

Implicit and Explicit Cognitive Sexual Processes in Survivors of Childhood Sexual Abuse

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ABSTRACT

Introduction. Women with a history of childhood sexual abuse (CSA) exhibit higher rates of sexual dysfunction than nonabused women.

Aim. Because sexual responses are affected by cognitive processes, this study investigated the implicit and explicit cognitive processing of sexual stimuli in women with a history of CSA.

Methods. Women with (CSA; N = 34) and without (no history of abuse [NSA]; N = 22) a history of CSA participated in a quasi-experimental study.

Main Outcome Measure. Implicit processes, described as involuntary or unintentional responses to stimuli, were assessed using the Implicit Association Test (IAT). Explicit processes, described as intentional, voluntary, or effortful processing of sexual stimuli, were assessed through a self-reported questionnaire (Sexual Self-Schema Scale).

Results. Results showed initial evidence of between group differences in the cognitive processing of sexual stimuli. Regarding the implicit processes, women in the NSA group showed that sexual pictures were more strongly associated with positive valence (pleasure) than nonsexual pictures. For the CSA group, neutral and sexual pictures were similarly associated with pleasure. Conversely, for both groups, romantic pictures were more strongly associated with positive valence than sexual pictures. Moreover, sexual satisfaction was predicted by both implicit and explicit processes, suggesting that the sexuality of women is affected by both processes independently.

Conclusions. These results fit within the larger body of literature suggesting that implicit and explicit processes independently predict different aspects of behavior. **Rellini AH, Ing AD, and Meston CM. Implicit and explicit cognitive sexual processes in survivors of childhood sexual abuse. J Sex Med 2011;8:3098–3107.**

Key Word. Implicit Attitudes; Sexual Function; Sexual Abuse; Sexual Satisfaction; Childhood Sexual Abuse

Introduction

Studies have found that women with a history of childhood sexual abuse (CSA) have more sexual problems than women with no history of abuse (NSA; for a review, see references [1,2]). In particular, promiscuity, hypoactive sexual desire, female orgasmic disorder, and risky sexual behaviors are some of the most prominent difficulties in CSA survivors. Only a paucity of studies has attempted explaining cognitive mechanisms involved with the development and maintenance of such sexual problems [3–6]. Because cognitive

mechanisms are the focus of all cognitive-behavioral therapies, including those developed specifically for the treatment of sexual dysfunction (e.g., Nobre and Pinto-Gouveia [7]), a greater understanding of such mechanisms will enhance the development and efficacy of psychological treatments for female sexual dysfunction among survivors of CSA. A comprehensive study of the sexual impairments of women with a history of CSA should also incorporate the investigation of mechanisms that could explain the occurrence of both hypersexual and hyposexual behaviors in women with a history of CSA [8].

Models to understand sexual dysfunction vary on a number of dimensions but all acknowledge the role of implicit and explicit processes (for a review, see Pfaus [9]). Implicit processes have been described as effortless, automatic, involuntary, or unintentional responses to stimuli. These processes generally occur outside conscious awareness, although some may become accessible to awareness. They consume minimal intentional bias and require minimal processing capacity (e.g., references [10–12]). Differently from implicit processes, explicit processes are intentional, voluntary, or effortful processing of stimuli. They can be regulated, are fully conscious, relatively slow, and utilize higher levels of processing (for a review, see Beck and Clark [10]). Distinguishing explicit from implicit cognitive sexual processes is warranted when studying sexual problems in CSA survivors because impairments in these two types of processes are better addressed by different types of interventions. Explicit processes that underlie mood and anxiety disorders have been effectively addressed by cognitive techniques such as cognitive restructuring (e.g., references [13,14]). Conversely, impairments that occur at the implicit level are more difficult to address with cognitive interventions and, for this reason, behavioral techniques aimed at changing automatic, learned associations are considered more successful [15].

In the past, researchers have found different ways to integrate implicit and explicit processes. For example, one possible conceptualization looks at sexual arousal as the conscious (explicit) awareness of automatic (implicit) responses such as the autonomic arousal observed during exposure to sexual stimuli [16]. Similarly, the information processing model of sexual stimuli [17] focuses on two types of automatic (implicit) responses, cognitive and emotional, that precede conscious subjective and physiological sexual arousal experiences. According to this model, exposure to a stimulus is quickly followed by the processing of the stimulus at the implicit level. At this point, the stimulus is not yet conscious but the brain has utilized implicit attitudes and other cognitive associations to categorize the stimulus as threatening or appealing. This rapid process then directs our attention toward or away from the stimulus. Once our attention is focused on the stimulus, we become aware of its presence and our explicit attitudes can be accessed if we focus on the stimulus. In this manner, implicit attitudes affect our attention toward stimuli that are relevant and away from less relevant stimuli.

If we integrate these models, we could purport that for women who have been exposed to CSA, sexual stimuli may activate implicit cognitive associations such as memories of the abusive event, memories of the self during the time of the abuse, and other negative associations formed during the abuse. Moreover, emotional states unconsciously activated by sexual stimuli may also activate the autonomic system (e.g., increased sweating, faster heart rate) outside awareness of the connection between past events and current emotional responses.

Implicit processes have been studied by measuring reaction time (RT) to stimuli in paradigms such as priming tests, stroop tests, and Implicit Association Tests (IATs). Studies utilizing the priming paradigm have found that sexual information can be processed under the threshold of consciousness in normal populations [17–21]. Much less is known about the impact of implicit cognitive mechanisms on the sexual functioning of CSA survivors. To date, studies on the implicit processes of sexual stimuli in CSA survivors have used only trauma-related stimuli (for a review, see McNally [22]) and no study has utilized sexual stimuli that are not trauma-focused. Indirect evidence for a negative, implicit association (below the awareness threshold) between sexual stimuli and sexual responses in CSA survivors comes from a study on cortisol responses to sexual stimuli in women with and without a history of CSA [23]. On average, cortisol decreased less during exposure to sexual stimuli in the CSA group as compared with the control group. This difference is attributable to the fact that some women with a history of CSA showed an increase in cortisol (known as the stress hormone) during exposure to sexual stimuli. Cortisol is a hormone released at times when the organism is exposed to a stressor. An increase in cortisol in response to a video is therefore interpreted as the activation of the stress response. The observed increase in cortisol during exposure to sexual stimuli was positively correlated to an increase in subjective sexual arousal, and no increase in negative affect, in women with a history of CSA. This suggests that, at the consciousness level, women experienced the stimuli as positive and sexually arousing, while at the unconscious level, their body may have responded to the stimuli as stressors.

Explicit mechanisms are thought to impact sexual functioning through the activation of expectancies for the sexual activities and thus the manipulation of attention during sexual activities [17]. Thus, explicit processes of sexual stimuli can be

measured in a variety of ways, including by asking participants to describe how they perceive themselves sexually, how they feel about sexuality, or how they feel in response to sexual stimuli. According to this model, people who often have negative sexual experiences expect negative outcomes [24]. Eventually, the negative expectations lead the individuals to direct attention to cues in the environment that confirm their negative expectancies and distract them from sexual stimuli. In support of the hypothesis that explicit processes may be negatively affected by CSA, studies have shown that CSA survivors tend to pair sexual stimuli with negative emotions more often than women with no history of sexual abuse [4,6]. When CSA survivors were asked to sort sexual words into different categories, they differed from a group of women with no history of sexual abuse in that they were more likely to place names of genitalia with words indicating negative affect [4]. Also, in written texts about sexual fantasies, CSA survivors used more words indicating negative emotions compared with a control group, suggesting a stronger association between negative affect and sexual thoughts [6].

The main aim of the present study was to determine whether a history of CSA was associated with more negative (or less positive) implicit attitudes toward sexual stimuli. A second aim was to identify differences in the relationship between implicit and explicit sexual attitudes between women with and without a history of CSA. Implicit cognitive processes of sexual stimuli were assessed using the IAT, a methodology first developed by Greenwald and colleagues [25]. Explicit attitudes were assessed with the Sexual Self-Schema Scale (SSSS) [26], a self-report questionnaire that measures views of the sexual self such as romantic or passionate, open or direct, and embarrassed or conservative. Third, this study aimed at investigating the overall ability of implicit (IAT) and explicit (SSSS) variables to predict sexual function and sexual satisfaction. Based on the reviewed literature, we expected that a weaker association between pleasure and sex, or pleasure and romance (implicit attitudes measured with the IAT) would be more pronounced in CSA survivors compared with women with no history of sexual abuse. Second, we expected that the association between pleasure and sex, or pleasure and romance (implicit attitudes measured with the IAT) would be weaker in the CSA group compared with women with no prior history of sexual abuse. Finally, we expected that both implicit and explicit attitudes would independently predict sexual function and satisfaction, suggesting that these two

constructs are orthogonal and relevant for the sexuality of women.

Method

Participants

This study analyzed data from women with a history of CSA (N = 34) and women with no history of abuse (NSA; N = 22). The definition of CSA adopted in this study was the one proposed by Finkelhor, Hotaling, Lewis, and Smith [27]: self-reports of a sexual encounter where unwanted touching or penetration of genitals happened before age 16 with someone at least 5 years older. The following inclusion conditions were met by all women in the study: age between 25 and 35, fluent in English, predominantly or exclusively heterosexual, currently sexually active with a partner or partners. The exclusion criteria for all groups included having experienced a traumatic event in the previous 3 months, being currently involved in an abusive relationship, and having active psychotic symptoms in the past 6 months. If participants received medications known to affect sexual function (e.g., antidepressants, beta-blockers, and antihypertensive medications), they were included in the study under the condition of being stabilized as per the medication type and dosage for at least 3 months prior to the study and not reporting changes in sexual function from before starting the medications. Women in the NSA group did not qualify if they reported any sexual encounter before the age of 16 with someone 5 years or older, or if they had ever experienced sexual abuse. Also, participants were excluded from the NSA group if they reported a history of physical abuse or neglect during childhood.

The majority of the women were identified as Caucasian (65% and 55% of the CSA and NSA groups, respectively). Hispanic women represented 15% and 18%, and African Americans represented 12% and 5% of the CSA and NSA groups, respectively. No significant group differences were observed in mean age between the CSA (M = 28.5; standard deviation [SD] = 4.53) and the NSA (M = 30.8, SD = 5.53) groups.

Measures

Implicit Cognitive Processes

Two modified versions of the IAT [25] were used to assess the implicit cognitive processes of sexual and romantic stimuli. In the IAT-Neutral, the association between sexual concepts and pleasant

valence was compared with the association between neutral concepts and pleasant valence. In the IAT-Romantic, the association between sexual concepts and pleasant valence was compared with the association between romantic concepts and unpleasant valence. In these tests, the sexual concepts were represented by pictures depicting heterosexual couples having sex, the neutral concepts by women engaging in daily activities (e.g., talking on the phone, cooking, and driving), and the romantic constructs by pictures of heterosexual couples in stereotypical romantic behaviors (e.g., candlelight dinner, hugging, walking on the beach). In both IAT tests, pleasant and unpleasant constructs were represented by words previously identified to represent the concept of "pleasant" (e.g., joy, happy, good) and "unpleasant" (e.g., sick, bad, ill). The tests included five stimuli (picture or word) for each category (Sex, Neutral, Romantic, Pleasant, and Unpleasant).

A pilot study was conducted to ensure that the stimuli selected for the IATs were accurately depicting the constructs intended. The five stimuli for each category listed earlier were selected from a list of 53 sexual pictures, 48 romantic pictures, 31 neutral pictures, 56 pleasant words, and 33 unpleasant words. Eight undergraduate and graduate students were asked to complete a RT test that required them to quickly identify each stimulus as belonging to the concept tested. For example, to select the most appropriate romantic stimuli, participants were instructed to quickly press the key "YES" if the stimulus was romantic, or "NO" if the stimulus was not romantic. For each category, the five stimuli with the lowest RT and "YES" answer were selected for the study. The RT for each of the categories ranged from 530–631, 610–677, 479–540, and 541–572 milliseconds for the sexual, romantic, pleasant, and unpleasant categories, respectively. Neutral pictures were selected by asking people to indicate both positive and negative valence using a rating scale of 1 (*not at all*) to 5 (*extremely*), for each of the 31 pictures. The five pictures selected from this group scored an average of two or lower in both positive and negative valence.

The IAT comprises two training trials, two test trials, one training trial, and two more tests trials, in that order. For the IAT-Neutral, sexual and neutral pictures appeared, one at a time, in the middle of a computer screen while the names of the categories Sexual and Neutral appeared on the top right and top left corner of the screen. Participants were instructed to quickly press two keys on

a keyboard to indicate whether the picture belonged to the category indicated on the left (by pressing "e" with the second left digit) or on the right (by pressing "i" with the second right digit). Wrong answers were followed by a red "X" that appeared for 1 second in the middle of the screen. In the following trial, pleasant and unpleasant words appeared in the middle of the screen and the categories on the top left and top right of the screen were substituted with Pleasant and Unpleasant. Participants had to press the "e" or "i" keys to place these words into the correct pleasant or unpleasant categories. For the following two test trials, all four categories (Sexual, Neutral, Pleasant, and Unpleasant) appeared on the top corners of the screen, two on the left and two on the right (e.g., Sexual/Pleasant on the left, and Neutral/Unpleasant on the right). For the following two trials (40 stimuli per task), participants were instructed to press (as fast as possible) the two keys ("e" and "i") to indicate to which of the two categories on the top corners of the screen, the image or word that appeared in the middle, belonged. Another training trial followed and then the categories were switched for the final two trials so that the Sexual category was paired with Unpleasant and the Neutral category was paired with Pleasant (40 stimuli that used the same five stimuli per category). The IAT is based on the assumption that when the concepts in the same category are congruent in the person's mind (i.e., when Sexual and Pleasant categories are on the same side of the screen and when sex is a pleasant experience for the person), the RT is shorter than when the paired concepts are incongruent. Therefore, a woman who implicitly associates pleasure with the concept of sex is assumed to answer faster during the condition when sexual and pleasant categories are on the same side of the screen, as compared with when sexual and unpleasant categories are on the same side. The order of pairing of the categories was randomly assigned to participants.

The IAT-Romantic (romantic vs. sexual pictures) was organized in the same way, but romantic pictures and the Romantic category substituted the neutral pictures and category. The order of the IAT-Romantic and IAT-Neutral was randomized between participants so that half completed the IAT-Neutral first and the other half completed the IAT-Romantic first.

For the IAT, RT, measured in milliseconds, was the operational variable. For the IAT-Neutral, the average RT during the condition when the Sexual category was paired with the Unpleasant category

Table 1 IAT order of categories for both the sexual vs. neutral test and the sexual vs. romantic test

| IAT sexual vs. neutral | | IAT sexual vs. romantic | |
|------------------------|------------------|-------------------------|-------------------|
| Left | Right | Left | Right |
| Sexual | Neutral | Sexual | Romantic |
| Unpleasant | Pleasant | Unpleasant | Pleasant |
| Sexual/unpleasant | Neutral/pleasant | Sexual/unpleasant | Romantic/pleasant |
| Neutral | Sexual | Romantic | Sexual |
| Neutral/unpleasant | Sexual/pleasant | Romantic/unpleasant | Sexual/pleasant |

IAT = Implicit Association Test.

(and Neutral was paired with Pleasant) was subtracted from the average RT when Sexual was paired with the Pleasant category (and neutral was paired with unpleasant). Lower scores indicated a stronger preference for the Sexual/Pleasant dyad as compared with the Neutral/Pleasant. A similar data reduction was applied to IAT-Romantic so that lower scores corresponded to a preference for the Sexual/Pleasant as compared with Romantic/Pleasant (Table 1).

Explicit Cognitive Processes

The SSSS [26] measures perception of the self as a sexual being. This scale consisted of 50 trait-adjectives (26 scored and 24 fillers), which participants rated on a scale from “0” (*not at all descriptive of me*) to “6” (*very much descriptive of me*), on the degree to which each item described themselves. The scale comprised two positive dimensions (romantic/passionate and open/direct self-views) and a negative one (embarrassed/conservative). A total score for the SSSS was calculated by summing the items from the positive factors and subtracting the sum of the items from the negative factor. Andersen and Cyranowski [26] reported an internal consistency of $\alpha = 0.82$ and test-retest reliability (2-week interval) of $r = 0.91$. In this study, the internal consistency was $\alpha = 0.80$.

Sexual Functioning and Satisfaction

To assess levels of sexual functioning, participants completed the Female Sexual Function Index (FSFI) [28], a widely used questionnaire composed of 19 items divided into six subscales: Desire (two items), Arousal (four items), Lubrication (four items), Orgasm (three items), Satisfaction (three items), and Pain (three items). Each subscale has shown internal consistency within an acceptable range (Cronbach's $\alpha = 0.89$ – 0.97). Interitem reliability has been found to be within the acceptable range for sexually functional women (Cronbach's $\alpha = 0.82$ – 0.92). Test-retest reliabilities, assessed using a 4-week interval, have ranged between Pearson's $r = 0.79$ – 0.86 [28].

Divergent validity has been established using the Locke–Wallace Marital Adjustment Scale (Pearson's $r = 0.53$ for women with female sexual arousal dysfunction, Pearson's $r = 0.22$ for sexually functional women [28]). In this study, we utilized the full score (FSFI). Internal consistency for the full scale in the present study was $\alpha = 0.92$.

Sexual satisfaction was evaluated using the Sexual Satisfaction Scale—Women (SSS-W) [29], a 30-item questionnaire that measures five separate domains of sexual satisfaction supported by factor analysis: ease and comfort discussing sexual and emotional issues (Communication), compatibility between partners in terms of sexual beliefs, preferences, desires, and attraction (Compatibility), contentment with emotional and sexual aspects of the relationship (Contentment), personal distress concerning sexual problems (Personal Distress), and distress regarding the impact of their sexual problems on their partners and relationships at large (Relational Distress). The SSS-W domains had shown acceptable internal consistency (Cronbach's $\alpha \geq 0.74$) and test-retest reliability ($r = 0.58$ – 0.79). Also, the total score reliably differentiated between women with and without sexual dysfunction on each of the domain and total scores [29]. In this study, we utilized the total score (Satisfaction). Internal consistency for the full scale in the present study was $\alpha = 0.74$.

Procedure

Participants were recruited from the community through advertisements in a local newspaper and fliers posted in laundromats, local stores and services, and public bathrooms. The advertisement called for women with and without a history of “unwanted sexual experiences” for a study on women's sexual health. During a phone screening conducted by trained interviewers, inclusion and exclusion criteria were assessed. At the end of the screening, callers that qualified were provided a detailed description of the study and were scheduled for a 2-hour visit. After reviewing and signing the consent form, participants completed a sexual

psychophysiological assessment (data not presented here) that utilized sexual videos to activate sexual arousal. Subsequently, women were instructed to complete the two IAT tests. Women with even identification (ID) numbers completed the sexual vs. neutral IAT first (IAT-Neutral) and women with an odd ID number completed the sexual vs. romantic IAT first (IAT-Romantic). Finally, women completed a variety of questionnaires including the SSSS, the SSS-W, and the FSFI. Women were then thoroughly debriefed and compensated \$60 in agreement with the Institutional Review Board approval of this protocol.

Results

IAT Differences between Women with and without a History of CSA

The analysis of average RT in the IAT-Neutral yielded the general result that CSA participants were generally slower to respond across all conditions, $F(1, 404) = 27.8, P < 0.001$. Consistent with our hypothesis, we found several interaction effects presented in Figure 1. Regarding the association of sexual or neutral stimuli with pleasant or unpleasant valence, the pattern observed for the NSA group pointed to a closer association between sex and pleasant valence compared with the association between neutral and pleasant, $F(1, 20) = 14.8, P < 0.001$, effect size $f = 0.28$ (Figure 1A). This finding was not observed for the CSA group, $F(1, 20) = 0.06$, not significant (n.s.) (Figure 1B). Even though the sample size was one half times greater in the CSA group compared

with the NSA group, the CSA group showed no significant differences between the association sex/pleasant and neutral/pleasant, corroborating that the difference in effect sizes observed between groups could not be the result of lack of power. This result suggests that both sexual and neutral constructs were similarly associated with pleasure for the CSA group and this was not true for the NSA group.

When comparing romantic and sexual concepts in their association with pleasant and unpleasant valence, we observed a trend for participants in the NSA group to respond faster when romantic stimuli were paired with pleasant compared with when sexual stimuli were paired with Unpleasant, $F(1, 19) = 4.25, P = 0.05$ (see Figure 1C). The same pattern was found significant for the CSA group, $F(1, 28) = 7.21, P < 0.01$ (Figure 1D). This indicates that both the CSA and the NSA group associated pleasure with romantic constructs more than with sexual constructs.

Relationship between Implicit Associations and Explicit Sexual Self-Views

We regressed the total score of the SSSS on the centered scores for group (NSA = -1; NSA = 1), IAT, and the interaction IAT-X group. The first analysis was computed using data from the IAT-Neutral vs. Sexual and the second analysis utilized data from the IAT-Romantic vs. Sexual. Neither model was statistically significant. In the analysis utilizing IAT-Neutral, the model predicted 13.5% of variance in SSSS, $F(3, 44) = 2.28$, n.s., while in the analysis utilizing the IAT-Romantic, the model

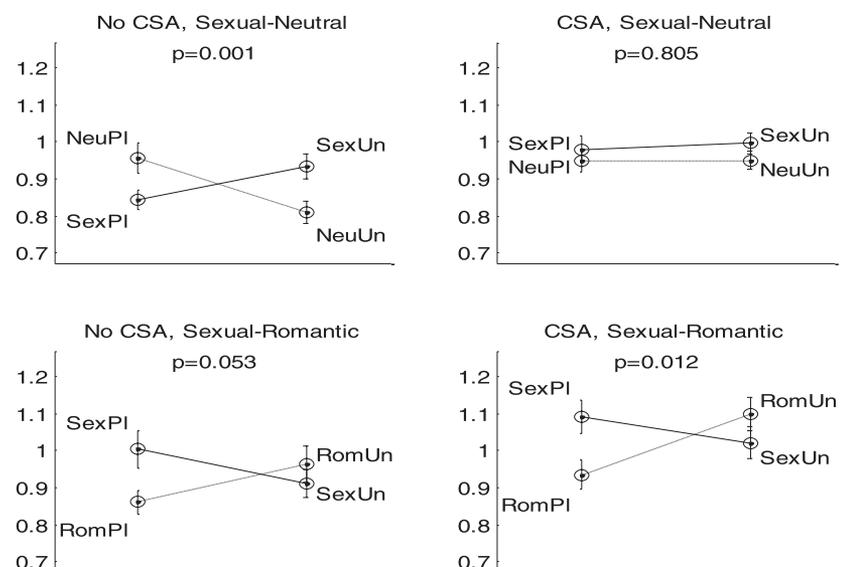


Figure 1 Reaction time (second) for Implicit Association Test (IAT) sexual vs. neutral and sexual vs. romantic divided for women with and without a history of child sexual abuse (CSA). Error bars show standard error of the mean. The *P* value refers to the significance level of the interaction.

predicted 10.7% of variance in SSSS, $F(3, 44) = 1.56$, n.s.

Implicit and Explicit Processes Predicting Sexual Function and Satisfaction

To assess whether implicit attitudes measured with the two IATs and sexual self-schemas could predict sexual function, we regressed FSFI on SSSS, IAT-Neutral and IAT-Romantic. The model was statistically significant and predicted 24.9% of variance in FSFI, $F(3, 44) = 4.42$, $P < 0.01$. An analysis of the regression coefficients showed that SSSS was the only variable that provided a unique and independent contribution to the model, $\beta = 0.49$, $P < 0.001$, and was independently responsible for 23.5% of variance in FSFI. The regression coefficients for IAT-Neutral and IAT-Romantic were not statistically significant, indicating that they did not provide a unique and independent contribution to the model. However, it is notable that IAT-Romantic predicted 2.3% of variance in FSFI. Although this is a small percentage compared with the effects of SSSS, it may be statistically significant if considered independently from SSSS (especially given the large effect of the SSSS variable, which may make other smaller effects harder to identify). To provide greater clarity on the relationship between implicit responses and FSFI, we computed a post hoc two-step regression where FSFI was regressed on IAT-Romantic and IAT-Neutral. This model was not statistically significant, $F(2, 45) = 0.22$, n.s., suggesting that self-reported sexual self-schemas but not implicit schemas measured with IAT predicted overall levels of sexual functioning.

A second model regressed the total score for the SSS-W (Satisfaction) on IAT-Romantic, IAT-Neutral, and SSSS. The model was statistically significant and predicted 24.8% of variance in Satisfaction, $F(3, 44) = 4.40$, $P < 0.01$. An analysis of regression coefficients showed that IAT-Romantic ($\beta = -0.36$, $P < 0.05$) and SSSS ($\beta = -0.36$, $P < 0.05$) provided unique and independent contributions to Satisfaction. In particular, IAT-Romantic predicted 10% and SSSS predicted 12% of variance in Satisfaction.

Discussion

This study investigated the implicit and explicit processes of sexual information in women with and without a history of CSA. Consistent with our hypotheses, implicit processes of sexual stimuli investigated with the IAT were impaired in the

CSA group compared with the NSA group. In particular, while the NSA group showed a stronger association between pleasure and sexual constructs compared with the association between pleasure and neutral constructs, the CSA group did not show such preference. This group difference was not as pronounced for the IAT-Romantic, where the CSA group showed a stronger preference for the romantic/pleasure as compared with the sexual/pleasure condition, and the NSA group showed the same pattern. Differently from expected, the CSA group did not show a stronger disagreement between implicit and explicit attitudes toward sexuality. Indeed, in both groups, this relationship was not significant. Finally, in partial support of our third hypothesis, we found evidence for an independent effect of implicit and explicit processes on sexual satisfaction. However, only explicit attitudes (SSSS) predicted a significant portion of variance in sexual functioning.

The lack of preference for the sexual/pleasant vs. the neutral/pleasant condition in the CSA group could result in a weaker activation of attention for the sexual stimuli, which would cause an inhibited interest and motivation for sexual stimuli, a phenomenon well documented by studies on CSA survivors [1,30]. In further support of this hypothesis, the literature shows a weaker physiological sexual response in CSA survivors compared with women with no history of sexual abuse [31].

Learning theories can provide a rationale for understanding impairment in the implicit association between sex and pleasure. A situation where the individual was exposed to intense anxiety or fear during sexual stimulation may have led to the pairing of anxiety with sexual stimuli. This learned association could have disrupted the natural association between sex and pleasure. With time, the individual is exposed to a variety of corrective sexual experiences (alone and with partners), which can help the individual to learn that, rationally, sex is not necessarily paired with negative affect. As in the case of panic disorder, the individual learns to rationally interpret innocuous stimuli as nonthreatening; however, her body continues to automatically respond with anxiety [15]. For the CSA survivor, a sufficient number of positive sexual experiences may have helped her to rationally learn that the sexual stimuli provided by a loving partner are not threatening; however, her brain may be implicitly wired to negatively respond to such stimuli.

Differently from the comparison of sexual and neutral constructs, the CSA and NSA groups did

not differ in their association of pleasure with the romantic constructs. Both CSA and NSA groups showed a preference for the pleasure/romantic pair compared with the pleasure/sexual pair. This finding is particularly important because it allows ruling out potential confounding explanations for the lack of significant difference between pleasure and the sexual and neutral constructs observed for the CSA group. The fact that CSA survivors showed a preference for the romantic/pleasure pair rules out the potential explanation that the lack of preference for the sex/pleasure pair was the result of impaired cognitive flexibility specific to CSA survivors, lack of salience of the stimuli, or lack of understanding of the task.

These results do not support the hypothesis that CSA survivors implicitly process sexual stimuli as a threat. In a previous study, we found that in a subgroup of women with a history of CSA, exposure to sexual stimuli rated pleasant was associated with an increase in cortisol levels, an indication of the activation of the stress response [23]. Interestingly, not all CSA survivors showed an activation of the stress response. Perhaps, in this study too, negative implicit sexual attitudes were only affecting a subgroup of women with a history of CSA, and this prevented us from seeing a group difference.

Women's views of their sexual selves as measured by the SSSS were not associated with their scores in the implicit tasks. We expected a mild correlation for the NSA group and a weaker correlation for the CSA group. This finding is in agreement with literature on personality traits and implicit attitudes, indicating that self-reports of personality traits are weakly associated with implicit attitudes as measured with the IAT, and show weaker predictive ability of behavior as compared with IAT scores [32]. It is possible that a larger sample would have yielded a statistically significant relationship; although, it is important to note that the sample size was large enough to detect a moderate effect for the correlations between IAT and self-reported measures.

In partial support of our hypothesis, we found that implicit and explicit attitudes toward sexuality predicted sexual satisfaction for all women in the study. This finding is important because it provides preliminary evidence that implicit attitudes were significant predictors of sexual satisfaction and were independent from explicit attitudes. Moreover, it is notable that implicit attitudes were predictors of satisfaction but not sexual functioning. It is feasible that implicit attitudes result in appraisal

of a sexual situation that can impact satisfaction. Differently, sexual function, a construct more strongly based on symptoms, may not depend as much on implicit evaluation, perhaps because it is more objective in nature (reaching an orgasm, experiencing sexual arousal). Future studies investigating the nature of implicit attitudes and the directionality of the relationship between attitudes and satisfaction may be important to determine the relevance of these implicit mechanisms in the treatment of sexual dysfunction.

This study does not explain the presence and the direction of a potential interaction between the implicit associations and explicit sexual self-views. It is plausible that women who do not pair sex with pleasure experience less physiological sexual arousal during sexual stimulation and this may color the views of themselves as nonpassionate. This postulation presumes that impairments in cognitive implicit processes precede impairments in the sexual self-view. Alternatively, the view of the self as nonpassionate or not romantic may contribute to evaluating sexual stimuli as less interesting. This may lead to less awareness of one's sexual needs, which could in turn decrease the likelihood of having pleasant sexual experiences. This cycle would weaken the cognitive association between sex and pleasure. Longitudinal studies that investigate temporal precedence of sexual self-schemas, sexual function, and implicit cognitive networks could provide a greater understanding of this issue.

We operationalized explicit processes with a self-reported questionnaire that asked people to report on how they viewed their sexual self. However, as Turner and Fischler [12] pointed out, it is often difficult to completely differentiate between explicit and implicit processes. This mix between implicit and explicit processes could potentially confound the interpretations of the explicit processes data. Similarly, the IAT is not able to fully eliminate explicit processes because the conscious awareness of the stimuli requires the activation of explicit mechanisms. A potential bias that may have affected the results of the IAT is the possibility that women more used to watching pornographic material may have shown a faster RT. However, given that CSA survivors are generally more sexually experienced than women with NSA [2], this would mean that CSA survivors would be expected to answer more quickly, which is the opposite of what we observed. Another criticism of the IAT is whether this task is completely independent from explicit processes. People are aware of

the stimuli and, although their responses are very quick, processes that are explicit can affect such responses. With respect to this study, it is feasible that people's discomfort with sexual pictures, their embarrassment, and other attitudes not related to sex per se may have influenced their responses. Although, it is also important to note that we found an interaction effect and therefore, whatever explicit or implicit attitude was at play during the task, it led to different results for women with a history of CSA as compared with women with NSA.

In conclusion, this study provides initial support for the presence of impairments in the implicit cognitive processes of sexual stimuli in CSA survivors. Because implicit processes are linked to physiological sexual arousal [33], this may help to explain why CSA survivors have been observed to have impairments in laboratory measures of physiological sexual response [31]. In a previous study on physiological sexual arousal, when asked to consciously increase their physiological sexual arousal to an erotic film, CSA survivors (with and without later adult revictimization) were unable to do so, while nonabused women were able to consciously increase their sexual arousal [34]. Based on the current findings, the implicit processes of CSA survivors may be impeding the physiological responses to erotic stimuli. Future studies on methods to understand whether the problem lies in the inhibition or the lack of excitation of sexual responses may shed some light on the relationship between implicit and explicit cognitive processes in female sexual arousal specific to CSA survivors.

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Conflict of Interest: None.

Statement of Authorship

Category 1

- (a) **Conception and Design**
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Category 2

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Category 3

- (a) **Final Approval of the Completed Article**
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