

Blogging About Trauma: Linguistic Markers of Apparent Recovery

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Abstract

The content of traumatic event-focused blogs was analysed for linguistic content associated with recovery from trauma. The Linguistic Inquiry and Word Count (LIWC) program was used to identify changes in cognitive, affective, and self-focused word use over the course of entries in thirty public access blogs. Although blogging per se did not result in word use associated with recovery, certain characteristics of blogging, such as time between entries and the number of comments posted, were associated with linguistic markers of recovery. This suggests that the use of web-based writing as a therapeutic technique may be more helpful if tailored to an individual's needs, such as how often and how long a person should engage in therapeutic internet journaling.

Keywords: *Blog, LIWC, trauma narrative, PTSD*

Introduction

Over the past 20 years, several studies have demonstrated that writing about traumatic life events is beneficial in the post-trauma recovery process (see Frattaroli, 2006; Smyth, 1998). More recently, technological changes and the increasing presence of the internet in people's lives have expanded the potential forums for engaging in disclosure to include blogs. A blog, or weblog, is a personal webpage consisting of a series of entries or posts presented in reverse chronological order, often centering on a particular theme or interest of the person maintaining the blog or "blogging" (Kumar, Novak, Raghavan, & Tomkins, 2004). A recent AOL survey of bloggers indicated that nearly 50% of bloggers use their blogs as a form of "self-therapy" ("AOL Survey," 2005). As such, it is important to consider the therapeutic implications of this activity. While the explicit use of the Internet for therapeutic purposes has been evaluated (e.g., Barak & Bloch, 2006; Chester & Glass, 2006), the current study extends this work to spontaneous use of the Internet for apparently therapeutic purposes.

In the last several years, the use of the Internet in general for the purposes of mental health promotion and therapy has increased dramatically (Chester & Glass, 2006). Other therapeutic uses of the Internet include communication with clients (McDaniel, 2003), online support services (Barak & Bloch, 2006), marriage and family therapy services (Bischoff, 2004), substance abuse recovery (Hall & Tidwell, 2003), and education websites (Winefield, Coventry, & Lambert, 2004). However, only a few studies have looked at

the efficacy of such programs. While client-perceived helpfulness of online counseling sessions has been associated with therapeutic outcome and an increase in positive emotion (Barak & Bloch, 2006), practitioners in general may have pervasive negative attitudes toward "Internet therapy" (McClure, Livingston, Livingston, & Gage, 2005). Indeed, the consumer perception of benefit from online services may be greater than the benefits perceived by the mental health profession (Palmiter & Renjilian, 2003). While clients may prefer face-to-face counseling when choosing between the two options, this finding is likely mediated by comfort in using electronic means of communication (Rochlen, Beretvas, & Zack, 2004). McDaniel (2003) also suggests that augmenting trauma therapy using a series of emails in creating a narrative of the trauma and preparing for face-to-face sessions may be beneficial for both client and therapist.

Previous research on blogging for therapeutic purposes indicates that bloggers in general show greater psychological distress than do users of social network sites who do not blog (Baker & Moore, 2008). Depressed bloggers tend to externalise, as well as discuss ongoing treatment options such as psychological or pharmacological intervention (Clarke & van Amerom, 2008). Although the internet can play a crucial role in the development of the self during emergent adulthood (Matsuba, 2006), relatively stable personality traits (such as high neuroticism and high openness to experience) are associated with blogging in general (Guadagno, Okdie, & Eno, 2008). However, these findings may be better predictive of who utilises blogs, rather than identifying how blogs may be utilised for therapeutic purposes.

Bloggers also have a specific audience of readers, often comprised of the blog-reading public, specific blogging friends, and "real life" friends and family (Trammell & Keshelashvili, 2005). The use of the internet for supportive purposes, such as connecting with others who have faced similar life stressors, may particularly be helpful for members of marginalised groups (McKenna & Bargh, 1998). Indeed, persons seeking support when self-identifying as a member of a marginalised group post messages in online discussion groups at a greater frequency than persons in mainstream newsgroups, and those who reported greater group identification in turn showed greater self acceptance and lower estrangement (McKenna & Bargh, 1998). Thus, many of the traditional functions of

group psychotherapy also may be available as a means of self therapy. However, mutual support in online environments may not lead to changes in problem behaviors (Adler & Adler, 2008), and an over-reliance on internet communication can lead to greater depression and compulsive internet use (van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008).

When considering any treatment for posttraumatic stress, it is important to explicate the definition of recovery. Researchers have identified three characteristics that signal a return to healthy, “normal” functioning following a traumatic event (Resick & Calhoun, 2001): (a) an increase in cognitions and insights relating to the traumatic event, (b) a reduction in the emotional distress associated with the traumatic event, and (c) integration back into social activities that may have been disrupted by the traumatic event.

Cognitive processing of traumatic events has been approached from several theoretical orientations, including constructivist theories (Janoff-Bulman, 1992), cognitive-behavioral models (Foa & Rothbaum, 1998), and posttraumatic growth models (Tedeschi & Calhoun, 2004). Across these orientations, the agreed-upon definition of cognitive processing includes the ability to express insight about the traumatic event, to assert causal relationships relating to one’s life before, during, and after the traumatic event, and to process discrepancies between one’s ideal world and the traumatic event. Recent work on repetitive writing tasks has shown that words reflecting these cognitions in written and spoken trauma narratives (e.g., realise, should, would) are reflective of better recovery outcomes following a traumatic event (see Chung & Pennebaker, 2007).

With respect to the emotional distress associated with a traumatic event, the original goal of exposure-based therapies was to assist the individual in reducing the emotional distress associated with reminders of the trauma (Foa & Rothbaum, 1998). Treatment focused on eliminating avoidance of negative emotions, assuming that the client would habituate to this distress and experience fewer symptoms of post traumatic stress disorder (PTSD) (Resick & Calhoun, 2001). In other studies using repetitive, trauma-focused writing, a decrease in the use of words associated with negative emotions (e.g., afraid, upset), with a corresponding increase in words associated with positive emotions (e.g., cheerful, exciting) has been associated with recovery from symptoms of PTSD (see Chung & Pennebaker, 2007).

A person’s social environment and self-concept often are affected by a traumatic event (Janoff-Bulman, 1992). The use of first person singular pronouns (i.e. *I* and *me*) has been associated with higher levels of conflict in interpersonal interactions (Simmons, Gordon, & Chambless, 2005), is associated with higher levels of depression and suicidality (Pennebaker, Mehl, & Niederhoffer, 2003), and more rumination on traumatic events (Mergenthaler & Bucci, 1999). In addition, the use of group-focused pronouns (i.e.,

we versus *I*) in the wake of a traumatic event may be related to the degree to which a person seeks support from others and integrates into social activities following a traumatic event (Mehl & Pennebaker, 2003).

Studies using both controlled writing tasks and measuring natural communication have shown inconsistent results regarding the relationship between written disclosure of a traumatic event and measures of recovery (see Frattaroli, 2006; Harris, 2006; Meads, Lyons, & Carroll, 2003). In other words, not all writing may be equally beneficial. Because these inconsistencies may be due to variability in the focus, duration, and instructions associated with a particular writing task, it is necessary to consider what parts of a writing protocol may lead to better indices of recovery (Sloan, Marx, Epstein, & Lexington, 2007). Thus, in the current study we consider what components may make internet writing a more or less effective modality for processing, and ultimately recovery, following traumatic life events.

Goals of the Current Study

The primary goal of the current study was to determine whether individuals’ blogs that focus on the description of a traumatic event show a change over time in linguistic content associated with recovery following a traumatic event. Furthermore, we evaluated what factors associated with blogging predicted these linguistic changes.

Method

Sample

Thirty public, English-language blogs were identified for which the main topic of the blog was the description of a traumatic event and subsequent postings focused on recovery from or the results of the event (as opposed to blogs that include descriptions of a traumatic event in individual postings – see Thelwall & Stewart, 2007). Blogs were identified through Google™ Blog Search using the following key words: trauma, PTSD, survivor, IED, Iraq, injured, Katrina, rape, accident, cancer, and recovery. This is a small number of blogs compared to the number considered active (Kumar et al., 2004), but not inconsistent with the recent surveys showing that only 1% of bloggers focus on physical or mental health problems (Lenhart & Fox, 2006).

The blogs were de-identified prior to analysis, removing information such as IP and email addresses. Of bloggers, 53% ($n = 16$) were women; the average age was 33.8 ($SD = 13.7$, range: 18-64). Five types of trauma were addressed: rape recovery ($n = 7$), cancer treatment ($n = 8$), military injury while serving in Iraq ($n = 4$), car accidents ($n = 2$), and Hurricane Katrina ($n = 9$). The average number of postings per blog was 50.4 ($SD = 58.3$, range 10-249). The average number of words in each entry was 406.9 ($SD = 430.8$).

Measures

Recovery. Recovery was evaluated in two distinct ways: (1) a computer assessment of linguistic markers associated with trauma recovery (LIWC; Pennebaker, Francis, & Booth, 2001), and (2) a qualitative rating of recovery. In order to ensure that these indicators did not overlap, and to ensure a sample from across the timeline for both indicators, each blog was divided using a split-half technique ($N = 1512$ total entries). Even-numbered blog entries ($n = 756$) were analysed for linguistic change, and odd-numbered entries ($n = 756$) were rated for subjective recovery.

Linguistic Measures. Even-numbered blog entries were analysed using the Linguistic Inquiry and Word Count (LIWC) program (Pennebaker et al., 2001). This program examines the occurrence of various types of words in a writing sample. The complete LIWC dictionary includes 70 different language categories. For each category, the LIWC program provides a percentage count of words in that category for a given writing sample. The cognitive mechanisms, positive word, negative word, and self reference (singular and plural pronouns) categories were used in the current study. The difference between positive and negative word count was the dependent variable reflecting affective change, and the difference between singular and plural personal pronouns was the dependent variable for social reference.

Rated Recovery. Odd-numbered blog entries were rated for whether the blogger had recovered from the traumatic event across the course of blog entries. To assess recovery, raters considered whether there was a reduction in preoccupation with the traumatic event, whether there was an increased discussion of getting back to everyday life, and whether there were reductions in reports of anxiety, re-experiencing, dissociation, nightmares, avoidance, and suicidal ideation. Across these varying clinical dimensions, a gist criterion was used to rate whether the blogger was recovering (rated 1), whether the blogger remained the same (rated 0), or whether the blogger was worsening (rated -1). All blogs were independently assessed by two trained raters, who were blind to the hypotheses of the study and to the linguistic analysis conducted by the LIWC program. Reliability was adequate (type II agreement ICC = .81); disagreements were resolved through discussion.

Social Support. In a blog setting, those viewing the blog entries may post comments on each entry, which may be helpful, unsupportive, or simply irrelevant spam (Kumar et al., 2004). The blogger can then decide which comments are publicly visible, often censoring unsupportive comments, although this does not prevent the blogger from being “flamed” or harassed by others who may send less supportive comments to the blogger (Nardi, Schiano, Gumbrecht, & Swartz, 2004). It is not known whether blog audiences provide beneficial social support by commenting on entries. Therefore, number of comments posted to each blog entry was included in the current study as a rough measure of social support, with comments posted to the previous (odd-numbered) blog entry predicting word use change in each new (even-numbered) blog entry.

Blog Chronology. Because two primary differences between blogging and structured writing studies involve the number of writing sessions (entries or posts) and the time between sessions, both of these variables were included in the present analysis as potential associates of word use in blogs. The chronological number of each entry was considered the primary measure of “time” to measure change in word. Time between sessions was used to measure how frequently the blogger wrote, and the total number of days since initiating the blog was included to control for recovery over time.

Results

Blog Structure Analyses

The undivided blogs (both odd- and even-numbered entries) first were analysed using analysis of variance (ANOVA) to examine differences between trauma types on relevant structural variables. Results showed significant differences between type of trauma for number of comments, $F(4, 1507) = 258.6, p < .001, \eta_p^2 = .409$, days since previous post, $F(4, 1507) = 5.53, p < .001, \eta_p^2 = .015$, and number of words per blog entry, $F(4, 1507) = 43.33, p < .001, \eta_p^2 = .104$. Specific differences detailed in Table 1.

Overview of Data Analysis

We used hierarchical linear modeling (HLM6 - Raudenbush, Bryk, & Congdon, 2004) to assess linguistic changes as a result of blogging over time (Level 1) in relation to within-blog individual difference variables

Table 1: Structural differences based on trauma type

Trauma Type	Entries	Comments		Frequency		Words per entry	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Military Injury	323	22.72 _a	19.10	5.10 _{ab}	21.19	614.10 _a	643.97
Hurricane Katrina	228	4.40 _b	8.36	1.73 _c	4.74	261.53 _c	308.09
Sexual Assault	288	2.17 _{bc}	3.48	2.70 _{bc}	4.70	370.25 _b	365.71
Cancer Recovery	593	1.98 _c	5.37	3.03 _{bc}	5.73	332.43 _{bc}	234.87
Car Accident	80	.10 _c	.30	6.75 _a	10.89	705.79 _a	602.81

Note. Means with different subscripts in each category are significantly different using the Bonferroni correction, $p < .05$.

Table 2: Singular and plural personal pronoun use

Blog Topic	Singular <i>M</i> (<i>SD</i>)	Plural <i>M</i> (<i>SD</i>)	Difference <i>M</i> (<i>SD</i>)
Sexual Assault	12.21 (3.55)	1.99 (2.22)	10.22 (3.38) _a
Military Injury	11.29 (3.17)	2.47 (1.78)	8.82 (2.71) _b
Cancer Recovery	10.14 (3.19)	1.95 (1.89)	8.19 (2.91) _b
Car Accident	9.91 (1.72)	2.42 (1.05)	7.49 (1.25) _{bc}
Hurricane	6.78 (3.49)	1.77 (1.79)	5.01 (3.18) _c

Note. Means with different subscripts are significantly different ($p < .05$) using the Bonferroni correction.

(Level 2). An extremely important strength of this modeling approach is that it does not require the same number of observations for each blogger or equal time intervals between blog entries. First level units were 756 even-numbered blog entries, and second level units were the 30 blogs in the study. Level 1 predictors were number of comments, number of writing sessions, time since the last post, and overall time since the blog was initiated. Level 2 predictors were gender, trauma type, and recovery rating. Dependent variables were the linguistic marker scores of cognitive mechanisms, affect, and reference to the self for each blog assessed. Variables were centered on the grand mean prior to analysis. Three models were examined, one with each of the linguistic markers as the dependent variable.

For all three models, the full model was significantly better than the intercept model, $\chi^2(3, N = 756) = 52.81-119.04, p < .001, \eta^2 = .25-.58$. In addition, there was a moderate proportion of variance explained due to the hierarchical structure of each model, $\rho = .20-.35$.

For the model predicting cognitive content, days since previous post was the only significant Level 1 predictor of cognitive word use ($\beta_1 = .0056, p < .05$), with greater cognitive word use associated with a longer time between entries, approximately a one percent increase in cognitive word use associated with each day between posts. At Level 2, rated recovery approached significance, $\gamma_{01} = .46, p = .08$, with a trend toward greater cognitive word use per entry associated with bloggers rated as recovering ($M = 6.92, SD = 2.9$) or remaining the same ($M = 6.57, SD = 2.3$) versus those rated as worsening ($M = 5.68, SD = 2.4$).

Days since previous post was also a significant Level 1 predictor of change in affective content, $\beta_1 = -.023, p < .01$, indicating .023 unit decrease in the difference score between positive and negative affect (indicating greater negative emotional tone) for each day between blog posts. At Level 2, rated recovery was a significant predictor of change in affective tone, $\gamma_{01} = .55, p < .01$, with a greater trend toward positive affect associated with bloggers rated as recovering ($M = .797, SD = 2.2$) and remaining the same ($M = .526, SD = 2.3$) than those rated as worsening ($M = -.142, SD = 2.9$) following the traumatic event.

For models predicting change in reference to the self, both days since previous post ($\beta_1 = .010, p < .05$) and number of posted comments ($\beta_2 = -.023, p < .05$) were significant Level 1 predictors of reference to self. Greater time since the previous post was associated with more I-focused writing, and a greater number of comments was associated with more group-focused writing. At Level 2, both blog topic, $\gamma_{01} = .63, p < .05$ and rated recovery, $\gamma_{02} = -.92, p < .05$, were significant predictors of change in reference to self. A greater trend toward we-focused writing in each blog post was associated with bloggers rated as recovering ($M = 4.99, SD = .36$) and remaining the same ($M = 5.16, SD = .14$) than bloggers rated as worsening ($M = 6.2, SD = .20$) following the traumatic event. To further analyse the effect of blog topic on changes in reference to the self, a univariate ANOVA compared blog topic conditions with self reference as a dependent variable, $F(4, 751) = 42.78, p < .001, \eta_p^2 = .19$. Differences between groups are detailed in Table 2.

Discussion

The goal of the current study was to examine whether blogging about traumatic events predicts word use associated with recovery from traumatic events, and what factors might increase the likelihood of these markers of recovery. In general, a blogger's use of words reflecting cognitive processing, emotional valence, or reference to the self did not change in adaptive ways over blog entries. However, substantial individual variability in linguistic changes suggested that for some individuals, such changes did occur. In fact, those bloggers who showed these changes in word use over the course of blog entries were more likely to be classified as "recovered." These results suggest that blogging overall may not elicit therapeutic word use associated with recovery, but that blogging may be beneficial for particular persons.

While several variables were included as possible predictors of change in word use, including number of comments to each blog post, number of writing sessions, time since the last post, time since first post, gender, and topic, only time since the last post was a significant predictor of word use change for more than one outcome variable. Specifically, greater time since the last post

predicted more I-focused writing, a greater trend toward negative affect, and an increase in cognitive word use. Interestingly, this finding presents a kind of paradox, in which greater time between blog entries may increase meaning associated with the traumatic event, but at the same time bias the person toward a more negative and self-focused view of the trauma. In this way, these changes may be interrelated in complex ways. That is, the initial struggle with the meaning of an event may be temporarily associated with self-focused, negative feelings that may diminish as meanings become more solidified.

Regarding type of traumatic event, there were significant differences in reference to the self among blogs, with blogs about rape and military injury containing more self-focused writing, and blogs about surviving Hurricane Katrina containing more group-focused writing. This may reflect differences in the way that the social environment around a person may change with a traumatic event. Because a military injury may remove a soldier from his unit, and a rape may cause the victim to feel stigmatised, this can cause significant separation of the person going through the trauma from those who normally may provide crucial support. In addition, as a clinician's ability to intervene in combat arenas may be limited, the potential availability of an internet- or blog-based intervention may be particularly helpful. On the other hand, community-wide traumas such as a hurricane or a terrorist attack may cause those who are victims of the trauma to seek more support, or for the community to come together to rebuild and heal, evidenced by the higher use of group-focused writing (Cohn, Mehl, & Pennebaker, 2004; Gortner & Pennebaker, 2003).

Structural differences between blogs may shed the most light on when blogging may be most beneficial following a traumatic event. Specifically, blogging about military injury elicited the greatest amount of social support through posted comments, as well as showing a high degree of overall words written when blogging. Blogs about military injury were also most likely to be rated as "recovered" relative to other blog topics, and those blogging about military injury posted less frequently than most other bloggers, a characteristic associated with multiple indexes of recovery. Thus, more effective recovery might be facilitated by less frequent blogging. This suggests that less frequent, longer posts are most beneficial, rather than frequent, shorter posts.

Along these lines, researchers and clinicians have already acknowledged the need for writing tasks to include specific instructions (Smyth, 1998). Previous research has shown that disclosure in the absence of a controlled setting may be less effective or deleterious (Sheffield, Duncan, Thomson, & Johal, 2002), and has been one of the primary concerns of clinicians regarding the ethical use of the internet for providing mental health services (McClure et al., 2005). Interventions using web-based journaling may need user specific instructions, including frequency of blog entry, length of time spent on an entry, or specific instructions for entry content. This type of directed journaling may help to

make blogging more beneficial in the post-trauma recovery process.

One methodological issue raised in the study of blogs is that the data may be both left- and right-censored. That is, the activity of blogging may begin at variable points in people's recovery process (left-censored), and may continue to varying points (right-censored). As a consequence, we focus on the pattern of changes over time in each blog, rather than the average levels of positive emotion, cognitive language, and self-focused language. Moreover, our assessments of recovery are constrained by the fact that bloggers may cease blogging before they return to normal functioning. In other words, the fact that blogging appeared not to be beneficial for recovery in our study in no way implies that individuals did not go on to recover. While this limitation was necessary given the nature of the data in the current study, future studies may need to include a more controlled test of recovery which can be evaluated independently of the trauma narrative. The fact that adaptive linguistic changes over time were linked to overall recovery warrants further work outlining how blogging can be adapted to better suit therapeutic goals. In addition, bloggers may have sought outside help, such as a therapist or support group, that could have been responsible for recovery trends over time.

In general, this study provides evidence that unstructured blogging may not result in the same benefits previously associated with writing about traumatic events. Although blogging about traumatic events may be an enticing modality in research and clinical practice, care should be taken regarding the distinction between types of writing that may be beneficial and types of writing that may be convenient. Whereas writing about traumas can play a crucial role in the recovering from these events, attention to the needs of the individual must also be taken into consideration before using any kind of therapeutic intervention.

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Research Profiles

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