Changes in the sexual self-schemas of women with a history of childhood sexual abuse following expressive writing treatment

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Abstract

Objective: Sexual self-schemas are cognitive generalizations about the sexual self that influence the processing of sexually pertinent information and guide sexual behavior. Until recently sexual self-schemas were exclusively assessed with self-report instruments. Recent research using the Meaning Extraction Method (MEM), an inductive method of topic modeling, identified seven unique themes of sexual self-schemas: family and development, virginity, abuse, relationship, sexual activity, attraction, and existentialism from essays of 239 women (Stanton, Boyd, Pulverman, & Meston, 2015). In the current study, these themes were used to examine changes in theme prominence after an expressive writing treatment. Method: Women ($N = 138$) with a history of childhood sexual abuse (CSA) completed a five-session expressive writing treatment, and essays on sexual self-schemas written at pre-treatment and post-treatment were examined for changes in themes. Results: Women showed a reduction in the prominence of the abuse, family and development, virginity, and attraction themes, and an increase in the existentialism theme. Conclusions: This study supports the validity of the seven themes identified by Stanton and colleagues (2015) and suggests that expressive writing may aid women with a history of sexual abuse to process their abuse history such that it becomes a less salient aspect of their sexual self-schemas.

Keywords: sexuality, sexual health, sexual abuse, language analysis, topic modeling
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Self-schemas are cognitive generalizations about the self that affect people’s perceptions and behavior (Markus, 1977). Schemas act as heuristics about the self that can lead to negative consequences as information is selectively processed and evaluated according to these overarching beliefs. For example, a person who holds a self-schema that he or she is “damaged” will interpret situations that arise in his or her life, such as being bullied or getting divorced, as additional evidence for these negative beliefs, and the beliefs will become more entrenched. Self-schemas arise from social experiences during infancy and childhood (Bowlby, 1969, 1988; Mikulincer, 1995), and tend to be stable over time (Mikulincer, 1995). Self-schemas have been shown to play a role in the development of a number of psychological disorders including depression (Dozois & Beck, 2008), social anxiety (Alden, Au Yeung, & Plasencia, 2014), and eating disorders (Stein & Corte, 2008). Empirically supported treatments for these disorders often focus on altering maladaptive self-schemas through therapeutic exercises (Beck, 2011).

Sexual self-schemas represent cognitive generalizations about the sexual self and influence beliefs about sexuality and sexual behavior (Andersen & Cyranowski, 1994). Sexual self-schemas have been associated with sexual function in women: women with greater positive sexual self-schemas report higher sexual function than women with lower positive sexual self-schemas (Andersen, Woods, & Copeland, 1997; Rellini, Ing, & Meston, 2011). Historically, sexual self-schemas have been assessed with a self-report instrument composed of a trait-adjective rating scale that provides scores for two independent positive themes: passion/romance...
and openness to sexual experience, and one independent negative theme: embarrassment/conservatism (Andersen & Cyranowski, 1994).

The Meaning Extraction Method (MEM), a topic modeling method for natural language analysis, was recently used to extract sexual self-schema themes from women’s open-ended expressive writing essays on their sexuality (Stanton et al., 2015). This process generated seven unique themes including family and development, virginity, abuse, relationship, sexual activity, attraction, and existentialism, in contrast to the three themes measured by the sexual self-schema self-report instrument (Andersen & Cyranowski, 1994). The family and development theme focused on family members (“mother, father, sister, brother”), childhood associations, (“pretend, kid”), and puberty/coming of age, (“pretty, breast, eventually”). The virginity theme was related to dating and the loss of virginity in high school and college. The abuse theme focused on types of sexual abuse (“rape, abuse, molest”), negative emotions (“ashamed, disgust, hate”), and negative judgements (“horrible, bad, wrong”). In contrast, the relationship theme was concerned with intimacy and connection in romantic relationships. The sexual activity theme focused on sexual body parts (“penis, hand”) and sexual behaviors, (“kiss, intercourse, oral”). The theme of attraction was focused on compelling qualities (“power, attractive”) and a sense of openness to sexual experiences (“arouse, fantasy, ready”). The existentialism theme focused on emotional reflection and meaning making processes, with indicators like “understand” and “grow.” Unlike traditional self-report instruments, the MEM approach generates themes from participants’ natural language using an inductive approach that removes many problematic constraints and blind spots imposed by the researcher from the assessment procedures. Relative to a standard questionnaire, participants can describe their self-schemas more comprehensively in their own words, thereby reflecting their own pre-existing concept relations, and can complete a basic
writing task in approximately the same time as a battery of self-report questionnaires. The MEM methodology facilitates participant-generated content, rather than researcher pre-conceptions, to guide the study of complex phenomena such as self-schemas. The non-invasive nature of the MEM makes it particularly useful for exploring sensitive topics like sexuality.

Research by Stanton and colleagues was the first to apply the MEM to essays on sexual self-schemas (2015). The MEM has previously been used to examine diverse constructs such as personality (Chung & Pennebaker, 2008), aftercare treatment (Wolf, Chung, & Kordy, 2010), cultural differences (Ramírez-Esparza, Chung, Sierra-Otero, & Pennebaker, 2012), attitudes towards alcohol (Lowe et al., 2013), and personal values (Boyd et al., 2015). In addition to the identification of seven unique themes of women’s sexual self-schemas, Stanton et al. (2015) reported differences in the prominence of themes by demographic characteristics. Importantly, women with a history of childhood sexual abuse (CSA) wrote about the abuse and attraction themes more than their non-abused counterparts. In contrast, non-abused women wrote about the virginity and relationship themes more than the abused women.

The differences in MEM theme prominence between abused and non-abused women are supported by previous research using self-report measures of sexual self-schemas that have also identified differences between these groups. In studies using self-report instruments, women with a history of CSA report lower positive, but not greater negative, sexual self-schemas than non-abused women (Meston, Rellini, & Heiman, 2006; Reissing, Binik, & Khalifé, 2003). Differences between the sexual self-schemas of these groups may be important for describing the sexuality of abused women, who are at a higher risk of developing sexual dysfunction than their non-abused peers (Leonard & Follette, 2002; Loeb et al., 2002). In the general population of women, 43% report sexual problems (Laumann, Paik, & Rosen, 1999; Shifren, Monz, Russo, &
Segreti, 2008), yet in abused samples 65-85% of women report sexual difficulties (Sarwer & Durlak, 1996; Westerlund, 1992). Abused women also show a unique presentation of sexual difficulties with a higher prevalence of arousal dysfunction than other disorders (Leonard & Follette, 2002; van Berlo & Ensink, 2000), yet in the general population of women, low desire is the most common sexual complaint (Laumann et al., 1999; Shifren et al., 2008). Abused women are also less responsive to standardized sex therapy treatments than non-abused women (Berman, Berman, Bruck, Pawar, & Goldstein, 2001; Maltz, 2002, 2012), suggesting that there may be something unique about the sexual difficulties of abused women.

The differences in sexual self-schemas, presentation of sexual dysfunction, and response to standardized sex therapy between abused and non-abused women suggests that abused women may require specialized sex therapy approaches. Post-trauma expressive writing has been shown to improve mental and physical health in a variety of clinical and non-clinical samples (Frattaroli, 2006). Although the exact mechanisms linking expressive writing and health benefits remain under investigation (Pennebaker, 2004), the writing process is believed to aid in the cognitive processing of past experiences and the integration of these experiences into self-schemas (Pennebaker & Chung, 2011). Meston and colleagues proposed that expressive writing treatment might be a particularly appropriate form of treatment for women with a history of abuse, as women can control the pace and intensity of the treatment sessions (Meston, Lorenz, & Stephenson, 2013). Sexual abuse has been described as a crime about power and control over the child victim (Hall, 2008; Scheff & Retzinger, 2003), therefore any methods for restoring control to the patient during treatment may accelerate the healing process (Maltz, 2002, 2012). In their randomized clinical trial of a five-session expressive writing treatment for sexual difficulties in women with a history of CSA, Meston and colleagues found that participants’ sexual function
improved and symptoms of depression and posttraumatic stress disorder (PTSD) decreased (Meston, Lorenz, & Stephenson, 2013). Given that prior research on expressive writing suggests that writing may alter maladaptive self-schemas (Pennebaker & Chung, 2011), we applied the MEM procedure to the essays written by abused women before and after this expressive writing treatment to determine whether treatment led to changes in women’s sexual self-schema themes. This method allows us to determine whether abused women’s schemas become more similar to the thematic patterns of non-abused women’s schemas (identified by Stanton et al., 2015) following treatment. A greater understanding of the experience of sexual dysfunction for abused women, particularly the ways in which their problems are distinct from the sexual problems of non-abused women, could contribute to the development of specialized treatments for this vulnerable population.

Based on the assumption that as abused women heal, their sexual self-schema theme use will more closely resemble that of non-abused women, we hypothesized that abused women would show increases in the prominence of the virginity and relationship themes and decreases in the prominence of the abuse and attraction themes in their essays, thus making their themes more similar to those reported by non-abused women. We did not anticipate changes in the other theme categories: family and development, sexual activity, attraction, and existentialism. Results may provide insight into the cognitive processing that occurs during expressive writing treatment for women with a history of CSA.

Method

Participants

Participants were recruited from the local community with online and print advertisements. Recruitment materials described a treatment study for women experiencing
sexual difficulties with a past history of CSA. Interested women called the laboratory to complete a phone screen to determine eligibility. The eligibility criteria included at least 18 years of age, a history of CSA prior to age 16, currently sexually active or in a potentially sexual relationship with a partner, and currently experiencing sexual dysfunction, sexual distress, or low sexual satisfaction. For the purposes of this study, CSA was defined as forced or unwanted oral, anal, or vaginal penetration, or genital touching or fondling before age 16 and at least two years prior to study enrollment. Women were excluded from the study if they reported experiencing sexual abuse in the previous two years, a traumatic event in the previous three months, being involved in an abusive relationship, a diagnosis of bipolar disorder or schizophrenia in the past six months, suicidal or homicidal ideation, recent illicit drug use, or currently receiving psychological treatment for abuse or sexuality-related concerns. Further details on the recruitment and screening of participants can be found in Meston et al., 2013. Eligible women were invited to schedule an intake session to participate in the study.

The final sample included 138 women ages 19 to 63 ($M = 34.10, SD = 10.49$). The majority of the sample identified as heterosexual (82%), 7% identified as bisexual, 7% identified as lesbian, and 4% did not report their sexual orientation. In this sample 56% of the women were Caucasian, 14% were Hispanic/Latina, 10% were African American/Black, 2% were Asian, 0.7% were Native American, 11% were biracial or multiracial, and 7% did not report their racial identity. The majority of the sample had completed at least some college (82%). The sample included more women who were married or in a committed relationship (67%), than single women (27%), and 6% of women did not report their relationship status. The majority of the sample reported CSA that included penetration (81%); the rest of the sample reported genital
touching or fondling only (19%). Age of first CSA experience ranged from 1 to 15 with an average of 8.86 years ($SD = 4.60$).

**Materials**

**Assessment Writing Prompt.** In each assessment session women completed a 30-minute writing task individually on a computer in a private testing room. The writing prompt read:

*For the next 30 minutes, I would like you to write about your personal thoughts and feelings associated with sex and sexuality. In your writing, I’d like you to link your thoughts about sex to past, current, or future sexual experiences or relationships. You might also address more broadly how you view yourself as a sexual person. Please try to be as detailed as possible in your description. I’d like you to really let go and explore your very deepest emotions and thoughts.*

**Measures.** Women completed a demographics questionnaire. Women also completed a number of self-report measures on sexual and mental health including sexual function, depressive symptoms, and PTSD symptoms, that have been presented elsewhere (e.g., Meston et al., 2013) but were not relevant to the current analyses.

**Procedure**

Study sessions were completed in a sexuality laboratory at a large university and led by female research administrators who were doctoral students with master’s degrees in psychology.

**Assessment Sessions.** Eligible participants completed five identical two-hour assessment sessions at pre-treatment, post-treatment, two week follow-up, one month follow-up, and six month follow-up. In the first assessment session (i.e., pre-treatment session) women were oriented to study procedures and completed informed consent. In each of the five assessment sessions women were asked to write for 30-minutes on a sexual essay prompt (described above).
The same sexual essay writing prompt was used in each session in order to evaluate changes in the essays over time. Only the assessment session sexual essays were analyzed for the current study. In each assessment session women also completed self-report and interview measures of mental and sexual health. Participants were compensated monetarily for their time. A total of 407 assessment session sexual essays were completed by participants and analyzed in the current study. Similar to other longitudinal treatment studies, a number of participants showed attrition between assessments. Nevertheless, participants in the current sample completed an average of 2.95 sessions out of 5 possible sessions. Participants had to attend a minimum of two sessions (the intake session and at least one other session) in order to be included in the current analyses. Eighty-six participants met this requirement out of the full sample of 138 women.

**Treatment Sessions.** After the pre-treatment assessment women were randomly assigned to one of three expressive writing treatment groups. Treatment included five 30-minute sessions completed weekly or bi-monthly. In each treatment session the participant completed the writing task on a desktop computer in a private room. The treatment session writing prompts were not identical each session. Treatment essays were not analyzed for the current study, as the variability in the prompts precluded a controlled examination of changes in theme use. A more comprehensive explanation of the treatment is detailed elsewhere (Meston et al., 2013), and the full text of all study prompts can be viewed online (http://bit.ly/wKzXT8)².

**Language Analysis**

Past research applying the MEM to essays on sexual self-schemas identified seven unique themes including *family and development, virginity, abuse, relationship, sexual activity, attraction,* and *existentialism* – the words included in each theme can be found in Stanton et al., ²

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² Given the level of attrition in later assessment sessions, the essays of women in all three treatment groups were included in the current study in order to achieve adequate statistical power for the theme use analyses.
2015 (Table 5) in the order of the strength of their factor loading to that theme. For a more detailed explanation of the identification of the seven sexual self-schema themes, including details of the Principal Components Analysis used to extract the themes, see Stanton et al., 2015. Theme use in each essay was quantified using a standard word-counting approach. This approach uses word-counting software (Boyd, 2014) to calculate the percentage of words belonging to each theme within each essay. Theme use, then, was reflected as a percentage of the total essay. These quantified theme scores were used for all subsequent analyses. Note that each theme constitutes a bipolar dimension that can theoretically range in scores from -100 to +100. Theme use scores that are positive indicate greater theme prominence in the essay, and negative scores indicate less prominence in the essay.

**Analytic plan**

Data were analyzed with linear mixed effects repeated measures models to test for changes in theme use across time (i.e., across the five assessment sessions from pre-treatment through six month follow-up). Mixed effects analyses allow for the modeling of individual differences in both baselines (random intercepts) and trajectories (random slopes), and are robust to missing data (i.e., data for a given participant may be present for the one month follow-up session but not the six month follow-up session, depending on attrition; Schafer & Graham, 2002). Follow-up pairwise comparisons were made with Tukey’s Honest Significant Difference (HSD) test to manage the family-wise error rate for multiple comparisons.

**Results**

Although we did not anticipate any changes in the *family and development* theme, women showed a significant decrease in their use of the *family and development* theme over time. Pairwise comparisons revealed a significant difference between pre-treatment and post-
treatment, pre-treatment and two week follow-up, pre-treatment and one month follow-up, and pre-treatment and six month follow-up (Table 1 for all statistical values). There were no significant differences between any of the other pairs of time points (Figure 1 Panel A).

According to our hypothesis that abused women’s theme use would come to resemble that of non-abused women, we anticipated an increase in the use of the *virginity* theme. Women actually showed a significant decrease in their use of the *virginity* theme over time. Pairwise comparisons indicated a significant difference between pre-treatment and post-treatment, pre-treatment and two week follow-up, pre-treatment and one month follow-up, and pre-treatment and six month follow-up. There were no significant differences between any of the other pairs of time points (Figure 1 Panel B).

In line with our hypotheses that the *abuse* theme would become less salient after treatment, women showed a significant decrease in their use of the *abuse* theme over time. Pairwise comparisons indicated a significant difference between pre-treatment and post-treatment, pre-treatment and two week follow-up, pre-treatment and one month follow-up, and pre-treatment and six month follow-up. There were no significant differences between any of the other pairs of time points (Figure 1 Panel C).

Although we had anticipated an increase in the *relationship* theme, the data revealed a more complex relationship. The greatest use of the *relationship* theme occurred at post-treatment. There was a significant increase in the use of this theme between pre-treatment and post-treatment. There was a significant decrease in the use of this theme between post-treatment and one-month follow-up, and post-treatment and six-month follow-up (Figure 1 Panel D).

There was no change in the use of the *sexual activity* theme over time, as we had hypothesized. Women’s use of the *sexual activity* theme did not change after treatment.
In support of our hypotheses, women showed a significant decrease in their use of the *attraction* theme over time. Pairwise comparisons revealed a significant decrease in the use of this theme between pre-treatment and six month follow-up. There were no significant differences between any of the other pairs of time points (Figure 1 Panel E).

Women showed a marginally significant (*p* < .06) increase in their use of the *existentialism* theme over time, in contrast to our hypothesis that use of this theme would remain stable. Pairwise comparisons indicated that there was a significant difference in the use of this theme between pre-treatment and six month follow-up. There were no significant differences between any of the other pairs of time points (Figure 1 Panel F).

**Discussion**

After an expressive writing treatment, women with a history of CSA showed changes in their use of certain sexual self-schema themes. Abused women evidenced a decrease in their use of the *abuse, family and development, virginity,* and *attraction* schemas, and an increase in their use of the *existentialism* schema. The prominence of the *relationship* schema initially increased and then decreased. There was no change in the prominence of the *sexual activity* schema.

In line with our hypotheses, women showed a reduction in their use of the *abuse* schema. As women processed their history of abuse throughout treatment they may have organized their memories and emotions about the abuse, and/or habituated to thoughts of the abuse, leading to a reduced salience of this schema when writing about their sexuality after treatment. Expressive writing has been posited to improve mental health by aiding in the processing of past traumatic events (Pennebaker & Chung, 2011). Clinical experts in the treatment of women with a history of CSA and sexual dysfunction advocate for treating trauma symptoms related to abuse prior to treating sexual difficulties (Maltz, 2002, 2012). These experts explain that sex therapy is not...
appropriate if the patient is still experiencing a significant level of post-traumatic stress. The expressive writing treatment may have aided women in processing their abuse history, such that by the end of treatment, the theme of abuse was a less-easily accessible component of their sexual self-schemas. In other words, writing may have helped the women to acknowledge and set aside their history of abuse, so that they could focus on the other elements of their sexual self-schemas.

The reduction in the family and development schema might be related to the reduction in the abuse schema, as 52% of the women in this study reported being abused by family members. As abuse became less salient for women, their focus on family may have also decreased. Notably, the entire reduction in women’s use of these two schemas (abuse, and family and development) occurred between the pre-treatment and post-treatment sessions, and that reduction was maintained over time in the follow-up assessment sessions (Figure 1 Panels A and C). This pattern in theme use supports the notion that the expressive writing treatment itself (i.e., the five treatment sessions) helped women to process their abuse history, as women did not show further reductions in the use of the abuse and family and development schemas in the follow-up assessment sessions. In addition to the abuse survivor, family members are also negatively affected by reports of sexual abuse in the family, therefore participants may have used the family and development theme less over time as they processed the impact of abuse on their families.

Contrary to our hypotheses, women did not show an increase in the prominence of the virginity schema. Rather, women showed a decrease in the use of this schema over time. Prior research has noted differences in the use of this theme between abused and non-abused women and suggested that the loss of virginity may be central to the psychosexual development of non-abused women, but not of abused women, for whom the abuse is likely the most salient aspect of
their early psychosexual development (Stanton et al., 2015). Despite engaging in the expressive writing treatment, the schema of *virginity* did not gain comparable prominence in abused women’s sexual self-schemas as has been found for non-abused women. Early sexual abuse may permanently affect the way women view the beginning of their sexuality. It is possible that early sexual experiences will always have a negative valence for abused women, therefore processing and letting go of past experiences in favor of focusing on the present is more adaptive for this group than trying to reframe their early sexual experiences more positively.

Consistent with our hypotheses, women showed a reduction in their use of the *attraction* schema from the post-treatment to the final follow-up session. As a reminder, this schema focused on compelling qualities and openness to sexual experiences. Prominence of the *attraction* schema was previously found to differ between women with and without a history of CSA, with abused women showing a greater prominence of this schema than non-abused women (Stanton et al., 2015). Two notable patterns of sexual behavior have been observed in women with a history of CSA: hypersexuality and hyposexuality (Rellini, 2008). Hypersexuality has been posited to be related to high impulsivity. It is possible that some of the abused women in the current study had a history of hypersexuality, which might have been expressed through a higher use of the *attraction* schema in their pre-treatment essays. As treatment helped women to process their abuse history, their tendency towards impulsivity and hypersexuality may have decreased, which was then reflected through a reduction in the *attraction* schema.

Previous research has shown that non-abused women write about the *relationship* schema, which focuses on intimacy and connection with a romantic partner, more than abused women (Stanton et al., 2015); therefore we predicted that abused women would write about this schema more over time. Consistent with our hypothesis, the *relationship* schema showed a
significant increase in prominence between the pre-treatment and post-treatment assessments (Figure 1 Panel D), yet this increase was not maintained over time in the follow-up sessions. Women showed a significant decrease in this schema from post-treatment to the follow-up sessions at one month and six months post-treatment. It is possible that the dose provided in this expressive writing treatment (i.e., five 30-minute writing sessions) was not enough treatment to produce reliable changes in this schema. Difficulty in intimate relationships has been conceptualized as a consequence of the disruption of trust that occurs during CSA, especially if the perpetrator is a parent or relative (Cole & Putnam, 1992). Therefore abused women may require more treatment on intimacy issues before they are likely to show similar use of the relationship schema in their writing compared to non-abused women. On the other hand, it is also possible that expressive writing aids abused women more in self-focused elements of sexual self-schemas rather than relational elements of sexual self-schemas. Abused women may feel the need to further develop their independent sexual identities before thinking about their sexuality in a relational context. This difference could indicate that treatment for sexual difficulties in abused women necessitates a greater focus on the self than on the partner or relationship.

The existentialism schema, which invokes concepts associated with meaning-making and reflection (“thought, understand, question, grow”), increased in prominence after treatment. Yet, for this schema, the increase did not occur until the final follow-up session, six months after the end of treatment (Figure 1 Panel F). In this case, both the treatment (five treatment sessions) and assessment (five assessment sessions) writing sessions may have allowed women to engage in meaning-making and reflection on their treatment progress. Meaning making has been defined as a longer-term process than other aspects of therapy (Adler, 2012), suggesting that continuing expressive writing exercises past the initial five treatment sessions may confer additional benefit.
It is also possible that women’s meaning making processes continued beyond the six month follow-up session but since women were not assessed after six months post treatment, we were unable to examine the potential progression of this psychological process. The increase in the existentialism schema could also be related to the design of the study, as the six month follow-up assessment session was women’s final session of an eight to 12 month study process. Women may have waited until the final session to reflect on their entire experience in the study and therefore the increase in the existentialism schema was not observed until this session. If the study had concluded after three follow-up sessions (rather than the five sessions used in the current study), analyses may have identified a change in this schema earlier. Future research with this expressive writing treatment might examine changes in the existentialism theme to help determine the most effective length of treatment.

Changes in the prominence of sexual self-schema themes in women’s essays from pre- to post-treatment provides further validation of the seven themes identified with the MEM by Stanton and colleagues (2015). The seven sexual self-schema themes were consistently observed in the essays written by women at different points in time, suggesting that these themes are reliable over time. This was the first study to compare changes in the use of these themes after treatment and found that many of the themes changed in prominence after the expressive writing treatment, suggesting that the treatment affected women’s sexual self-schemas. Results also indicate that although abused women may focus less on their abuse over time, other elements of their sexual self-schemas, such as the relative importance of virginity and relationships, may remain distinct from the sexual self-schemas of non-abused women even after the abused women’s sexual function has improved.
Findings from the current study on the relative prominence of sexual self-schemas may aid therapists who work with this population. Results indicate that when abused women are asked to engage in expressive writing about their sexuality, they first choose to focus on the abuse and their family and development, and later on existential ideas of reflection, questioning, and growth. Therapists who serve this population may want to experiment with this progression of self-schema themes in psychotherapy treatment. To aid therapists in this process, already existing software could be used that quickly identifies these themes in text or the transcript of a therapy session so that therapists could receive a report of women’s use of schemas for the current session and previous sessions to track treatment progress. It might also be possible to track schemas to determine the appropriate length of treatment. If therapists notice an avoidance of abuse and family and development schemas early in treatment, it may be sign that they are working with a patient who will require more treatment than average to address her concerns. When women begin to use words that are associated with the existentialism schema, it may be an indicator that treatment is advancing towards termination.

In addition to benefits for individual therapy, it may be possible to assess sexual self-schemas in natural language in order to identify women who are at-risk for psychological difficulties related to a history of CSA. Much of the research using topic modeling methods, such as the MEM, analyzes natural language text from the internet (e.g., Boyd et al., 2015; Iliev, Dehghani, & Sagi, 2014). Given the rise in popularity of personal expression in online blogs and social media sites, many people share personal information related to psychopathology online (Prieto, Matos, Álvarez, Cacheda, & Oliveira, 2014). Online text could be analyzed for the seven sexual self-schema themes, particularly for the presence of the abuse and family and development schemas, to help identify women who are struggling with abuse-related issues.
These women could be provided with information about support services for abuse survivors, including information about Meston et al.’s (2015) expressive writing treatment. Women could utilize the expressive writing treatment at home in an effort to process their abuse history and improve their sexual function and overall mental health.

There were a number of limitations in this study that warrant mention. Compared to other studies of natural language use (Chung & Pennebaker, 2008), the sample was relatively small. Additionally, this study used a non-random sample, as all participants were seeking treatment for sexual difficulties. Therefore, these results might not generalize to the larger population of women with a history of abuse and sexual difficulties who are not seeking treatment. Due to attrition in the later follow-up sessions, we were unable to examine the potential relationship between changes in theme prominence and changes in treatment outcomes. A greater understanding of the relationship between sexual self-schemas and sexual and mental health would be helpful information for clinicians interested in assessing natural language use as a marker of treatment progress.

As previously mentioned, women with a history of CSA are at a heightened risk of developing sexual difficulties and fail to respond to existing sex-therapy treatments as well as their non-abused counterparts. To date, researchers have been unable to explain the differences between the sexual problems of these two groups of women. Methods of natural language analysis, such as the MEM, provide a promising new method of looking deeper into the minds of abused women suffering from sexual difficulties. The current study lends further support to the MEM-extracted sexual self-schemas identified previously (Stanton et al., 2015), and demonstrated meaningful changes in certain schemas after expressive writing treatment, suggesting that expressive writing treatment alters women’s sexual self-schemas. Future research
with larger samples of women, possibly gleaned from the internet, are needed to further explore the validity of these themes, and examine their relationship to sexual health. Additional studies may provide a more comprehensive understanding of sexual dysfunction in abused women and could aid in the development of specialized treatments for this underserved population.

References


and physical abuse, Sexual knowledge sexual self-schema and relationship adjustment.

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### Changes in Sexual Self-Schema Theme Prominence over Time

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<td>Both</td>
<td>3.33*</td>
<td>2.92*</td>
<td>.66</td>
<td>.50</td>
<td>.57</td>
<td>1.96</td>
<td>3.00*</td>
<td>2.94*</td>
<td>1.04</td>
<td>1.09</td>
<td>.10</td>
</tr>
<tr>
<td>Sexual activity</td>
<td>No change</td>
<td>.50</td>
<td>1.20</td>
<td>.65</td>
<td>.41</td>
<td>.20</td>
<td>.46</td>
<td>.65</td>
<td>1.16</td>
<td>.20</td>
<td>.72</td>
<td>.52</td>
</tr>
<tr>
<td>Attraction</td>
<td>Decrease</td>
<td>2.65*</td>
<td>1.98</td>
<td>1.83</td>
<td>1.60</td>
<td>3.07*</td>
<td>.07</td>
<td>.23</td>
<td>1.23</td>
<td>.16</td>
<td>1.27</td>
<td>1.41</td>
</tr>
<tr>
<td>Existentialism</td>
<td>Increase</td>
<td>2.34†</td>
<td>.35</td>
<td>.31</td>
<td>.06</td>
<td>2.73*</td>
<td>.59</td>
<td>.25</td>
<td>2.20</td>
<td>.32</td>
<td>2.69</td>
<td>2.35</td>
</tr>
</tbody>
</table>

*Note.* Statistics are presented for overall differences and pairwise comparisons between sessions. T1 through T5 represent the pre-treatment (T1), post-treatment (T2), two week follow-up (T3), one month follow-up (T4), and six month follow up (T5) sessions respectively. Degrees of freedom for the overall tests were 4, 265.

† p < .06, * p < .05, ** p < .01, *** p < .001
CHANGES IN SEXUAL SELF-SCHEMA

A)

B)

C)

D)
Figure 1 Panel A. Changes in the use of the family and development theme over time. Women showed a significant decrease in their use of this theme between the pre-treatment and post-treatment sessions that was maintained through the follow-up sessions.

Figure 1 Panel B. Changes in the use of the virginity theme over time. Women showed a significant decrease in their use of this theme between the pre-treatment and post-treatment sessions that was maintained through the follow-up sessions.

Figure 1 Panel C. Changes in the use of the abuse theme over time. Women showed a significant decrease in their use of this theme between the pre-treatment and post-treatment sessions that was maintained through the follow-up sessions.

Figure 1 Panel D. Changes in the use of the relationship theme over time. Women showed a significant increase in their use of this theme between the pre-treatment and post-treatment sessions. Then women showed a significant decrease in the use of this theme between the post-treatment and one month follow-up sessions, and the post-treatment and six month follow-up sessions.
Figure 1 Panel E. Changes in the use of the *attraction* theme over time. Women showed a significant decrease in their use of this theme between the pre-treatment and six-month follow-up sessions.

Figure 1 Panel F. Changes in the use of the *existentialism* theme over time. Women showed a significant increase in their use of this theme between the pre-treatment and six-month follow-up sessions.