participants to avoid emotions additional analyses were conducted on a measure of cohesion without emotion words (i.e., causal, insight, conjunction and tentative words).

The same analysis was conducted for the cohesion without emotion words. For the first session, unlike the measure of cohesion, this analysis failed to indicate an interaction between the condition and topic,  $F(1,174) = 1.27, p = .3$ . The analysis, instead, indicated a statistically significant main effect of both the condition of disclosure (i.e., writing or speaking),  $F(1,174) = 5.93, p = .02$ , and the topic of disclosure (i.e., trauma or everyday

experience),  $F(1,174) = 8.74, p = .004$ . The average cohesion without emotion words indicated that overall those who wrote (back-transformed  $M = 2.90\%$ ) were less cohesive than those who spoke (back-transformed  $M = 3.19\%$ ), and that overall those who disclosed about a trauma (back-transformed  $M = 3.23\%$ ) were more cohesive than those who disclosed about an everyday experience (back-transformed  $M = 2.87\%$ ).

For the second session, however, the pattern for cohesion without emotion words mimicked that of cohesion as there was only a main effect for topic,  $F(1,173) = 13.71, p < .001$ . The average cohesion without emotion words also mimicked that of cohesion and indicated the word use contributing to cohesion for those who either wrote or spoke about a trauma (back-transformed  $M = 3.55\%$ ) was greater than those who either wrote or spoke about an everyday experience (back-transformed  $M = 3.00\%$ ).

### **Cohesion and Distress**

The next analyses examined the relationships between cohesion and self-reported distress levels, measure by the Impact of Event Scale, under the conditions of writing and speaking about either a traumatic or an everyday experience. For the first session, an initial Condition (writing/speaking)  $\times$  Topic (trauma/everyday)  $\times$  Cohesion analysis of variance was conducted with the level of distress as the dependent variable and the arcsine transformed level of cohesion as a continuous variable.

The first session analysis indicated a three-way interaction between the conditions, the topics and the continuous variable of cohesion, interaction  $F(1,170) = 4.12, p = .04$ . Further analysis of the first session three-way interaction indicated that the relationship between cohesion and distress was dependent on the levels of condition and topic: Specifically, cohesion was significantly related to distress for those speaking about an everyday experience,  $F(1,170) = 5.17, p = .02$ . When the levels of cohesion were isolated for those in this condition (i.e., speaking about an everyday experience), a partial

correlation was discovered,  $r = .17, p = .02$ .<sup>1</sup> No other disclosure conditions were significantly related to distress,  $ps > .6$ .

Because of the availability of distress data in the previous studies, the second session distress analysis was only conducted for those in the spoken condition. Therefore, an initial Topic (trauma/everyday)  $\times$  Cohesion analysis of variance was conducted for those in the speaking condition with the level of distress as the dependent variable and the arcsine transformed level of cohesion as a continuous variable. This second session analysis failed to indicate a relationship between distress and topic,  $F(1,58) = 1.74, p = .2$ , or distress and cohesion,  $F(1,58) = 0.61, p = .4$ . There was also no indication of a statistically significant interaction between topic and cohesion, interaction  $F(1,58) = 2.16, p = .2$ .

Once again, the focus of the current study was on cohesion as it is measured by six language variables (i.e., causal, insight, conjunction, tentative, positive emotional and negative emotional). However, to address any possible concerns surrounding the written placebo control instructions asking participants to focus on emotions and the spoken placebo control asking participants to avoid emotions additional analyses were conducted on a measure of cohesion without emotion words (i.e., causal, insight, conjunction and tentative words).

For the first session, an initial Condition (writing/speaking)  $\times$  Topic (trauma/everyday)  $\times$  Cohesion without Emotion Words analysis of variance was conducted with the level of distress as the dependent variable and the arcsine transformed level of cohesion without emotion words as a continuous variable. The pattern for the first session analysis of cohesion without emotion words mimicked that of cohesion and indicated a three-way interaction. This interaction was between the conditions, the topics

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<sup>1</sup> For this and the following analysis, the partial  $r$  was obtained through a multiple regression because the analysis of variance did not provide it.

and the continuous variable of cohesion without emotion words, interaction  $F(1,170) = 4.04, p = .05$ . Further analysis of this first session three-way interaction indicated that the relationship between cohesion without emotion words and distress was dependent on the levels of condition and topic: Specifically, cohesion without emotion words was significantly related to distress in the same way cohesion was—for those speaking about an everyday experience,  $F(1,170) = 4.50, p = .04$ . When the levels of cohesion without emotion words were isolated for those in this condition (i.e., speaking about an everyday experience), a partial correlation was once again discovered,  $r = .16, p = .04$ . No other disclosure conditions were significantly related to distress,  $ps > .4$ .

Because of the availability of distress data in the previous studies, the second session distress analysis was only conducted for those in the spoken condition. Therefore, an initial Topic (trauma/everyday)  $\times$  Cohesion without Emotion Words analysis of variance was conducted for those in the speaking condition with the level of distress as the dependent variable and the arcsine transformed level of cohesion as a continuous variable. The pattern of second session analysis of cohesion without emotion words did not mimic that of cohesion but rather indicated a statistically significant interaction between topic and cohesion without emotion words when related to distress scores, interaction  $F(1,58) = 5.56, p = .02$ . Further analysis of the second session two-way interaction between cohesion without emotion words and topic indicated that the relationship between cohesion without emotion words and distress was dependent on the topic of disclosure: Specifically, cohesion without emotion words was still significantly related to distress for those speaking about an everyday experience,  $F(1,58) = 4.00, p = .05$ . When the levels of cohesion without emotion words were isolated for those in this condition (i.e., speaking about an everyday experience), once again a partial correlation was discovered,  $r = .25, p = .05$ . The other disclosure condition was not significantly related to distress,  $F(1,58) = 1.63, p = .2$ .

## Cohesion Over Time

Another interesting question is concerned with the change in cohesion over time. To assess this change a Condition (writing/speaking)  $\times$  Topic (trauma/everyday) analysis of variance was conducted, which included the arcsine transformed cohesion score for the second session as the outcome measure and the arcsine transformed cohesion score for the first session as a covariate. Once the first session cohesion scores were included, the analysis indicated only a main effect for the topic of disclosure,  $F(1,163) = 11.32, p = .001$ . The average cohesion scores for the second session, taking into account the first session cohesion scores, indicated that overall those who disclosed about a traumatic event (back-transformed  $M = 3.05\%$ ) changed their level of cohesion over time more than those who disclosed about an everyday experience (back-transformed  $M = 2.65\%$ ).

Once again, the focus of the current study was on cohesion as it is measured by six language variables (i.e., causal, insight, conjunction, tentative, positive emotional and negative emotional). However, to address any possible concerns surrounding the written placebo control instructions asking participants to focus on emotions and the spoken placebo control asking participants to avoid emotions additional analyses were conducted on a measure of cohesion without emotion words (i.e., causal, insight, conjunction and tentative words).

For cohesion without emotion the Condition (writing/speaking)  $\times$  Topic (trauma/everyday) analysis of variance was conducted, which included the arcsine transformed cohesion score for the second session as the outcome measure and the arcsine transformed cohesion score for the first session as a covariate. Once the first session cohesion scores were included, the analysis indicated only a main effect for the topic of disclosure,  $F(1,163) = 8.15, p = .005$ . The average cohesion without emotion scores for the second session, taking into account the first session cohesion without emotion scores, once again indicated that overall those who disclosed about a traumatic

event (back-transformed  $M = 3.46\%$ ) changed their level of cohesion over time more than those who disclosed about an everyday experience (back-transformed  $M = 3.02\%$ ).

## **Chapter 4**

### **Discussion**

#### **Condition of Disclosure and Cohesion**

This was simply an exploratory study in that the language categories found when speaking about a traumatic event have been largely understudied. The goal of this research study was to explore the language when speaking in comparison to what is known about the language when writing. The primary question focused on whether or not language use when one writes differs from the language use when speaking based on the subject matter of disclosure. The main analysis partially supported this question. It first indicated that the six language variables important for cohesion in writing—causal, insight, conjunctions, tentative, and positive and negative emotional words (Boals & Klein, 2005; Graesser et al., 2004; Pasupathi, 2007; Ramírez-Esparza & Pennebaker, 2006)—are also related to each other when speaking.

In the writing sample individuals were asked to relive their traumatic event, as well as their everyday experience by focusing on the emotions surrounding these events. These instructions may have directed the participants to use a disproportionate amount of emotion words, which are key variables in the cohesion measure.

In the speaking sample individuals were asked to relive their traumatic event by focusing on the emotions surrounding these events. However, they were asked to avoid the emotions or opinions related to their everyday experience and to focus on the facts. These instructions may have directed the participants to use a disproportionate amount of emotion words, which are key variables in the cohesion measure.

To address this difference, analyses were conducted for cohesion without emotion words—causal, insight, conjunction and tentative words. The initial investigation for these four language variables also indicated a relationship for both writing and speaking. This suggests the approach to disclosure—being cohesive—when speaking may be somewhat similar to that of writing.

There were interesting, if varied, findings when the different cohesion measures (i.e., with and without emotional words) were examined in relation to how and what was disclosed. When emotional words were included, individuals disclosing about a traumatic event were more cohesive (i.e., used more of the six language variables) when speaking versus writing. However, this pattern did not hold for those disclosing about an everyday experience because the difference in cohesion between writing and speaking about an everyday experience was likely because of random chance. This may have been an artifact of the instructions given to the everyday experience participants. That is, the difference that may have been created between writing and speaking may have been mitigated by the increase in emotion words for those who wrote.

This possibility is further supported by the difference in cohesion without emotion words. When emotional words were not included, those who wrote in general did so less cohesively than those who spoke. This means those who spoke about a traumatic event or an everyday experience did so more cohesively suggesting that speaking is a more cohesive act than writing. Once again, those who disclosed about a traumatic event in general did so more cohesively than those who disclosed about an everyday experience.

Together these findings suggest, just as previous research does, that there is a difference in processing when addressing a trauma versus an everyday experience. More importantly, is the suggestion that while the processing for disclosing about a trauma may be similar when writing and speaking the execution of that process may differ. That is, although both methods of disclosure have an element of cohesion those who speak may be more cohesive than those who write.

One explanation for this finding is when individuals disclose about important events they are seeking to understand it, and speaking may be a more efficient way of getting at that understanding. Pennebaker and Francis (1996) suggest that individuals do, in fact, use language to seek out understanding and apply meaning to experiences. Their experience is with writing, but it may be the case that when speaking one is uninhibited

by the strict rules of grammar bearing down on one who writes. This freedom could lead to more substance, which could lead to greater understanding. This understanding may be represented through the language variables measured, and therefore show up as cohesion.

Another possible explanation for this finding is that when individuals speak they are simply more coherent than when they write about them. That is, speaking is a more common behavior than writing, and as such people are more comfortable participating in it. It is difficult, however, to be confident through research because before the invention of the Linguistic Inquiry Word Count (LIWC) program, Russell (1989) concluded that there has been little substantial progress in the area of language and psychotherapy (i.e., talk therapy), which is the closest analogy to what was studied in the current project. After the invention of LIWC few researchers, if any, have analyzed the language categories in relation to cohesion within psychotherapy. Therefore, it is difficult to confirm or deny that speaking is an avenue through which coherent narratives are more easily produced.

Another interesting finding from this study is that the difference in cohesion between those who wrote and those who spoke, regardless of subject matter, failed to be discovered in the second session disclosures with or without emotional words included in the measure. That is, by the second instance of addressing the traumatic event those who wrote had become as cohesive as those who spoke. Still there was a difference in cohesion for those who addressed a traumatic event versus an everyday experience. This could be a greater indicator that speaking is a more practiced ritual and as such lends itself to more cohesive disclosure in the immediate, and that approaching a traumatic event is done so differently than other mundane events. Nevertheless, with practice it seems individuals are able to create equally coherent narratives when writing or speaking. This could have implications for psychotherapy in that the popular journaling homework may need to follow rather than precede the discussion of a traumatic event. That is, if

cohesion comes more naturally through speech it may be beneficial to talk about a traumatic event and then write about it to avoid an initial lack of cohesion.

### **Cohesion and Distress**

The secondary question was concerned with whether or not particular patterns of language use during disclosure were reliably related to the level of self-reported distress. For both versions of cohesion (i.e., with or without emotional words) the levels of cohesive speech for the first session were only related to distress for those who spoke about an everyday experience. This relationship was such that the more cohesive individuals were when talking about their everyday experiences the more distressed they were. There were no other significant correlations between cohesion and distress for the first session.

By the second session the results varied based on the measure. For the measure including the emotional words, the level of cohesion was unrelated to distress entirely, even for those who spoke about an everyday experience. However for the measure not including emotional words, the relationship between cohesion and distress for those speaking about an everyday experience had become stronger.

One possible explanation for the positive correlation between cohesion and distress in the first and second sessions comes through the understanding of what is happening during cohesive disclosure. It is possible that individuals constantly seek understanding and meaning in their lives (Pennebaker & Francis, 1996). If this were true, being denied the opportunity to speak about a traumatic event in favor of speaking about the mundane facts of everyday life may lead to more distress. An individual who willingly participates in a research study she knows is about a recent traumatic event may interpret a request to talk about the mundane (i.e., control participants) as a request to suppress their trauma. That is, the more an individual focused on meaningless behaviors (e.g., “I brushed my teeth, I went to the bathroom, I ate toast for breakfast”) the more their trauma was repressed. Therefore, those individuals may have unknowingly participated in

maladaptive behavior (Pennebaker & Francis, 1996). This could have been the factor that led to both increased cohesion and increased distress.

The fact that this relationship was not seen in the writing sample could be an artifact of the instructions given. For those in the writing condition, they were asked to relive emotionally their everyday experience, which offered an avenue for meaning making. Whereas those in the speaking condition were asked to give only the facts and actively avoid the emotions associated, which inherently leads to repressed emotions. Although the popular explanation for why disclosing about a traumatic event is helpful no longer centers on cathartic experiences, Stapleton (2009) is one of the only studies to allow the placebo participants the opportunity to utilize emotion in their disclosures. Given the patterns of the current study, it may be that using emotion in everyday disclosure is not positively helpful, but rather preventatively helpful in that it does not require maladaptive repression.

### **Cohesion over Time**

The participants who disclosed about traumatic events increased their cohesiveness over time more than those who disclosed about an everyday experience. This could be seen as evidence that individuals must address their trauma several times before seeing the maximum amount of benefit (Pennebaker, 2000). That is, if cohesion is the mechanism of change (Graybeal et al., 2002; Pennebaker & Seagal, 1999; Smyth et al., 2001) and it is continuously achieved, it seems logical to assume that with each disclosure more benefit would be gained. Therefore, it is recommended that individuals write or speak about their traumatic event more than once.

### **Limitations and Future Research**

There were certainly a few limitations inherent in this study. The samples came from two previously conducted studies, meaning the participants were not randomly assigned from the exact same population into either writing or speaking. Moreover, the studies only shared one measure of distress making it difficult to examine completely the

relationship between language and outcome. Additionally, the writing study was somewhat abbreviated in that the participants only wrote for 10 min. Therefore, designing an experiment in which these factors are controlled is recommended.

The last and most important limitation highlights the limitation with the Linguistic Inquiry Word Count program (LIWC). The program LIWC simply counts the words and creates a percentage based on the total word count for a given text. As researchers have accurately pointed out, this approach does not take into consideration the context of words (Hirsh, 2009; Kangas, 2014), and in some cases may completely misinterpret the meaning. As Sloan (2009) explains if a person says, “I am not happy” LIWC still codes “happy” as a positive emotional word, which is clearly the opposite of what the person was trying to say.

The results of this study could be used to guide future research. A next step would be to take the information gained and carry out an experiment that manipulates language use (i.e., offer a limited vocabulary to be used or encourage the use of certain categories), controls for extraneous variables more effectively and investigates the effect on distress when speaking about a traumatic event. These experiments could illuminate some of the mysteries raised by the current study and would more effectively evaluate distress and language while speaking.

Another important step may be to include context-driven language analysis. This would be a divergence from the traditional research done on language when writing. However given the relative absence of comparative studies between writing and speaking this new line of research could offer the perfect opportunity to consider the context and meaning of the words written and spoken. There are a few programs that could be considered for future research including Latent Semantic Analysis (Landauer, McNamara, Dennis, & Kintsch, 2007) and Co-Metrix (Graesser et al., 2004).

There is evidence that speaking out loud alone, much like writing in a journal, is psychologically beneficial (Newton, 2012). Therefore, more investigations of the

difference between writing and speaking should be conducted. This line of research could lead to an important understanding of how the processes used when speaking about a traumatic event are executed. Additionally psychotherapy, or talk therapy, typically encourages vocal disclosure of traumatic events, therefore, this line of research may be useful for discovering why these disclosures are helpful within treatment.

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## Appendix

### Impact of Event Scale

*Instructions:* Think about the time when [event occurred]. Read each item and then circle the number which indicates how distressing each difficulty has been for you **during the past 7 days** with respect to this experience.

| Question   | not at all | rarely | sometimes | often |
|--|------------|--------|-----------|-------|
| I thought about it when I didn't mean to   | 0          | 1      | 2         | 3     |
| I avoided letting myself get upset when I thought about it or was reminded of it                               | 0          | 1      | 2         | 3     |
| I tried to remove it from my memory  | 0          | 1      | 2         | 3     |
| I had trouble falling asleep or staying asleep because of pictures or thoughts about it that came into my mind | 0          | 1      | 2         | 3     |
| I had waves of strong feeling about it   | 0          | 1      | 2         | 3     |
| I had dreams about it  | 0          | 1      | 2         | 3     |
| I stayed away from reminders of it   | 0          | 1      | 2         | 3     |
| I felt as if it hadn't happened or it wasn't real  | 0          | 1      | 2         | 3     |
| I tried not to talk about it   | 0          | 1      | 2         | 3     |
| Pictures about it popped into my mind  | 0          | 1      | 2         | 3     |
| Other things kept making me think about it   | 0          | 1      | 2         | 3     |
| I was aware that I still had a lot of feelings about it, but I didn't deal with them                           | 0          | 1      | 2         | 3     |
| I tried not to think about it  | 0          | 1      | 2         | 3     |
| Any reminder brought back feelings about it  | 0          | 1      | 2         | 3     |
| My feelings about it were kind of numb   | 0          | 1      | 2         | 3     |