Arch Sex Behav (2007) 36:67–77
DOI 10.1007/s10508-006-9076-9

ORIGINAL PAPER

Sexual Desire and Linguistic Analysis: A Comparison of Sexually-Abused and Non-Abused Women

Alessandra H. Rellini · Cindy M. Meston

Received: 26 September 2005 / Revised: 6 February 2006 / Accepted: 11 February 2006 / Published online: 30 November 2006

Abstract Although studies have identified a relationship between a history of child sexual abuse (CSA) and problems with hypoactive sexual desire, little is known about the potential cognitive and affective mechanisms involved in the sexual desire of women with a history of CSA. In this study, 27 women with a history of CSA and 22 women with no history of abuse were asked to write about sexual and non sexual topics. The Linguistic Inquiry Word Count software program was used to compute the percentage of words that fell into positive emotions, negative emotions, body, and sex categories. As expected, women with a history of CSA used more negative emotions words when writing about sexual topics, but not non-sexual topics, compared to non-abused women. Women with a history of CSA also used more sex words when writing about the non-sexual topics compared to non-abused women. Frequencies of body and sex words used in the sexual texts were positively linked to levels of sexual desire function. This association was not different between women with and without a history of CSA. A history of CSA remained an independent predictor of levels of sexual desire dysfunction even when taking into consideration the language used in the sexual texts, indicating that there may be aspects of the sexual desire experienced by women with a history of CSA that differ from non-abused women that remain unexplored.

Keywords Language · Child sexual abuse · Sexual desire · Sexual function · Linguistic analysis

A. H. Rellini · C. M. Meston (✉)
Department of Psychology, University of Texas at Austin,
One University Station A8000, Austin, Texas 78712
e-mail: meston@psy.utexas.edu

Introduction

Reviews of studies on women with a history of child sexual abuse (CSA) have reported that, in both community and clinical samples, a history of CSA is associated with low sexual desire during adulthood (e.g., Leonard & Follette, 2002; Loeb et al., 2002). This relationship is less clear among women recruited from a student population (e.g., Meston & Heiman, 2000; Rind, Tromovitch, & Bauserman, 1998), a sign that women with a history of CSA may be a heterogeneous group (Loeb et al., 2002). The potential negative consequences of low sexual desire on the development and maintenance of intimate relationships (Brezsnyak & Whisman, 2004) warrants a more thorough understanding of sexual desire in women with a history of CSA. To date, only a few studies have addressed the potential cognitive and affective processes involved in the sexual desire of women with a history of CSA.

Research examining the cognitive effects of sexual abuse could elucidate the nature of sexual desire concerns experienced by women with a history of CSA. Women with a history of CSA often display unusually high levels of attention for trauma or threat-related information (Amir, McNally, & Wiegartz, 1996), and show memory impairments that are not attributable to non-trauma factors, such as IQ or education levels (Bremner et al., 1995; Gray & Lombardo, 2001). Sexually abused women who develop posttraumatic stress disorder allocate more cognitive resources toward threatening stimuli than non-threatening stimuli (e.g., Foa, Feske, Murdock, & Kozak, 1991). They also show more attentional biases towards trauma related, but not neutral, words as compared to healthy controls (Cassiday & Lyons, 1992; Foa et al., 1991; Golier, Yehuda, & Southwick, 1997; Yehuda et al., 1995). Changes in cognitive processes (e.g., interpretation, storing, and retrieval of information) were identified

in women with a history of CSA, including an altered sense of the self and the world (Ehlers & Clark, 2000). Taken together, these findings suggest that cognitive processes employed to interpret and react to the world may differ between women with and without a history of CSA. In particular, the cognitive mechanisms that may be affected by a traumatic event are attentional biases, interpretation, storage, and retrieval of sexual information. Given that the traumatic experience in women with a history of CSA is centered on a sexual behavior, it is feasible that some of the cognitive mechanisms involved in the interpretation and reaction to sexual stimuli may be impaired among these women.

Indeed, the literature provides initial evidence for a difference in the cognitive process of sexual stimuli between women with and without a history of CSA. Implicit measures of sexually-relevant information networks showed that women with a history of CSA differed from non-abused women in that they linked negative affect to sexual words (Meston & Heiman, 2000). Compared to non-abused women, women with a history of CSA also showed a significantly less positive view of the sexual self (Meston, Rellini, & Heiman, 2006) as measured by the Sexual Self-Schemas Scale (Andersen & Cyranowski, 1994). Views of the self as passionate and romantic were negatively linked to feelings of anxiety experienced during sexual activities with a partner among women with a history of CSA. While these studies provide initial evidence for a difference in cognitive processing of sexual information (e.g., acquisition, interpretation, and retrieval) between women with and without a history of CSA, it remains unclear how these differences are linked to sexual dysfunction in women with a history of CSA. Another limitation of previous studies is the use of self-report methods. Although self-report questionnaires provide important data regarding women's explicit self-schemas, they are limited by demand characteristics and the reliance on introspection for the responses (Nosek, Greenwald, & Banaji, 2005). More indirect measures have been deemed more apt at detecting cognitive processes with less influence of introspection.

Recently, a number of researchers have used computerized text analyses, a standardized method to analyze spoken and written language, as a potentially useful method to acquire quantitative information that is not affected by the same limitations imposed by questionnaires. Text analysis has been used since the late 1960s (e.g., Gottschalk & Gleser, 1969; Stone, Dunphy, Smith, & Ogilvy, 1966). This method was first adopted to make psychodynamic interpretations of the content of people's writings. Initially, this methodology required intense training and often resulted in unreliable data. Later versions of text analysis became more sophisticated and strived to improve reliability and validity. Currently, one of the text analyses most commonly used is the frequency count of words that fall within pre-established categories (e.g., pronouns, negative emotions, positive emotions, sex, and body; Pennebaker, 2000; Stiles, 1992; Stone et al., 1966; Weintraub, 1989). The assumption behind this type of text analysis is that an individual experiencing happiness is more likely to use words such as *happy*, *joy*, *laugh*, and *smile*. Pennebaker and King (1999) provided evidence that the vocabulary that people use to express themselves is a stylistic behavior and can provide important information regarding the personal views of the self held by the individual. Texts written on a variety of topics showed moderate to strong correlations with achievement motives (King, 1995), personality characteristics (Pennebaker & King, 1999), and psychological diagnoses, such as depression (Schnurr, Rosenberg, & Oxman, 1992), suicidality (Thomas & Duszynski, 1985), and somatization disorders (Oxman, Rosenberg, Schnurr, & Tucker, 1988). One commonly used program to analyze text is the Linguistic Inquiry Word Count (LIWC; Pennebaker, Francis, & Booth, 2001).

Computerized text analysis is quite different from a qualitative approach to content analysis in that sentences such as "I am not satisfied" would code the word "satisfied" as positive emotions while a sentence such as "I am dissatisfied" would code "dissatisfied" as a negative emotion. In content analysis, both sentences would be coded as indicative of negative affect. Computerized text analysis is based on evidence that there are differences between people who choose to use the word "not satisfied" compared to those who use the word "satisfied." If differences in word choice were linked to CSA or to sexual function, text analyses could be used to assess dimensions of cognitive processes that are more indirect and less likely to be under the conscious manipulation of the individual.

It is feasible that a linguistic analysis of sexually relevant texts would enrich our understanding of the cognitive process of sexually relevant information among women with a history of CSA. In particular, by quantifying the frequency of linguistic variables (e.g., positive emotions), the LIWC analysis allows one to explore the relationship between these linguistic variables and a history of CSA or sexual function. An additional advantage of linguistic analysis over self-report measures is that it is less direct and therefore it is likely less affected by demand characteristics. In contrast to self-report questionnaires that ask participants to choose an answer that has been already pre-determined, text analysis affords more freedom to the individual to explore more general topics. For instance, while a questionnaire on self view may ask a participant to check the extent to which she perceives herself according to specific dimensions, when using a text analysis methodology, the participant would simply be asked to write about the way she sees herself. Both tasks are probably affected by demand characteristics in that, in both cases, the participant is likely to try to present a more positive view. However, text analysis may focus on aspects of self view that

are not readily apparent, such as frequency of words related to the body or frequency of words related to references to other people.

Theoretical frameworks of the long term effects of trauma can be useful for the development of hypotheses on linguistic differences between women with and without a history of CSA. Herman's (1992) psychodynamic model of trauma recovery points to developmental blocks caused by the trauma that impedes the formation of healthy relationships. In particular, Herman's theory highlights feelings such as shame and anger as key emotions that negatively affect the ability of the individual to trust the self and others. Herman described the child enduring physical or sexual abuse as trapped in the ambivalence of having to rely on the perpetrator for care and nurturance. The child resolves this ambivalence by attributing the cause of the pain to some innate flaw in the self, which often leads to an alienation of the individual from the self and others. In agreement with this theory, studies have found that women with a history of CSA report feeling angry at, and distant from, their own bodies during sexual activities (Wenninger & Heiman, 1998). Also, as previously mentioned, people who experienced traumatic events allocate more cognitive resources and show a greater focus on trauma related words (McNally, 1997). Herman's trauma recovery theory would likely explain the distance from one's body as a feeling of distrust towards the most basic elements of one's life, such as the body. The focus on trauma-related information could be interpreted as an attempt to make sense of aspects of life that the trauma survivor is trying to work through. Replaying the traumatic event through memories, flashbacks, and, at times, through behaviors, has been interpreted by Herman as an attempt to solve the ambivalence and the conflicts caused by the abuse. Indeed, studies on trauma memories point to a link between treatment and improvement in the fragmentation of thoughts and memories of the abuse (Foa, Molnar, & Cashman, 1995). This link indicates that people who had traumatic histories may experience confusion regarding the trauma and trauma-related information. As further evidence of a connection between language and cognitive processes, a study found that as trauma treatment progresses and the distress caused by the traumatic memories decreases, the coherence of the speech and the narrative of the traumatic memories increases (Foa et al., 1995).

The ambivalence of sexually abused women towards the self and others, described by Herman (1992), can be expanded to explain the relationship these women have with sexuality. Sexuality is both an attempt to re-establish a connection with others and, at the same time, may represent a source of pain. In this sense, sexually abused women experiencing sexual difficulties would be expected to show a high preoccupation with sex in an attempt to make sense of the ambivalence they have towards sexuality. Similarly, if a sexually abused woman experiences conflicts regarding her body, she would likely utilize more cognitive resources trying to understand her relationship with her body. Thus, preoccupation with sex and with the body would appear through text analysis as a higher frequency of sex and body words. Also, in agreement with both Herman's model and past studies that link negative affect and sex in sexually abused women (Meston & Heiman, 2000; Meston et al., 2006), a history of CSA would be expected to be associated with fear or anxiety during sexual activities with a partner.

The present investigation was designed to examine differences in the language used by sexually abused women and non-abused women when writing about sexuality and, if so, whether these differences were linked to levels of sexual desire function. Based on research indicating that sexually abused women tend to link negative affect to sexual stimuli (Meston & Heiman, 2000), we hypothesized that sexually relevant texts written by sexually abused women would show a higher frequency of negative emotions and a lower frequency of positive emotions as compared to texts written by women with no history of abuse. Additionally, based on studies that found an over-preoccupation with trauma-related behaviors (e.g., Amir et al., 1996), and based on Herman's (1992) model on trauma and recovery, the sexual desire function of sexually abused women was expected to be linked to a higher frequency of sexual and body words used when writing sexually relevant texts. An additional aim of this study was to establish whether the language utilized in sexually-relevant texts was linked to levels of function in sexual desire. It was expected that the language used in the sexually relevant texts would be linked to sexual desire, but not the language used in non-sexual or neutral texts.

Method

Participants

Participants were recruited from the community through advertisements in a free local newspaper with a readership of over 263,500. The advertisement called for women with and without a history of unwanted sexual experiences to participate in a study on women's sexual thoughts and behaviors. During a brief phone screening, the interviewer assessed a history of CSA using a definition based on the Life Stressor Checklist Questionnaire (Wolfe & Kimerling, 1997): "Have you had sex (oral, anal, genital) before age 16 when you did not want to because someone forced you in some way or threatened to harm you if you didn't?" Such behaviorally-specific questions have been found to be more sensitive in assessing a history of CSA as compared to more subjective questions such as "Have you been sexually abused?" (Wyatt, 1991). Of the 27 sexually abused women, 14 reported

Table 1 Demographics of women with and without a history of child sexual abuse

	CSA ($n = 27$)		Comparison group ($n = 22$)		
	M	*SD*	*M*	*SD*	*t*
Age (in years)	32.8	9.4	29.6	7.9	− 1.24
Length of relationship (in months)	28.4	33.7	42.9	50.5	− 0.95
Beck Depression Inventory	14.0	8.5	6.86	6.5	− 3.23**
No. of sexually traumatic events	6.4	5.0	0.0	0.0	
Age of sexual abuse onset (in years)	8.0	10.6			
Age sexual abuse ended (in years)	10.6	3.4			
Duration of abuse (in years)	3.2	3.7			
	n	%	*n*	%	*L.R.*
Marital Status					0.74
Single	6	22.2	7	31.8	
Committed relationship	12	44.4	10	45.5	
Married	9	33.3	5	22.7	
Ethnicity					3.59
Caucasian	16	59.3	13	59.1	
Hispanic	7	25.9	5	22.7	
African-American	4	14.8	2	9.1	
Asian-American	0	0.0	1	4.5	
Income					0.21
<$20,000	17	63.0	15	68.2	
Education					1.34
High school	7	25.9	8	36.4	
Some college/graduate degree	20	74.1	14	63.7	

**$p < .01$.

an incident of sexual abuse after age 16 (age range, 16–32 years).

Table 1 provides information on group demographics. Based on the results of likelihood ratio statistics, no statistically significant group differences in ethnicity, education, type of relationship (i.e., dating, committed relationship or married), or income were found. The groups also did not differ significantly in age and length of relationships.

Three of the women in the CSA group and three women in the comparison group were excluded from data analyses because the essays they wrote for the study were too short to be analyzed (<80 words). The shortest essay after eliminating these 6 essays was 133 words. Despite an initial screening of women who experienced sexual abuse during adulthood, five women in the comparison group reported during the study a history of adult sexual abuse and were, therefore, excluded from the analyses. The final sample consisted of 27 sexually abused women and 22 non-abused women.

Measures

A demographic questionnaire was used to collect data on age, ethnicity, education level, family income, and type of relationship (i.e., dating, committed relationship or married). Levels of sexual function were assessed with the Female Sexual Function Index (FSFI; Rosen et al., 2000). The 19 items in this scale were rated on a 5-point Likert scale; higher scores indicate higher levels of functioning. The FSFI was validated on women with and without hypoactive sexual desire disorder and has shown acceptable inter-item correlations (over .74) and ability to distinguish women with and without a clinical diagnosis of hypoactive sexual desire disorder (Meston, 2003). A score over 26.5 in the FSFI full scale has been found to be the most sensitive cut off between women with and without sexual dysfunction (Wiegel, Meston, & Rosen, 2005). The questionnaire has been divided into the domains of desire, arousal, lubrication, orgasm, satisfaction, and pain.

The Life Stressor Checklist Questionnaire (Wolfe & Kimerling, 1997) was used to assess the type of sexual abuse in the participants' lives. This questionnaire asks women to report age of first event, frequency, and type of event for 30 different types of sexual and non-sexual stressful events. A total number of traumatic sexual events was calculated by counting each event in which the participant indicated having experienced intense horror, fear, or helplessness (Table 1).

The Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988) was used to assess the severity of depression. This 21-item scale has been extensively used for the assessment of depressive symptoms in clinical and non-clinical populations. The items are scored on a 0–3 point scale, where higher scores indicate a higher level of depressive symptoms (range, 0–63). Given the link between depression and language (Schnurr et al., 1992), the BDI was administered to

control for differences in language attributable to levels of depression per se rather than a history of CSA. Additionally, depression is often accompanied by negative thoughts, perseveration, and preoccupation, which may confound potential group differences on how women with and without a history of CSA write about sexual and non-sexual topics.

Linguistic analysis

A computer-aided linguistic analysis was conducted using the LIWC, a program that computes the percentage of words in each essay that fall within preset categories. The dictionary used by the LIWC is composed of 345 words associated with negative emotions, 265 words that express positive emotions, 202 body words, and 96 sex words. Originally, the words in each category were selected by three independent judges who agreed on which category each word should fall. In the development of LIWC, approximately 1.6 million words coming from texts collected from 1,695 writers were used to ensure the dictionary was comprehensive and valid. Judges stopped including words in the text after LIWC showed the ability to recognize approximately 80% of the words in any given text (for more information, see Pennebaker et al., 2001). This study utilized four of the original word categories computed with LIWC: positive emotions (e.g., *sweet*, *tender*, and *fantastic*), negative emotions (e.g., *annoying*, *violent*, *scary*), body (e.g., *shoulder*, *skin*, *breast*), and sex (e.g., *erection*, *sex*, *kiss*).

Participants were instructed to write continuously on a personal computer for 20 min on each of three topics presented by the experimenter. As per the guidelines provided by Pennebaker (1994) on how to conduct writing studies, participants were encouraged to write continuously and ignore spelling, grammar, and punctuation. To increase participants' comfort with writing personal material, they were given the option of deleting their essays at the end of the study. All participants submitted their essays.

Neutral essay. Women were asked to write about their previous day. They were encouraged to focus on the events and to be as detailed and objective as possible. This essay was used as a way to control for individual differences in writing style not associated with thoughts about sex since the focus of this study was specific to sexually relevant language rather than language in general. This type of essay has been used as a control condition in several past writing studies (Pennebaker, 1989).

Fantasy essay. Participants were instructed to: "Write a detailed account of your sexual fantasies. Fantasies are anything that you consider a 'turn on.' Specifically, write about what makes that particular sexual fantasy sensual to you." Sexual fantasies were considered a good topic for a sexual essay because they refer to sexual activities that do not require the participation of other people and therefore are more likely to reflect personal views of sexuality not affected by interaction with others (Dubois, 1997).

Picture essay. Participants were asked to write a story based on a picture (see Appendix) depicting a woman sitting on a bed looking out of a window and a man approaching her from behind. Participants were asked to write about what they thought the people in the picture were doing, what happened before, what was happening at that moment, and what would happen next. The picture was purposely ambiguous to facilitate both positive (e.g., romantic) and negative (e.g., danger) interpretations. The picture essay was used as a reflection of the personal interpretation of sexually ambiguous stimuli.

Procedure

Participants that contacted the Female Sexual Psychophysiology Laboratory to inquire about the study were told that the study aimed at investigating how women with and without a history of sexual abuse viewed sexuality. A trained research assistant conducted a short standardized phone screening to assess inclusion and exclusion criteria. Exclusion criteria were: presence of traumatic experiences that occurred in the previous four months, sexual abuse that occurred in the previous two years, and current involvement in a sexually abusive relationship. The four month waiting period for the trauma experience was selected to screen out individuals who were experiencing acute stress or who may have been going through the normal process of recovery after a traumatic event, which is estimated to last 2 to 4 months (American Psychiatric Association, 2000). Two years were selected for sexual abuse rather than four months because we purposely wanted to focus on a group of women with unresolved problems due to the sexual abuse. Presence of an abusive intimate relationship was assessed by asking women whether their current partner ever forced them to have sex against their will. Inclusion criteria were: over the age of 18, more than a 5th grade education, and English native speaker. Participants with no history of CSA were excluded from the study if they reported a sexually abusive experience during adulthood. Participants in the CSA group were included in the study if they reported a history of CSA as previously defined. At the end of the screening, participants were given a brief description of the study and were scheduled for their first visit. A total of 71 participants called in regard to this study; 52 women qualified for the study and data from the two-session study was analyzed for 49 women. Individual visits were scheduled on two consecutive days during which participants completed the questionnaires and wrote the three essays (20 min per essay) on a computer located in a private

Table 2 Group differences in levels of sexual function as measured with the Female Sexual Function Index

	CSA ($n = 27$)		Comparison group ($n = 22$)			
	M	*SD*	*M*	*SD*	*t*	*d*
Desire	3.70	1.31	4.44	0.90	2.25*	0.66
Arousal	3.79	1.55	4.84	1.58	2.30*	0.67
Lubrication	4.45	1.57	4.92	1.78	0.96	0.28
Orgasm	3.92	1.75	4.64	1.92	1.34	0.39
Satisfaction	3.12	1.70	4.25	1.89	2.17*	0.63
Pain	4.88	1.48	5.03	1.91	0.32	0.09
Full scale	23.86	7.10	28.14	8.67	1.86	0.54

Note. Cohen's $d = (M_1 - M_2)/\sigma_{pooled}$

*$p < .05$.

room. During the first visit, participants were instructed to write the fantasy essays and during the second visit they wrote the picture essay followed by the neutral essays. In an attempt to reduce any type of carry over effect from the questionnaires or the other essays written in the study, the fantasy essay was always the first essay participants wrote and it was written during the first visit. Since sexual fantasies are assumed to be associated with sexual desire, and hormone levels have an impact on women's desire (Regan, 1999), the visits were scheduled between the 16th and 28th day of the participants' menstrual cycle to control for hormonal fluctuations. At the end of the study, participants were debriefed and compensated $50 for their time.

Results

Group scores on all the FSFI domains are shown in Table 2. Women in the CSA group showed significantly higher levels of sexual desire dysfunction assessed by the FSFI, $t(47) = 2.25$, $p < .05$, as compared to women in the comparison group. Women with a history of CSA scored, on average, in the dysfunctional range of the FSFI full scale while women in the comparison group scored, on average, in the functional range (cut off 26.5; Weigel et al., 2005).

Concerning the linguistic variables (Table 3), no significant group differences in word frequency type were observed for the sexual fantasy essay. Women with a history of CSA used, on average, significantly more words in the negative emotion category and significantly less words in the sex category when writing the picture essay. In the neutral essay, abused women used, on average, significantly more positive emotions and, on average, significantly more sex words. Severity of BDI depressive symptoms was not significantly associated with any of the language domains (Pearson *r* range, −.12 to .26); therefore, BDI scores were not used in the subsequent analyses.

In order to test whether language provided information on the sexual function of women with a history of CSA, we conducted three sets of partial correlations (one for each essay) between sexual desire, CSA, and the four selected word categories (i.e., body, sex, positive emotions, and negative emotions) as shown in Table 4. This type of correlation allowed the investigation of the interaction between two variables (e.g., sexual desire and body words) while controlling for the effect of the other variables (e.g., sex, positive emotions, negative emotions, and CSA).

Based on these correlations, variables that showed a significant link with desire were included in a hierarchical linear regression composed of two blocks: block one included CSA as the sole predictor, while block two included CSA and language variables (e.g., body) as illustrated in Table 5. This design allowed for testing whether language provided an additional explanation of sexual desire originally explained by

Table 3 Mean number of word type as a function of group and essay type

Essay type	CSA group ($n = 27$)		Control ($n = 22$)			
	M	*SD*	*M*	*SD*	*t*	*d*
Fantasy						
Sex	2.79	1.53	2.79	1.31	0.01	0.00
Body	1.88	1.82	1.25	0.92	1.26	0.44
Positive emotions	3.36	1.73	2.74	1.22	1.22	0.42
Negative emotions	1.01	0.76	0.70	0.57	1.39	0.46
Picture						
Sex	0.63	0.50	1.30	1.06	−2.69**	0.81
Body	1.50	1.10	1.99	1.27	−1.31	0.41
Positive emotions	2.98	1.26	3.43	1.74	−0.97	0.30
Negative emotions	2.20	1.18	1.35	1.03	2.41*	0.77
Neutral						
Sex	0.26	0.25	0.05	0.12	3.28**	1.07
Body	1.02	0.75	1.10	0.70	−0.35	0.11
Positive emotions	1.34	0.89	0.85	0.58	2.04*	0.65
Negative emotions	0.57	0.46	0.37	0.32	1.56	0.51

Note. Cohen's $d = (M_1 - M_2)/\sigma_{pooled}$.

*$p < .05$; **$p < .01$.

Table 4 Partial correlation coefficients for each essay of FSFI desire domain with CSA and language variables

Essays	CSA	Body	Sex	Positive emotion	Negative emotion
Fantasy	− .42**	− .04	− .03	.33*	.07
Picture	− .40**	.51***	.24	.07	− .51
Neutral	− .40**	− .01	− .17	.25	.09

Note. CSA (child sexual abuse) was a binary variable (CSA vs. no CSA).

*$p < .05$; **$p < .01$; ***$p < .001$.

a history of CSA. A significant F change ($F\Delta$) in block two would mean that the variables included in this block added a significant contribution to the explanation provided by a history of CSA alone. An analysis of the regression coefficients allowed further insight into which variables more strongly contributed to the model. Since the three types of essays were expected to show different patterns, a separate hierarchical linear regression was computed for each essay.

Fantasy essay

A partial correlation identified a significant relation between sexual desire and positive emotion ($r = .33$) (Table 4); therefore, positive emotion was used in the following hierarchical regression. Frequency of body words, sex words, and negative emotions were not linked to sexual desire. CSA was entered in the first block and positive emotion was entered in the second block of the hierarchical regression (Table 5). Desire was the outcome variable. CSA alone significantly predicted 15% of variance in levels of sexual desire. Adding positive emotions to the model explained 30% of sexual desire, which corresponded to a significant increase ($F\Delta = 8.30$, $p < .01$). An analysis of the regression coefficients showed that positive emotions and CSA independently contributed to the explanation of sexual desire. As expected, positive emotions were positively associated with levels of sexual desire while CSA showed a negative link. To explore further whether the link between positive emotions and sexual desire differed according to a history of CSA, an interaction variable (CSA × PosEm) was added to the second block of the regression. The CSA × PosEm interaction did not show a significant regression coefficient ($\beta = .685$, $t = 1.65$, $p = .11$), indicating that there was no significant difference between women with and without a history of CSA in the way in which positive emotions expressed in the fantasy essay were linked to sexual desire.

Table 5 Regression statistics of FSFI desire on CSA, language variables and interaction between CSA and language variables for each essay

	R^2	$F\Delta$	β	t	p
Fantasy essay					
Block one	.15				
CSA			− .418	− 2.73	.010
Block two	.30	8.30			
CSA			− .481	− 3.38	.002
Positive emotion			.390	2.63	.013
Picture essay					
Block one	.15				
CSA			− .418	− 2.73	.010
Block two	.31	9.94			
CSA			− .293	− 2.10	.043
Body			.440	3.15	.003

Picture essay

As a manipulation check, we read each picture essay to identify whether the picture elicited a sexual story. Of 60 stories based on the picture that were collected in a pilot study, 56 described sexual behaviors, indicating that the common interpretation of the picture led to the narration of a sexual interaction. Partial correlations were computed on the 49 texts used in this study. When all language variables (i.e., positive emotions, negative emotions, sex, and body) and CSA were used, the model showed a significant link between desire and body words ($r = .510$, $p < .001$).

A hierarchical linear regression used CSA in the first block while body was added in the second block. As previously observed, block one (i.e., CSA) accounted for a significant portion (15%) of variance in desire. Block two (i.e., body words) added a significant contribution to block one (31%, $F\Delta = 9.94$, $p < .05$). An investigation of the regression coefficients revealed that both body words and CSA provided an independent significant contribution to the explanation of levels of desire. Higher frequencies of body words in the picture essay were associated with higher levels of sexual desire in the FSFI desire domain while CSA had a negative association (Table 4). An interaction variable between a history of CSA and body language (CSA × body) was included in the second block of the hierarchical regression. The interaction variable did not show a significant unique contribution ($\beta = .285$, $t = 1.15$, $p = .26$), suggesting that women with and without a history of CSA did not differ in the way in which body words were linked to sexual desire.

Neutral essay

Partial correlations indicated that none of the language variables from the neutral essay had a significant link with sexual desire (Table 4). Because of the lack of significant correlations, no regression was computed between CSA and sexual desire.

Discussion

Despite evidence of sexual desire problems among women with a history of CSA, little is known regarding the role of cognitive and affective processes associated with their low sexual desire. Based on prior work indicating that linguistic analyses provide information on cognitive mechanisms, this study investigated the link between sexually relevant language and sexual desire in women with and without a history of CSA. Results from this study provide initial evidence that linguistic analyses can be useful for understanding the cognitive and affective processing of sexually relevant information associated with levels of sexual desire in women with and without a history of CSA.

As predicted, women with a history of CSA used significantly more negative affect words when writing about a sexual story based on a picture. In the picture essays written by non-abused women, the female character "was in love," "was thinking of a tender and sweet day with her partner," while the female character in the essays written by women with a history of CSA was "in the middle of a fight," "feeling trapped," "a prisoner," "being forced" and at times was "sad" because someone in her life died. Since all women were provided with the same picture, it can be inferred that the difference in interpretation was the product of internal cognitive processes. These findings are supported by previous literature that showed a link between sexual information and negative emotions in women with a history of CSA (Meston & Heiman, 2000). The fantasy essay did not show a significant difference in frequency of negative emotions between women with and without a history of CSA. The lack of a group difference may be the product of the nature of the essay topic. When participants were asked to write about what made them sexually aroused, they may have selected arousing images or ideas associated with positive affect because of the shame or embarrassment that may be elicited by sexual fantasies linked to negative emotions. Thus, the results observed in this study may reflect a ceiling effect in that all essays had a large number of positive affect words.

Contrary to expectation, women with a history of CSA used less sex words than women with no history of CSA. Also, frequency of positive emotions used in the fantasy essay and references to the body used in the picture essay were moderately, positively correlated with levels of sexual desire. This indicated that women who were more likely to focus on positive emotions when thinking of their sexual fantasies and who wrote about the bodies of the characters in the picture had higher levels of sexual desire.

Based on Herman's (1982) model and on past research that found a greater amount of cognitive resources to be allocated to trauma-related stimuli (Amir et al., 1996), we expected a greater number of sex and body words used by women with a history of CSA to be associated with more sexual desire dysfunction. The fact that this hypothesis was not confirmed may signify that problems with sexual desire in women with a history of CSA are not linked with an over-preoccupation or the re-experiencing aspect of the trauma explained by Herman in her model of trauma and recovery. Also, in their traumatic sexualization model, Finkelhor and Browne (1985) described sexual problems experienced by women with a history of CSA as linked to an over preoccupation with sex. The present study did not find evidence that the sexual desire problems experienced by women with a history of CSA were linked to a greater focus or attention on sexually explicit stimuli. Alternatively, it may be that, since both essays used in this study elicited sexual topics, there may have been a ceiling effect of the sexual words. Alternatively, it may be possible that the oversexualization of sexually abused women consistently observed by researchers and clinicians may not be directly linked with sexual function or sexual desire.

An oversexualization of sexually abused women may be more visible when asking them to write about non-sexual topics; in fact, women with a history of CSA wrote more about sex in the neutral essay compared to non-abused women. However, the greater frequency of sex words used in the neutral essay was not linked to problems with sexual desire, indicating that although an oversexualization of the individual may occur in women with a history of CSA, it does not appear to explain the sexual desire problems experienced by these women.

This finding to suggests that the etiology and mechanisms of sexual desire problems of women with a history of CSA may not differ from women with no history of CSA, or, at least, may not differ in the dimensions tested in this study, which included the explicit expression of positive and negative affect and the focus on body and sexual stimuli. What remains unanswered is whether there is a difference between women who have been re-victimized during adulthood and those who have not. The small sample in this study prevented us from investigating potential group differences associated with revictimization. It is feasible that women who have been re-victimized may hold a stronger negative view of their sexuality. However, it is also feasible that other characteristics of the abuse, such as frequency of the abuse, age of onset, relationship with the perpetrator, and behaviors that occurred during the abuse are associated with the processing of sexual information. Variables such as these have shown to be highly correlated with each other. Future studies that use a more comprehensive definition of CSA may be able to identify more specific differences between women with different histories of sexual abuse.

Interestingly, the differences in language noted between women with and without a history of CSA did not appear to provide an explanation for sexual function in the domain of sexual desire. The partial correlations computed on sexual

desire and the language variables did not show a significant relationship between levels of sexual desire and sex words or negative emotions used in the picture story. There are many possible interpretations of this finding. One interpretation is that the cognitive differences between women with and without a history of CSA investigated in the study were not active components of sexual dysfunction in sexually abused women. Thus, the interpretation of ambiguous stimuli or sexual fantasies may not capture the differences in women with and without a history of CSA connected to levels of sexual desire. It is also plausible that there may be no differences in cognitive processes involved in the sexual desire of women with and without a history of CSA, meaning that the hypoactive sexual desire dysfunction experienced by women with a history of CSA may be based on the same etiological principles of the hypoactive sexual desire disorder of women with no history of sexual abuse. If this were the case, there would not be the need to develop a hypoactive sexual desire treatment specific to women with a history of CSA. However, the fact that CSA was independent from language in the prediction of sexual desire indicates that there were aspects of sexual desire among women with a history of CSA that were unique and not explained by the language variables explored in this study.

While in the fantasy and the picture essays language was found to be significantly associated with sexual desire, none of the linguistic variables computed for the neutral essay showed a relationship with sexual desire. This finding provides initial evidence of the validity of linguistic analysis to assess cognitive mechanisms linked to sexuality. Indeed, if the association between language and sexual desire was specific to aspects of language used only when writing sexually relevant topics, it is feasible to assume that the cognitive mechanisms that transpired through the language were also specific to sexually relevant information. However, future studies that analyze the sexual language of women with no history of CSA and with and without hypoactive sexual desire disorder are needed to further elucidate the association between sexually relevant language and sexual abuse.

It is interesting to note that the two sexually relevant essays used in this study showed a link with sexual desire through different word categories: the fantasy essay with positive emotions and the picture essay with body words. This suggests that focusing on body or positive emotions is not always an indication of high sexual desire. The two essays may have activated different beliefs about sexuality such that different topics may call for different beliefs and emotions, which may be differentially associated with sexual function. That is, a low level of positive sexual affect while writing about one's sexual fantasy may be an indication of low sexual desire but this may not be the case when writing a story in response to a picture of two strangers. If this interpretation is correct, we would expect that the use of different essays may be able to activate additional beliefs that are also closely related to sexual function specific to women with a history of CSA. Future studies that focus on a greater variety of sexually relevant essays may be able to provide a more complete picture of the cognitive processes involved in the interpretation and expression of sexually related information.

Compared to women with no history of sexual abuse, women with a history of CSA used more positive emotion and sex words when they were asked to give an objective account of their day (neutral essay) but used more negative emotions words and less sexual words when writing a story in response to an ambiguous picture (picture essay). These findings are initial evidence of a difference in the way women with and without a history of CSA process sexual information, although this may not be associated with their sexual function. It is important to note that the great majority (97%) of the participants described a sexual interaction in their picture essay. In the essays written by women with a history of CSA, the frequency of the sexual words, and therefore the focus on the sexual aspect of the story, was lower than in women with no history of CSA.

A few limitations of this study warrant mention. The sample size may not have been large enough to detect small differences between groups. However, word categories that differed significantly between groups showed large effect sizes ($\eta^2 = .10$–$.22$), suggesting that, when present, the linguistic differences can be detected with small samples. Factors relating to recruitment and sample selection also need to be taken into consideration. Women knew that the study was going to be on sexuality; thus, it is feasible that women with a history of CSA with more severe levels of sexual dysfunction may not be represented in the study. Indeed, the average levels of FSFI full scale was 23.86, which is only 3 points below the cut off for sexual dysfunction (Wiegel et al., 2005). Also, although linguistic analysis is less threatened by demand characteristics, it is still feasible that participants may have engaged in hypothesis guessing or may have felt pressure to conform to what they perceived was the goal of the study since they were aware the study was on sexuality in women with a history of CSA. Finally, CSA was defined as a categorical variable, causing heterogeneous groups of women with a history of CSA to be combined, such as women with and without a history of re-victimization during adulthood. Given the high rates of revictimization among women with a history of CSA, it is feasible that many of the women who participated in this study may have been victimized as adults, thus obscuring the extent to which our results were associated with childhood or later sexual abuse.

In conclusion, quantitative linguistic analyses, such as that computed with the LIWC, appear to be useful for the investigation of cognitive processes associated with sexual function

in the area of sexual desire. Although differences were observed in the language used by women with and without a history of CSA, these differences were not linked to levels of sexual desire raising the question of whether it is necessary to approach the diagnoses and treatment of hypoactive sexual desire disorder differently in women with and without a history of CSA. Since different linguistic patterns emerged from different essays (e.g., positive emotions from fantasy essay and body from picture essay) it would be appropriate to reproduce this study using a wider variety of sexual essays to ensure a more complete picture of the myriad potential differences that play a role in the sexual function of women with a history of CSA.

Appendix A. Picture Used for the Picture Essay

Acknowledgments This publication was made possible by Grant Number F31 MH68165-02 from the National Institute of Mental Health to Alessandra Rellini, and by Grant Number RO1 AT00224-02 from the National Center for Complementary and Alternative Medicine to Cindy Meston. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institute of Mental Health or the Center for Complementary and Alternative Medicine. The authors would like to acknowledge R. Sherlock Campbell for help with data analysis, and Melissa Farmer and Jessica Davis for their help with data collection.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Amir, N., McNally, R., & Wiegartz, P. (1996). Implicit memory bias for threat in posttraumatic stress disorder. *Cognitive Therapy and Research*, *20,* 625–635.

Andersen, B. L., & Cyranowski, J. M. (1994). Women's sexual self-schema. *Journal of Personality and Social Psychology*, *67,* 1079–1100.

Beck, A. T., Steer, R. A., & Garbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review*, *8,* 77–100.

Bremner, J. D., Randall, P., Scott, T. W., Capelli, S., Delaney, R., McCarthy, G., et al. (1995). Deficits in short-term memory in adult survivors of childhood abuse. *Psychiatry Research*, *59,* 97–107.

Brezsnyak, M., & Whisman, M. A. (2004). Sexual desire and relationship functioning: The effects of marital satisfaction and power. *Journal of Sex and Marital Therapy*, *30,* 199–217.

Cassiday, K. L., & Lyons, J. A. (1992). Recall of traumatic memories following cerebral vascular accident. *Journal of Traumatic Stress*, *5,* 627–631.

Dubois, S. L. (1997). Gender differences in the emotional tone of written sexual fantasies. *Canadian Journal of Human Sexuality*, *6,* 307–315.

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy*, *38,* 319–345.

Finkelhor, D., & Browne, A. (1985). The traumatic impact of child sexual abuse: A conceptualization. *American Journal of Orthopsychiatry*, *55,* 530–541.

Foa, E. B., Feske, U., Murdock, T. B., & Kozak, M. J. (1991). Processing of threat-related information in rape victims. *Journal of Abnormal Psychology*, *100,* 156–162.

Foa, E. B., Molnar, C., & Cashman, L. (1995). Change in rape narratives during exposure therapy for posttraumatic stress disorder. *Journal of Traumatic Stress*, *8,* 675–690.

Golier, J. A., Yehuda, R., & Southwick, S. M. (1997). Memory and posttraumatic stress disorder. In P. S. Appelbaum & L. A. Uyehara (Eds.), *Trauma and memory: Clinical and legal controversies* (pp. 225–242). New York: Oxford University Press.

Gottschalk, L. A., & Gleser, G. C. (1969). *The measurement of psychological states through the content analysis of verbal behavior*. Berkeley: University of California Press.

Gray, M. J., & Lombardo, T. W. (2001). Complexity of trauma narratives as an index of fragmented memory in PTSD: A critical analysis. *Applied Cognitive Psychology*, *15,* S171–S186.

Herman, J. L. (1992). *Trauma and recovery*. New York: Basic Books.

King, L. A. (1995). Wishes, motives, goals, and personal memories: Relations and correlates of measures of human motivation. *Journal of Personality*, *63,* 985–1007.

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,* 346–387.

Loeb, T. B., Williams, J. K., Carmona, J. V., Rivkin, I., Wyatt, G. E., Chiun, D., et al. (2002). Child sexual abuse: Associations with the sexual functioning of adolescents and adults. *Annual Review of Sex Research*, *13,* 307–345.

McNally, R. J. (1997). Implicit and explicit memory for trauma-related information in PTSD. *Annals of the New York Academy of Sciences*, *821,* 219–224.

Meston, C. M. (2003). Validation of the Female Sexual Function Index (FSFI) in women with female orgasmic disorder and in women with hypoactive sexual desire disorder. *Journal of Sex and Marital Therapy*, *29,* 39–46.

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.

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.

Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2005). Understanding and using the implicit association test: II. Method variables and construct validity. *Personality and Social Psychology Bulletin*, *31,* 166–180.

Oxman, T. E., Rosenberg, S. D., Schnurr, P. P., & Tucker, G. J. (1988). Diagnostic classification through content analysis of patients' speech. *American Journal of Psychiatry*, *145,* 464–468.

Pennebaker, J. W. (1989). Confession, inhibition, and disease. *Advances in Experimental Social Psychology*, *22,* 211–244.

Pennebaker, J. W. (1994). *Hints on running a writing experiment*. Unpublished manuscript.

Pennebaker, J. W. (2000). Telling stories: The health benefits of narrative. *Literature and Medicine*, *19,* 3–18.

Pennebaker, J. W., Francis, M. E., & Booth, R. J. (2001). *Linguistic inquiry and word count (LIWC): LIWC2001*. Mahwah, NJ: Erlbaum.

Pennebaker, J. W., & King, L. A. (1999). Linguistic styles: Language use as an individual difference. *Journal of Personality and Social Psychology*, *77,* 1296–1312.

Regan, P. C. (1999). Hormonal correlates and causes of sexual desire: A review. *Canadian Journal of Human Sexuality*, *8,* 1–16.

Rind, B., Tromovitch, P., & Bauserman, R. (1998). A meta-analytic examination of assumed properties of child sexual abuse using college samples. *Psychological Bulletin*, *124,* 22–53.

Rosen, R., Brown, C., Heiman, J., Leiblum, S., Meston, C., Shabsigh, R., et al. (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.

Schnurr, P. P., Rosenberg, S. D., & Oxman, T. E. (1992). Comparison of TAT and free speech techniques in eliciting source material in computerized content analysis. *Journal of Personality Assessment*, *58,* 311–325.

Stiles, W. B. (1992). *Describing talk: A taxonomy of verbal response modes*. Newbury Park, CA: Sage.

Stone, P. J., Dunphy, D. C., Smith, M. S., & Ogilvy, D. M. (1966). *The general enquirer: A computer approach to content analysis*. Cambridge, MA: MIT Press.

Thomas, C. B., & Duszynski, K. R. (1985). Are words of the Rorschach predictors of disease and death? The case of "whirling." *Psychosomatic Medicine*, *47,* 201–211.

Weintraub, W. (1989). *Verbal behavior in everyday life*. New York: Springer.

Wenninger, K., & Heiman, J. R. (1998). Relating body image to psychological and sexual functioning in child sexual abuse survivors. *Journal of Traumatic Stress*, *11,* 543–562.

Wiegel, M., Meston, C. M., & Rosen, R. C. (2005). The Female Sexual Function Index (FSFI): Cross-validation and development of clinical cutoff scores. *Journal of Sex and Marital Therapy*, *31,* 1–20.

Wolfe, J., & Kimerling, R. (1997). Gender issues in the assessment of posttraumatic stress disorder. In J. P. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 192–238). New York: Guilford.

Wyatt, G. E. (1991). Child sexual abuse and its effects on sexual functioning. *Annual Review of Sex Research*, *2,* 249–266.

Yehuda, R., Keefe, R. S., Harvey, P. D., Levengood, R. A., Gerber, D. K., Geni, J., et al. (1995). Learning and memory in combat veterans with posttraumatic stress disorder. *American Journal of Psychiatry*, *152,* 137–139.