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Linguistic Changes in Expressive Writing Predict Psychological Outcomes in Women With History of Childhood Sexual Abuse and Adult Sexual Dysfunction

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An expressive writing treatment was recently reported to reduce depressive symptoms and improve sexual function and satisfaction in a sample of female survivors of childhood sexual abuse (Meston, Lorenz, & Stephenson, 2013). We conducted a linguistic analysis of this data to determine whether pre- to posttreatment changes in participants' language use were associated with the improvements in sexuality and depression. Linguistic Inquiry and Word Count (LIWC), a program that counts the use of word categories within a text, was used to evaluate the impact of several word categories, previously associated with changes in mental health (Frattaroli, 2006), and shown to differ between childhood sexual abuse survivors and nonabused women (Lorenz & Meston, 2012), on treatment outcomes. A reduction in the use of the word "I" and an increase in positive emotion words were associated with decreased depression symptoms. A reduction in the use of "I" and negative emotion words were associated with improvement in sexual function and sexual satisfaction. The findings suggest that, because language may serve as an implicit measure of depression and sexual health, monitoring language changes during treatment may provide a reliable indicator of treatment response free of the biases of traditional self-report assessments.

Keywords: childhood sexual abuse, expressive writing, sexual function

Childhood sexual abuse (CSA) is associated with an increased risk of psychopathology including depression and posttraumatic stress disorder (PTSD; for review, see Polusny & Follette, 1995). Women with a history of CSA experience depression at twice the rate of the general population (Molnar, Buka, & Kessler, 2001). Some researchers suggest that CSA is the single largest preventable cause of psychopathology (Roesler, 2000), particularly in women (Cutler & Nolen-Hoeksema, 1991; Fleming, Mullen, Sibthorpe, & Bammer, 1999). Women with a history of CSA also report elevated rates of sexual dysfunction, sexual dissatisfaction, and intimate partner relational issues, including divorce (for a review, see DiLillo, 2001; Leonard & Follette, 2002).

Standard treatments for depression or PTSD fail to effectively address the sexual problems experienced by this population (Leonard & Follette, 2002), possibly because CSA additionally disrupts healthy psychosexual development (Rellini, 2008). Sexuality-focused extensions to preexisting treatments for depression and PTSD postsexual abuse have been proposed, yet few have been examined empirically (Leonard & Follette, 2002). Research has also suggested that traditional sex therapy techniques such as sensate focus and directed masturbation may be inappropriate for women with a history of CSA (Maltz, 2002). Women with a history of abuse tend to hold more negative associations with sexuality than their nonabused counterparts (Meston & Heiman, 2000; Meston, Rellini, & Heiman, 2006). Therefore, a sexuality-focused treatment that is sensitive to a history of CSA is needed for this population. Meston and colleagues developed an expressive writing treatment for women with a history of CSA with adult sexual problems, guided by the notion that writing individually on this topic might provide a more acceptable mode of treatment (Meston et al., 2013). During individual writing sessions, the client is able to move through the treatment at her own pace and control the content of her essays.

Numerous studies have shown that writing individually about one's deepest thoughts and feelings about experiencing a traumatic event (or a number of other emotional topics) improves mental health (Frattaroli, 2006). A randomized clinical trial of Meston et al.'s expressive writing treatment, comparing the standard trauma-focused condition used in previous research with a sexual self-

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schema focused condition, demonstrated significant reductions in depression and improvements in sexual function and sexual satisfaction for all participants. The sexual self-schema writing condition guided participants to write about how their abuse history had affected their thoughts, feelings, and beliefs about their sexuality. Although the writing treatment helped all participants, women in the sexual self-schema condition demonstrated the greatest improvements in depression symptoms and sexual functioning and satisfaction (Meston et al., 2013).

Expressive writing treatments afford a wealth of data on participant's thoughts and feelings via their written essays. Previous research on essays from expressive writing studies has identified associations between the use of specific word categories and mental health (Pennebaker, 1997). Greater use of the first person pronoun "I" predicts greater symptoms of depression (Pennebaker & Chung, 2011). Psychological distancing words (e.g., could, should, would), which indicate attempts at cognitive avoidance, have been linked to higher levels of PTSD (Cohn, Mehl, & Pennebaker, 2004). In contrast, greater use of positive emotion words and moderate use of negative emotion words to describe a traumatic experience have been associated with better mental health outcomes (Pennebaker, Mehl, & Niederhoffer, 2003). Cognitive mechanism words demonstrating self-reflective thinking (e.g., realize, question, because) have been associated with better mental health outcomes (Pennebaker, 1993). One of the proposed mechanisms through which expressive writing is effective is integrating the traumatic experiences into a person's history, and thereby shifting their focus off of the past and onto the present (Pennebaker & Chung, 2011). Past and present tense words have been hypothesized to serve as markers of this change in temporal focus (Tausczik & Pennebaker, 2010). The few treatments proposed for abused women with sexual problems highlight mindfulness and efforts to engage in the present moment, rather than the past (Brotto, Seal, & Rellini, 2012; Maltz, 2012)

To date, little research has focused on word categories that may serve as markers of improvement in sexual well-being. One study asked women with a history of CSA and nonsexually abused (NSA) women to write essays on both a neutral topic and a sexual topic. In the neutral essay women were asked to write about the events they experienced in the previous 24 hr in objective detail, and in the sexual essay asked to write about their deepest thoughts and feelings about their sexuality. The authors found that for both groups of women, greater use of positive emotion words in the sexual essay predicted better sexual functioning and sexual satisfaction, yet they did not find any relationship between the use of negative emotion words and sexual health (Lorenz & Meston, 2012). This may suggest that for *all* women greater positive emotion is more important than lower negative emotion for promoting sexual well-being; however, negative emotion words have been shown to exhibit a more complex relationship to mental health than positive emotion words. Negative emotion words have a curvilinear relationship to mental health, such that the use of too many or too few negative emotion words, has been associated with poor mental health, but a moderate number of negative emotion words has been associated with better mental health (Pennebaker et al., 2003); however, whether this finding applies to a sample of women with a history of CSA is yet to be determined. The lack of a relationship between use of negative emotion words and mental health in the Lorenz and Meston (2012) study might be attributable

to this differential pattern for negative emotion words (i.e., that moderate use is most adaptive). Further research on emotion word use by abused women is needed to clarify these relationships.

Although positive emotion words showed a consistent relationship to sexual well-being in women with and without a history of CSA, these groups of women differed in their use of other word categories. In the same study on neutral and sexual essays, women with a history of CSA used the first person pronoun "I" more in the sexual essay than NSA women (Lorenz & Meston, 2012). Greater use of "I" has been associated with greater depression symptoms (Pennebaker & Chung, 2011), and women with a history of CSA are at a high risk of developing depression (Molnar et al., 2001). Women with a history of CSA may experience greater negative affect when thinking about their sexuality than NSA women (Rellini, 2008), which might then be reflected in their writing. In the same study, abused women used intimacy words (e.g., loving, arousable, warm) more than nonabused women in the sexual essay, perhaps suggesting a greater link between intimacy and sex for women with a history of CSA. In this study there were no differences in the use of sexual words (e.g., erection, sex, kiss) in the sexual essay between the two groups of women (Lorenz & Meston, 2012).

In another language analysis study, abused and nonabused women were asked to write essays on a neutral topic and a sexual topic, and in this case the sexual topic was an ambiguous picture of a couple. The neutral topic was the same as in the previous study. In this study, women with a history of CSA used more sexual words in the neutral essay, but fewer sexual words in the sexual essay, perhaps signaling hypervigilance for processing sexuality-related information in daily life, but an aversion or deficit for processing sexuality-related information in sexual scenarios (Rellini & Meston, 2011). The fact that women with a history of CSA used sexual words *less* than women without such a history in the sexual essay (Rellini & Meston, 2011) contrasts findings from the previously described study in which there was *no* difference in sexual word use between the groups of women (Lorenz & Meston, 2012). This discrepancy might be attributable to the varying instructions for the sexual essay across the two studies. In the Lorenz and Meston (2012) study the women were asked to write an essay about their own sexuality, providing an explicit instruction to write about sex, compared with the Rellini and Meston (2011) study in which participants were instructed to describe an ambiguous image of a couple that *could* be interpreted sexually.

Overall some important distinctions have emerged between the word use of abused and nonabused women in expressive writing essays. When writing on a sexual topic, women with a history of CSA tend to use "I" and intimacy words more than nonabused women, and sexual words as often as, or less than nonabused women. For all women, greater use of positive emotion words but *not* negative emotion words, predicted greater sexual well-being. The relationship between use of certain word categories and mental health outcomes suggests that one way to implicitly assess the efficacy of expressive writing treatment for CSA survivors is to examine word categories known to differ between abused and nonabused women, to see if abused women's use of these categories changes after treatment. In general, nonabused women tend to exhibit less mental and sexual health difficulties than women with a history of abuse (Leonard & Follette, 2002; Molnar et al., 2001). Therefore, as women with a history of CSA undergo treatment we

would expect both their essays and psychological symptoms to begin to more closely resemble those of nonabused women. Therefore the aim of the current study was to determine whether the essays of women with a history of CSA became more similar to the essays of nonabused women posttreatment, and assess whether these changes in word use were associated with improvements in mental and sexual health. As this was a treatment study it did not include essays from a nonsexually abused group, however, we will compare our abused participants' word use with the patterns observed for nonabused women from previous research.

The data for these analyses come from Meston and colleagues' randomized clinical trial of an expressive writing treatment for women with a history of CSA and sexual problems in adulthood. The study consisted of pre- and posttreatment assessments, as well as five 30-min expressive writing treatment sessions on assigned prompts, and produced significant reductions in depression and improvements in sexual function and satisfaction (Meston et al., 2013). The data for the current analyses were derived from self-report questionnaires completed at the pre- and posttreatment assessment sessions, and assessment essays written at the pre- and posttreatment assessment sessions on a neutral topic and a sexual topic. Essays written during the treatment sessions were analyzed separately and presented elsewhere (Lorenz, Pulverman, & Meston, 2013). We examined the changes in word use from pretreatment to the posttreatment and follow-up sessions in the sexual essay, controlling for the same category of words in the neutral essay.

Based on past research on the differences in word category use between sexually abused and nonabused women (Lorenz & Meston, 2012; Rellini & Meston, 2011), we hypothesized that posttreatment, abused women's assessment sexual essays would begin to more closely resemble the sexual essays of NSA women, meaning a lower incidence of the word "I," negative emotion words, intimacy words, and a greater incidence of positive emotion words. We also planned to test changes in sexual words but did not have a directional hypothesis for how that category might change as there are prior mixed findings for changes in sexual words. Given prior research on word use and mental health outcomes (Cohn et al., 2004; Pennebaker, 1993), we also hypothesized that at posttreatment women with a history of CSA would show a decrease in the use of past tense verbs and a corresponding increase in present tense verbs, a decrease in psychological distancing words, and an increase in cognitive mechanism words. We predicted that the following changes in word use would be associated with a reduction in depressive symptoms and improvement in sexual function and satisfaction: (a) decrease in the use of "I," (b) decrease in negative emotion words and increase in positive emotions words, (c) decrease in intimacy words, (d) decrease in past tense words and increase in present tense words, (e) decrease in psychological distancing words, and (f) increase in cognitive mechanism words.

In order to test the relationship between word use and treatment outcomes we completed two analytic steps for each word category and treatment outcome combination. We calculated (a) the changes in Linguistic Inquiry and Word Count (LIWC) categories over time, and then (b) the association between change in LIWC categories and change in treatment outcome variable.

Method

Participants

Participants were recruited via online advertisements and fliers posted in a large southwestern United States city. Interested women called the laboratory for information and completed a phone screening for eligibility. Inclusion criteria included, at least 18 years of age, reporting at least one involuntary sexual experience prior to the age of 16 and at least 2 years prior to the present, currently sexually active or cohabiting in a potentially sexual relationship, and a complaint of sexual dysfunction, sexual distress, and/or low sexual satisfaction. An involuntary sexual experience was defined as unwanted or forced oral, anal, or vaginal penetration with a penis, objects, or digits, or unwanted genital touching before the age of 16. Exclusion criteria included, experiencing a traumatic event in the prior 3 months, sexual abuse in the prior 2 years, diagnosis of a psychotic disorder in the past 6 months, suicidal or homicidal ideation, illicit drug abuse, a currently abusive intimate relationship, or concurrent treatment for CSA or sexuality-related concerns.

The current sample included 133 female survivors of CSA with an average age of 34.11 ($SD = 10.53$) years (see Table 1). The CSA reported was predominantly oral, anal, or vaginal penetration

Table 1
Demographics and Baseline Characteristics

	<i>n</i>	%
Race		
Caucasian/White	78	59
African American/Black	14	11
Asian American	2	2
Mixed race/other	13	10
Unspecified/data missing	26	20
Ethnicity		
Hispanic/Latina	25	19
Not Hispanic/Latina	108	81
Sexual orientation		
Bisexual ^a	27	20
Heterosexual	97	73
Homosexual	6	5
Unspecified/data missing	3	2
Relationship status		
Single	23	17
Casual relationship(s)	14	11
Married/in a long term relationship	94	71
Unspecified/data missing	2	1
Highest education completed		
Some high school	3	2
High school diploma	17	13
Some college/undergraduate degree	97	73
Advanced degree	16	12
Severity of abuse		
Oral, anal, or vaginal intercourse	108	81
Sexual touching only	25	19
	<i>M</i>	<i>SD</i>
Baseline assessments		
Beck Depression Inventory–II	18.89	10.70
Female Sexual Function Index	22.26	6.65
Sexual Satisfaction Scale for Women	82.32	23.24

^a "Bisexual" includes participants who indicated sexual interests or experiences that were not predominantly heterosexual or homosexual.

(81%), with a minority reporting solely sexual touching (19%). At intake a majority of the sample reported a clinically elevated level of depression symptoms (BDI-II > 10; 71%). The mean score for the Sexual Satisfaction Scale for Women (SSS-W; $M = 82.11$, $SD = 23.24$) was in the range associated with those seeking treatment for sexual problems (Meston & Trapnell, 2005).

Measures

Beck Depression Inventory–II (Beck, Steer, & Brown, 1996).

The BDI-II is an extensively validated measure of depression symptoms (Beck, Steer, & Carbin, 1988). In the present sample, the BDI-II demonstrated good reliability ($\alpha = .88$).

Female Sexual Function Index (FSFI; Rosen et al., 2000).

The FSFI is a widely used measure of female sexual function. The FSFI includes 19-items composing six subscales: desire, arousal, lubrication, orgasm, satisfaction, and pain. The questionnaire was standardized on 131 healthy control women and 128 age-matched subjects diagnosed with female sexual arousal disorder, and demonstrated good internal reliability and test–retest reliabilities (Rosen et al., 2000). The measure also showed excellent reliability ($\alpha = .97$) in a sample of women with female orgasm disorder and hypoactive sexual desire disorder (Meston, 2003). In the present sample, the FSFI demonstrated excellent reliability ($\alpha = .83-.95$).

Sexual Satisfaction Scale for Women (SSS-W; Meston & Trapnell, 2005). Sexual satisfaction was assessed with the SSS–W, a 30-item questionnaire composed of five factors: comfort discussing sexual and emotional issues (communication), compatibility between sexual partners (compatibility), contentment with emotional and sexual aspects of the relationship (contentment), personal distress concerning sexual problems (personal concern), and distress regarding the impact of their sexual problems on their partner and relationship (interpersonal concern). The measure has been shown to distinguish between women with and without sexual dysfunction, and exhibited good internal consistency ($\alpha = .74$), and good test–retest reliability ($r = .58-.79$) in a large sample of women (Meston & Trapnell, 2005). In the present sample, the SSS-W exhibited good reliability ($\alpha = .89$).

Data Collection

Participants completed a pretreatment assessment session to measure baseline symptom levels, then five expressive writing treatment sessions, and then four follow-up assessment sessions to measure treatment outcomes, that occurred immediately posttreatment, 2-weeks, 1-month, and 6-months posttreatment. In the pre- and posttreatment assessment sessions participants completed self-report measures of depression and sexual function, and wrote two assessment essays. The assessment neutral essay instructed participants to write objectively about their previous day in as much detail as possible, and the assessment sexual essay instructed participants to write about their deepest thoughts and feelings about sex and sexuality including past, present, and future sexual experiences and relationships (see <http://bit.ly/wKzXT8> for assessment essay prompts). The data for the current analyses were derived from these assessment neutral and sexual essays and self-report questionnaires. The neutral assessment essays served as a style-control for each participant's use of the specific word categories of interest in the sexual assessment essay at each time-point.

The study also included five 30-min expressive writing treatment sessions, and participants were randomly assigned to one of three treatment conditions. The three conditions were the standard expressive writing condition on thoughts and feelings about trauma (trauma-focused), a sexual self-schema condition on the effect of sexual abuse on one's sexuality (sexual self-schema focused), and a neutral control condition on changes in one's daily life. Participants in *all* three conditions demonstrated significant improvement in depression and sexual function and satisfaction, with women in the sexual self-schema focused condition showing the greatest improvement, followed by women in the trauma-focused condition (Meston et al., 2013), and women in the control condition (Pulverman, Lorenz, Stephenson, & Meston, 2012). In order to maximize the power of the current analyses participants from all three conditions were included.

Linguistic Analysis

Analysis of participants' assessment essays was conducted with LIWC software (Pennebaker, Frances, & Booth, 2001). The LIWC program has been widely used in both psychological and medical studies for analyzing word categories (Frattaroli, 2006). The program contains a dictionary of over 2,300 words and tallies their frequency in texts into over 70 discrete linguistic dimensions. These predefined dimensions range from linguistic categories (e.g., pronouns, articles), to content categories (e.g., emotion words, sexual words) and psychological processes (e.g., psychological distancing words). The LIWC program is organized such that a single word can be "counted" in multiple categories (see <http://bit.ly/c5LQHL> for complete word category list and examples). It has been acknowledged that LIWC is gross measure of word use and cannot account for all of the nuances of expressive writing (Pennebaker, Mehl, & Niederhoffer, 2003; Tausczik & Pennebaker, 2010). For example, LIWC does not discriminate between the use of "happy" and "not happy:" both instances would be counted as positive emotion words, however research exists that suggests there are differences between people who write "not happy" versus "sad" to describe a negative emotional state (Pennebaker & Stone, 2003). The word categories of interest in this study included: "I," positive emotion words (e.g., sweet, tender, fantastic), negative emotion words (e.g., annoying, violent, scary), past and present tense verbs (e.g., thought vs. think), sexual words (e.g., erection, sex, kiss), cognitive mechanism words (e.g., realize, question, because), and psychological distancing words (a factor derived from speech patterns in over 1,000 coded diary entries following a major traumatic event, see Cohn et al., 2004).

To assess sexual self-schema with LIWC, we also created a new category for intimacy words (e.g., loving, arousable, warm). These words were derived from the positive sexual self-schema dimension (passionate and romantic feelings and openness to sexual experiences) proposed by Andersen and Cyranowski (1994). See (<http://bit.ly/wKzXT8>) for a full list of words included in this factor.

Analytic Plan

We used mixed effects repeated measures models to test for changes over time in LIWC categories. For LIWC categories that changed across assessments, we then examined the association

between changes in LIWC categories and treatment outcome variables. Mixed effects modeling was chosen as it can evaluate the influence of covariates that changed over time alongside treatment outcome variables, and, by including random effects, can model individual differences in baselines (random intercepts) and trajectories (random slopes). We used a heterogeneous autoregressive covariance structure for repeated measures effects; this model allows the covariance at each timepoint to vary, while still capturing the tendency of assessments to be most closely related to the assessment immediately prior.

Results

We analyzed both the main effect of treatment condition (trauma focused, sexual self-schema focused, or control) and the interaction of condition and time; these effects were not significant in any analysis, indicating that changes in assessment-session LIWC variables were approximately equivalent across treatment conditions. Below we report on models not including treatment condition as a predictor.

Manipulation Check

We tested if there were significant differences in essay length or the number of words recognized by LIWC across essays. There was no significant effect of time for either word count, $F(4, 54.47) = .98, p = .43, d_{total} = -.0006$, or words recognized, $F(4, 19.81) = 1.40, p = .27, d_{total} = .02$ indicating that across assessment sessions, women wrote similar length essays, and each essay was evaluated with similar accuracy by the LIWC program.

Change in LIWC Categories Over Time

We hypothesized that following expressive writing treatment, CSA survivors would increase their use of positive emotion, present tense, and cognitive mechanism words but decrease in their use of “I,” negative emotion, past tense, and intimacy words, and words indicating psychological distancing. We hypothesized that use of sexual words would also change. To account for individual differences in linguistic style, we analyzed word categories in the assessment sexual essay while controlling for the same word category in the assessment neutral essay at each timepoint. As the largest changes occurred between pretreatment and posttreatment, below we list Cohen’s d for the pre–post difference as well as the sustained change effect (the average change between pretreatment and each subsequent timepoint).

Figure 1 shows change across time in all 10 categories tested. Women used “I” less over time, $F(4, 76.72) = 4.16, p = .004, d_{prepost} = -.20, d_{sustained} = -.23$. Positive emotion word use increased significantly, $F(4, 74.88) = 7.40, p = .00005, d_{prepost} = .53, d_{sustained} = .27$, while negative emotion word use decreased, $F(4, 10.48) = 5.16, p = .015, d_{prepost} = -.43, d_{sustained} = .23$. Use of past and present tense verbs changed significantly, $F(4, 76.91) = 11.50, p = .000002, d_{prepost} = -.66, d_{sustained} = -.45$ and $F(4, 17.99) = 6.77, p = .002, d_{prepost} = .52, d_{sustained} = .34$, respectively; as with emotion words, there were significant changes between pre- and posttreatment that were maintained through follow-ups (see Figure 1). Cognitive mechanism words did not change significantly, $F(4, 60.73) = 1.18, p = .328, d_{prepost} = -.05, d_{sustained} = .06$, nor did the use of sexual words, $F(4, 4.11) = 5.33,$

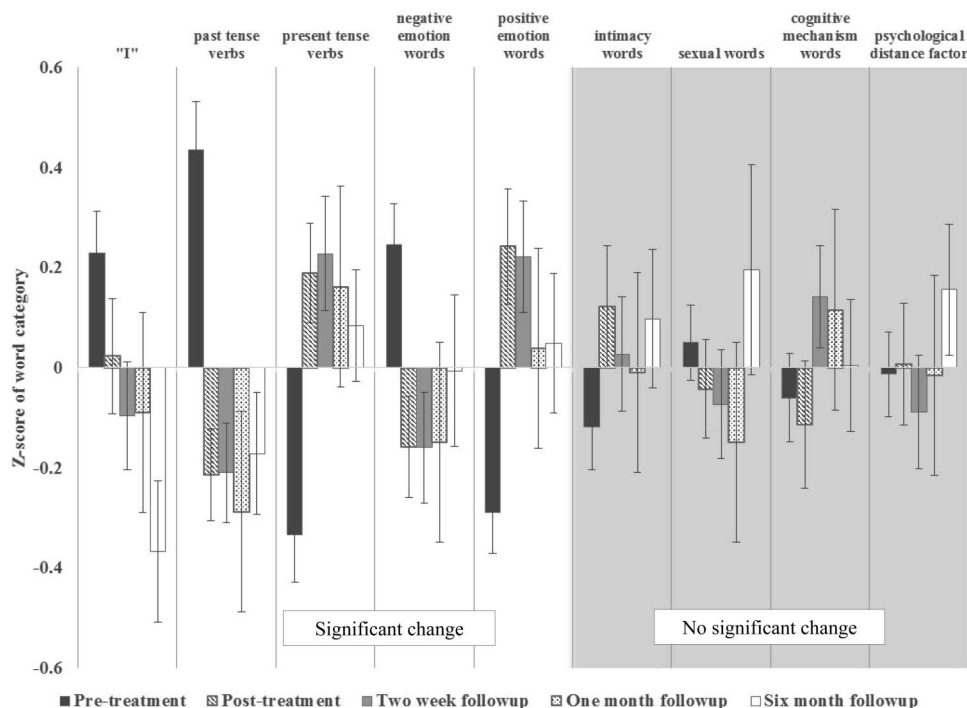


Figure 1. Changes in word categories across assessments. Note: Categories in the unshaded portion changed significantly over time, and categories in the shaded portion did not change significantly over time.

$p = .064$, $d_{prepost} = -.10$, $d_{sustained} = -.04$, intimacy words, $F(4, 62.04) = .82$, $p = .519$, $d_{prepost} = .05$, $d_{sustained} = .01$, or words indicating psychological distancing, $F(4, 33.94) = .40$, $p = .811$, $d_{prepost} = .23$, $d_{sustained} = .06$.

Association Between Change in LIWC Categories and Change in Treatment Outcomes

Positive and negative emotion words, present and past tense verbs, and “I” were identified as changing significantly in the assessment sexual essay across assessment sessions. We evaluated if changes in these word categories in the assessment sexual essay predicted change in depression, sexual functioning, and sexual satisfaction.

Decreases in depression were predicted by decreases in use of “I,” $F(1, 969.02) = 4.36$, $p = .037$, $r = .33$, and increases in positive emotion words, $F(1, 93.76) = 4.56$, $p = .035$, $r = .37$. Increased sexual satisfaction was predicted by decreases in both negative emotion words, $F(1, 17.67) = 7.47$, $p = .014$, $r = .31$, and use of “I,” $F(1, 594.37) = 7.74$, $p = .006$, $r = .37$. Increased sexual function was predicted by decreases in both negative emotion words, $F(1, 77.94) = 10.20$, $p = .002$, $r = .21$, use of “I,” $F(1, 1039.28) = 9.14$, $p = .003$, $r = .20$, and past tense verbs, $F(1, 10.55) = 8.74$, $p = .014$, $r = .12$.

Discussion

The aim of this study was to determine whether the posttreatment word use in the sexual essays of women sexually abused in childhood would begin to more closely resemble the word use of nonabused women compared with pretreatment measures. Prior studies have identified word categories that differ between abused and nonabused women (Lorenz & Meston, 2012; Rellini & Meston, 2011), but to date no research has examined whether women with a history of CSA show changes in their word use after psychological treatment. Posttreatment, women in our sample showed significantly decreased use of the first person pronoun “I,” negative emotion words, and past tense verbs, and significantly increased use of positive emotion words and present tense verbs. No changes from pre-to-post treatment were found for intimacy words, sexual words, cognitive mechanism words, or psychological distancing words. It appears that after the expressive writing treatment, the essays of women with a history of CSA became more similar to those of their nonabused counterparts (based on patterns observed in prior studies including nonabused women) in terms of words indicating self-focus, emotional valence, and temporal perspective. Given that nonabused women tend to exhibit less overall mental and sexual health difficulties than abused women (Leonard & Follette, 2002; Molnar et al., 2001), these shifts in word use are promising indicators of treatment response.

In this sample, reductions in the use of “I” and increases in positive emotion words predicted a reduction in depressive symptoms. This finding is in line with the robust association between the use of “I” and depression in the expressive writing literature; “I” is posited to reflect a ruminative self-focus that may be related to the maintenance of depression (Pennebaker & Chung, 2011). The relationship between increased positive emotion words and better mental health has also been found previously in expressive writing studies (Pennebaker et al., 2003). Notably we did *not* find

a relationship between changes in negative emotion words and depression, contrary to our hypotheses. As may be the case with the Lorenz and Meston (2012) findings on negative emotion word use, the lack of a relationship for negative emotion words maybe due to the curvilinear relationship between negative emotion word use and mental health (Pennebaker et al., 2003). It is possible that the expressive writing treatment did not catalyze women with a history of CSA to shift from the range of negative words they used initially (high, moderate, or low) thus leading to the lack of an effect for this word category.

In terms of the sexual health outcomes, decreases in the use of “I” and negative emotion words predicted improvements in sexual function and sexual satisfaction. The relationship between “I” and sexual health may be attributable to changes in depression. Depression is an important risk factor for the development of sexual problems in women both with and without a history of CSA (Bodenmann & Ledermann, 2008; Trudel & Goldfarb, 2010); therefore, this relationship may simply reflect the impact of depression on sexual health. Prior research on abused and nonabused women’s word use has documented that positive emotion word use, but *not* negative emotion word use, is associated with sexual function (Lorenz & Meston, 2012). In the current study, however, we found that for women with sexual abuse histories, decreases in negative emotion word use predicted better sexual function and sexual satisfaction, and changes in positive emotion word use did not predict changes in sexual outcomes. One notable difference between these studies was that the Lorenz and Meston (2012) study was cross-sectional, and women completed their writing samples pretreatment, the time at which they reported the greatest level of sexual problems. Taken together these findings suggest that although positive emotions may be a general marker of sexual wellbeing, reductions in negative emotions appear to be an important indicator of treatment-related change in improving sexual health among women with a history of abuse.

A reduction in the use of past tense verbs also predicted an increase in sexual function. Creating a coherent narrative of one’s traumatic experience has been proposed as one of the cognitive mechanisms through which expressive writing treatments are effective (Pennebaker & Chung, 2011). Writing may have aided the women to evaluate how their past sexual experiences influence their present sexual selves, leading to improved sexual wellbeing. However, the fact that psychological distancing word use was not altered by treatment suggests that improvements in sexual wellbeing were not due to “putting the past away” (i.e., creating emotional distance from abuse experiences). Instead, as abused women used writing to successfully incorporate these memories into a more balanced, adaptive sexual schema, their language may have naturally shifted from past to present focus.

Notably sexual words, intimacy words, and cognitive mechanism words were not altered by treatment. Prior research has produced mixed findings on the use of sexual words in sexual essays by abused women. In one previous study, abused women used less sexual words (Rellini & Meston, 2011), and in another study used an equal amount of sexual words as nonabused women (Lorenz & Meston, 2012). Given these mixed findings we did not propose a directional hypothesis for how treatment might affect this word category. Our finding that use of sexual words did not change, suggests that sexual words may be somewhat fixed and therefore not a reliable category for assessing treatment efficacy.

Prior research found that abused women use intimacy words more when writing about a sexual topic than nonabused women (Lorenz & Meston, 2012); therefore, we expected the use of this word category to decrease after treatment. We failed to find a change in intimacy words posttreatment, which may suggest that women's interpersonal schema were not as amenable to change via expressive writing as were more self-driven processes such as emotional valence or present-moment focus.

Our findings suggest that linguistic analysis may provide clinicians with a useful tool for monitoring treatment progress. Although validated self-report questionnaires play an important role in monitoring treatment gains, they are subject to well-documented biases such as social desirability (Paulhus & Reid, 1991; van de Mortel, 2008), and can only reflect symptoms of which the client is self-aware and willing to report. Linguistic analysis, being a more implicit method, and thus less susceptible to reporting biases, could provide additional useful assessment information to clinicians.

Of the few treatments specifically developed for CSA-related issues, most already include writing components (Chard, Weaver, & Resick, 1997; Leonard & Follette, 2002). Clinicians practicing treatments that include writing components could use linguistic analysis to monitor improvement in their clients over the course of therapy. For example, a program could be developed that analyzes client's essays and generates a report of the word categories known to be markers of mental health outcomes. The program could compare the results of the current essay with the results from previous essays to evaluate overall treatment response as well as changes over time. Ideally this would enable the therapist to acquire data about changes in psychopathology without adding to session time: the assessments are captured through the writing treatment itself.

This study had a number of limitations related to the sample and generalizability of findings. Despite an effort to recruit a representative sample of CSA survivors experiencing sexual difficulties, the majority of our sample had completed at least some college education, were relatively young, and were married or in a committed relationship. We cannot comment on whether these findings would generalize to a sample of less educated, older, and single women. Additionally, this study asked women to write about sexual self-schema and it is unclear if we would see similar findings with different writing prompts. Sexual self-schema prompts were chosen as sexual problems are common in this population. It is unclear to what degree changes in language use resulted from this match, and whether such a match is necessary to see improvement in treatment outcomes from expressive writing. For example, if adapting this treatment for people with social anxiety, it remains unclear whether the prompts should be focused on social interactions or whether a more general topic would suffice. In our effort to explore sexual self-schema we assessed for changes in intimacy word use, yet failed to find an effect for this word category. This may be partially attributable to the fact that intimacy words are a new LIWC category, created for our study in an attempt to more carefully assess changes in intimate relationship functioning. This word category may require further reliability testing.

Despite these limitations, to our knowledge, this was the first study to demonstrate that changes in word use are associated with treatment outcomes in an expressive writing treatment with survi-

vors of CSA. As the expressive writing paradigm continues to grow from a research method to a stand-alone therapeutic approach, greater focus should be afforded to the rich set of data embedded in client writings. Clinicians utilizing expressive writing now have a new method to examine the efficacy and pace of their treatments. Evidence of the relationship between linguistic changes and treatment outcomes in such a complex population, as that studied here, calls for research with other groups to determine the generalizability of this effect. Future studies on linguistic changes during the course of treatment could help to cement linguistic analysis as a tool for monitoring treatment response in expressive writing and other therapeutic treatments.

References

- Andersen, B. L., & Cyranowski, J. M. (1994). Women's sexual self-schema. *Journal of Personality and Social Psychology, 67*, 1079–1100. doi:10.1037/0022-3514.67.6.1079
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the BDI-II*. San Antonio, TX: Psychological Corporation.
- Beck, A. T., Steer, R. A., & Carbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8*, 77–100. doi:10.1016/0272-7358(88)90050-5
- Bodenmann, G., & Ledermann, T. (2008). Depressed mood and sexual functioning. *International Journal of Sexual Health, 19*, 63–73. doi:10.1300/J514v19n04_07
- Brotto, L. A., Seal, B. N., & Rellini, A. (2012). Pilot study of a brief cognitive behavioral versus mindfulness-based intervention for women with sexual distress and a history of childhood sexual abuse. *Journal of Sex & Marital Therapy, 38*(1), 1–27. doi:10.1080/0092623X.2011.569636
- Chard, K. M., Weaver, T. L., & Resick, P. A. (1997). Adapting cognitive processing therapy for child sexual abuse survivors. *Cognitive and Behavioral Practice, 4*, 31–52. doi:10.1016/S1077-7229(97)80011-9
- Cohn, M. A., Mehl, M. R., & Pennebaker, J. W. (2004). Linguistic markers of psychological change surrounding September 11, 2001. *Psychological Science, 15*, 687–693. doi:10.1111/j.0956-7976.2004.00741.x
- Cutler, S. E., & Nolen-Hoeksema, S. (1991). Accounting for sex differences in depression through female victimization: Childhood sexual abuse. *Sex Roles, 24*, 425–438.
- DiLillo, D. (2001). Interpersonal functioning among women reporting a history of childhood sexual abuse: Empirical findings and methodological issues. *Clinical Psychology Review, 21*, 553–576. doi:10.1016/S0272-7358(99)00072-0
- Fleming, J., Mullen, P. E., Sibthorpe, B., & Bammer, G. (1999). The long-term impact of childhood sexual abuse in Australian women. *Child Abuse & Neglect, 23*, 145–159. doi:10.1016/S0145-2134(98)00118-5
- Frattaroli, J. (2006). Experimental disclosure and its moderators: A meta-analysis. *Psychological Bulletin, 132*, 823–865. doi:10.1037/0033-2909.132.6.823
- Leonard, L. M., & Follette, V. M. (2002). Sexual functioning in women reporting a history of child sexual abuse: Review of the empirical literature and clinical implications. *Annual Review of Sex Research, 13*, 346–388.
- Lorenz, T. A., & Meston, C. M. (2012). Associations among childhood sexual abuse, language use, and adult sexual functioning and satisfaction. *Child Abuse and Neglect, 36*, 190–199. doi:10.1016/j.chiabu.2011.09.014
- Lorenz, T. A., Pulverman, C. S., & Meston, C. M. (2013). Sudden gains during patient-directed expressive writing treatment predicts depression reduction in women with history of childhood sexual abuse: Results from a randomized clinical trial. *Cognitive Therapy and Research, 37*, 690–696. doi:10.1007/s10608-012-9510-3

- Maltz, W. (2002). Treating the sexual intimacy concerns of sexual abuse survivors. *Sexual and Relationship Therapy, 17*, 321–327. doi:10.1080/1468199021000017173
- Maltz, W. (2012). *The sexual healing journey*. New York, NY: Harper-Collins.
- Meston, C. M. (2003). Validation of the Female Sexual Function Index (FSFI) in women with female orgasmic disorder and women with hypoactive sexual desire disorder. *Journal of Sex and Marital Therapy, 29*, 39–46. doi:10.1080/713847100
- Meston, C. M., & Heiman, J. R. (2000). Sexual abuse and sexual function: An examination of sexually relevant cognitive processes. *Journal of Consulting and Clinical Psychology, 68*, 399–406. doi:10.1037/0022-006X.68.3.399
- Meston, C. M., Lorenz, T. K., & Stephenson, K. R. (2013). Effects of expressive writing on sexual dysfunction, depression, and PTSD in women with a history of childhood sexual abuse: Results from a randomized clinical trial. *Journal of Sexual Medicine, 10*, 2177–2189. doi:10.1111/jsm.12247
- Meston, C. M., Rellini, A. H., & Heiman, J. R. (2006). Women's history of sexual abuse, their sexuality, and sexual self-schemas. *Journal of Consulting and Clinical Psychology, 74*, 229–236. doi:10.1037/0022-006X.74.2.229
- Meston, C., & Trapnell, P. (2005). Development and validation of a five-factor sexual satisfaction and distress scale for women: The Sexual Satisfaction Scale for Women (SSS-W). *Journal of Sexual Medicine, 2*, 66–81. doi:10.1111/j.1743-6109.2005.20107.x
- Molnar, B. E., Buka, S. L., & Kessler, R. C. (2001). Child sexual abuse and subsequent psychopathology: Results from the National Comorbidity Survey. *American Journal of Public Health, 91*, 753–760. doi:10.2105/AJPH.91.5.753
- Paulhus, D. L., & Reid, D. B. (1991). Enhancement and denial in socially desirable responding. *Journal of Personality and Social Psychology, 60*, 307–317. doi:10.1037/0022-3514.60.2.307
- Pennebaker, J. W. (1993). Putting stress into words: Health, linguistic, and therapeutic implications. *Behaviour Research and Therapy, 31*, 539–548. doi:10.1016/0005-7967(93)90105-4
- Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science, 8*, 162–166.
- Pennebaker, J. W., & Chung, C. K. (2011). Expressive writing and its links to mental and physical health. In H. S. Friedman (Ed.), *Oxford handbook of health psychology* (pp. 417–437). New York, NY: Oxford University Press.
- Pennebaker, J. W., Frances, M., & Booth, R. (2001). *Linguistic inquiry and word count (LIWC)*. Mahwah, NJ: Erlbaum.
- Pennebaker, J. W., Mehl, M. R., & Niederhoffer, K. G. (2003). Psychological aspects of natural language use: Our words, our selves. *Annual Review of Psychology, 54*, 547–577. doi:10.1146/annurev.psych.54.101601.145041
- Pennebaker, J. W., & Stone, L. D. (2003). Words of wisdom: Language use over the life span. *Journal of Personality and Social Psychology, 85*, 291–301. doi:10.1037/0022-3514.85.2.291
- Polusny, M. A., & Follette, V. M. (1995). Long-term correlates of child sexual abuse: Theory and review of the empirical literature. *Applied & Preventive Psychology, 4*, 143–166. doi:10.1016/S0962-1849(05)80055-1
- Pulverman, C. S., Lorenz, T. K., Stephenson, K. R., & Meston, C. M. (2012, May). *Non-trauma focused expressive writing improves psychological functioning in survivors of childhood sexual abuse*. Poster session presented at the annual meeting of the Association for Psychological Science (APS), Chicago, IL.
- Rellini, A. (2008). Review of the empirical evidence for a theoretical model to understand the sexual problems of women with a history of CSA. *Journal of Sexual Medicine, 5*, 31–46. doi:10.1111/j.1743-6109.2007.00652.x
- Rellini, A. H., & Meston, C. M. (2011). Sexual self-schemas, sexual dysfunction, and the sexual responses of women with a history of childhood sexual abuse. *Archives of Sexual Behavior, 40*, 351–362. doi:10.1007/s10508-010-9694-0
- Roesler, T. A. (2000). Discovery of childhood sexual abuse in adults. In R. M. Reece (Ed.), *Treatment of child abuse: Common ground for mental health, medical, and legal practitioners* (pp. 65–78). Baltimore, MD: Johns Hopkins University Press.
- Rosen, R., Brown, C., Heiman, J., Leiblum, S., Meston, C. M., Shabsigh, R., . . . D'Agostino, R. (2000). The female sexual function index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *Journal of Sex and Marital Therapy, 26*, 191–208. doi:10.1080/009262300278597
- Tausczik, Y. R., & Pennebaker, J. W. (2010). The psychological meaning of words: LIWC and computerized text analysis methods. *Journal of Language and Social Psychology, 29*, 24–54. doi:10.1177/0261927X09351676
- Trudel, G. G., & Goldfarb, M. R. (2010). Marital and sexual functioning and dysfunctioning, depression and anxiety. *Sexologies: European Journal of Sexology and Sexual Health, 19*, 137–142.
- van de Mortel, T. F. (2008). Faking it: Social desirability response bias in self-report research. *Australian Journal of Advanced Nursing, 25*, 40–48.

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