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Sex Differences in Memory for Sexually-Relevant Information

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Abstract The present study was conducted in an attempt to examine potential differences between men and women in memory for sexually relevant information. A total of 77 undergraduate students (31 men, 46 women) read a sexual story and completed memory tasks in response to the story. Based on previous research, we hypothesized that differences would exist between men and women for different types of sexual information and we hoped to understand whether specific variables (sexual experiences, sexual functioning, and reactions to the sexual story) could explain such differences. Men were more likely to remember erotic or explicit details of the story, whereas women were more likely to remember love and emotional bonding details of the story. Additionally, women were more likely to recall information referencing the characters in the story. Results from regression analyses indicated that sexual desire and satisfaction were related to differences in recall and recognition of the love and emotional bonding aspects of the story, and that frequency of sexual intercourse was related to differences in the recall of erotic or explicit details of the story. The significant results obtained in this study correspond to previously established sex differences in memory for sexual information.

Keywords Sex differences · Sexual information · Memory · Sexuality

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Introduction

Research has established differences between men and women relevant to the domain of sexuality, including, but not limited to, attitudes regarding sex (e.g., Oliver & Hyde, 1993), sexual satisfaction (e.g., Tsui & Nicoladis, 2004), sexual motivation (e.g., Jenkins, 2004), and approach to intimate relationships (e.g., Peplau, 2003). Given that cognition plays a key role in sexual functioning (e.g., Barlow, 1986), understanding potential differences between men and women in the cognitive processes involved in sexuality seems particularly relevant. Sex researchers have often relied on paradigms derived from cognitive psychology to understand the cognitive processes involved in sexuality (e.g., Geer, Judice, & Jackson, 2001; Geer & McGlone, 1990; Kirsch-Rosenkrantz & Geer, 1991, 1996). In particular, these investigations have examined differences between men and women in cognitive responses to erotic stimuli by employing methods such as the memory bias paradigm.

Geer and McGlone (1990) examined potential sex differences in recognition memory for sexually relevant information. In this study, 40 undergraduate college students (20 men and 20 women) read a short story containing erotic, romantic, and neutral sentences. After reading the story, participants were presented with sentences and asked to determine whether they had seen the sentence in the previous story. Results indicated that men were significantly faster and more accurate at recognition tasks of erotic sentences, whereas women were significantly faster and more accurate at recognition tasks of romantic sentences.

In a related study, Kirsch-Rosenkrantz and Geer (1991) examined sex differences in both the recall and recognition of sexual information. In contrast to the recognition tasks, which involved the decision of whether an item has previously occurred in a specific context, recall memory requires

an individual to explicitly evaluate their memory and retrieve information without any sort of cueing. Several theorists (e.g., MacDougall, 1904; Postman, 1963) have posited that performance on recognition memory tasks is generally superior to performance on recall memory tasks, as it requires more "memory strength" (i.e., more information in storage) to recall an item in memory as compared to recognizing an item in memory. The "generate-recognize" theory proposed that recognition memory requires only a familiarity decision, whereas recall memory involves a two-stage task in which retrieval of information in memory is followed by a familiarity decision (Anderson & Bower, 1973; Hollingsworth, 1913; James, 1890).

In Kirsch-Rosenkrantz and Geer's (1991) study, 126 undergraduate college students (63 men and 63 women) were presented with a story depicting a consenting heterosexual experience. Participants were instructed to assume the perspective of one of the fictional characters in the story which did not have to be the character in the story who shared the same sex as the participant. After reading the story, participants were instructed to write down as much as they could remember from the story. Subsequently, participants completed recognition tasks and rated each of the 39 elements in terms of their importance to the story. Results indicated that there were significant sex differences in the number of intrusions (subject-added elements) in the recall portion and in the number of false positives in the recognition portion. In both cases, men "remembered" more false information of both a sexual and romantic nature than did women. There were no significant differences between men and women in recognition accuracy, and no significant interactions were found between the perspective taken and recall or recognition memory. Additionally, no significant interactions were found between the importance ratings of the stories' elements and recall or recognition accuracy of those elements.

In a study designed to investigate sex differences in the organization of sexual information, Geer (1996) utilized the Pathfinder methodology developed by Schvaneveldt (1990). This method employs network modeling and has been used to understand how information is represented in one's memory by generating associative networks based on an individual's ratings of similarity between word pairs. In this study, 98 undergraduate college students (47 men and 51 women) rated the similarity of 120 combinations of 16 words deemed relevant to the domain of sexuality (e.g., male and female genitals, interpersonal relationships, etc.). Although there were many common elements across men and women, results indicated that each sex's networks were more similar to each other as compared to the opposite sex's networks. That is, women's networks were more similar to each others as compared to men's networks and vice-versa. Additionally, women had more links within the interpersonal relationships cluster and men had more links within the female genitals cluster and within sexual words low in social acceptability (e.g., fucking, cunt, and cock). It was posited that these findings substantiated and provided empirical support for the notion that systematic differences exist between sexes in the processing of sexual information.

The present study was conducted in an attempt to further investigate and clarify previously found sex differences in memory for sexually relevant information. This study extended past research of this nature by: (1) examining both immediate recall and recognition and delayed recall of sexual information in a group of men and women; (2) investigating potential predictors of any identified sex differences in memory for sexual information, including sexual functioning status, sexual experience, frequency of sexual behavior, and responses to sexual stimuli; (3) and analyzing recall data using a text analysis program specifically applicable to the sexual story used in this study. Additionally, the sexual stimulus (i.e., sexual story) used in the present study was expanded to include more categories than those used in previous studies, including the categories of Love/Emotional Bonding, Implicit/Romantic, Visual/Proximity, Erotic/Explicit, and Neutral.

Based on previous research (Geer, 1996; Geer & McGlone, 1990; Kirsch-Rosenkrantz & Geer, 1991), we hypothesized that men would remember more of the Erotic/Explicit details of the sexual story, and that women would remember more of the Love/Emotional Bonding details of the sexual story. Based on research indicating that men are more likely to attend to visual sexual information (e.g., Canli & Gabrieli, 2004; Hamann, Herman, Nolan, & Wallen, 2004), we hypothesized that men would remember more of the Visual/Proximity details of the story. Based on models of female sexual functioning which emphasize the importance of contextual information and cues (e.g., Basson, 2002), we predicted that women would remember more of the Romantic/Implicit details of the story. Further, we hypothesized that sexual experience and frequency would influence any identified differences between men and women in memory of the sexual story. Specifically, we predicted that increased sexual experience and frequency would be related to better memory for sexual information based on previous research linking familiarity and memory (e.g., Anderson, Silverstein, Ritz, & Jones, 1977). Additionally, we hypothesized that participants' reactions to the sexual story would help to explain any significant sex differences in memory. Based on research linking positive affect (e.g., Libkumen, Stabler, & Otani, 2004) and heightened arousal (e.g., Bradley, Greenwald, Petry, & Lang, 1992; Nielson, Radtke, & Jensen, 1996) to increased performance on memory tasks, we predicted that increased arousal and positive affect would facilitate performance on memory tasks, whereas negative affect would be more related to decreased

performance on memory tasks. We also included variables of sexual functioning status to provide for a more exploratory investigation of potential predictors of differences between men and women in memory for sexual information. It was our hope that by extending previous research to include a more thorough range of sexual factors and categories (e.g., visual sexual information) and an investigation of what potentially contributes to memory of these factors (e.g., past sexual experiences), we would be able to support the notion that men and women experience sexuality differently, while also providing a better understanding of what factors contribute to memory for sexually-relevant information.

Method

Participants

Participants were 77 (31 men, 46 women) undergraduate students (M age = 19.5 years, $SD = 2.1$, range = 18–32 years) enrolled in an introductory psychology course at a large university in the southwestern United States. Fifty-four percent of the participants identified themselves as Caucasian, 22% as Hispanic, 13% as Asian-American, 3% as African-American, and 8% as other.

For demographic variables by group, see Table 1. Men and women did not significantly differ in age, sexual experience or frequency of sexual activity (all p's $> .05$). Likelihood ratio statistics indicated that the two groups did not differ in ethnic representation ($p > .05$). For sexual functioning scores, men and women did not significantly differ on levels of sexual arousal or satisfaction; however, significant differences were found for sexual desire, $t(2,75) = 3.23$, $p = .002$, and orgasm, $t(2,75) = 2.38$, $p < .02$. That is, women reported more problems with sexual desire and orgasm as compared to men.

Procedure

All participants were recruited through an online system at the university that lists research studies available for psychology students to participate in for mandatory research credit. Participants were masked to the nature of the study upon signing up to participate and no one dropped out of the study after learning about the nature and content of the study. The study involved a single session consisting of completion of memory tasks in response to reading a sexual story and completing a series of questionnaires. The methods employed for the memory tasks in the present study were modeled after the well-validated Logical Memory subtest of the Weschler Memory Scale-Third Edition (WMS-III; The Psychological Corporation, 1997) which also involves the presentation of a story and subsequent memory tasks relevant to this information. All sessions were administered in small groups of same-sex participants and a same-sex experimenter was available to answer any potential questions. Participants were assured that their responses would be kept anonymous and confidential.

Upon arrival, the experimenter explained that the purpose of the study was to examine information obtained from writing samples and cognitive tasks which would include explicit erotic content. Consent was then obtained and participants were separated into private rooms, each equipped with a Dell Pentium computer. After receiving verbal instructions explaining the experimental procedures and how to use the computer equipment, each participant was left to complete the study in private. Subsequently, participants viewed instructional prompts on the computer monitor directing them through each step of the study while the experimenter was in a separate room and available for questions. The first task consisted of reading the sexual story. Instructions for this task included the following prompt on the participant's computer monitor: "Read the following story from beginning to end one time. Read the information carefully and at a continuous pace. When you have finished the story, press the space bar." Upon pressing the space bar, participants were not able to go back to the story and were presented with the following prompt for the Immediate Recall task:

> In the space below, try to recreate the story you just read. Whenever possible, write the sentences exactly as they were written in the story. If you don't remember the phrasing, just write down exactly what happened as you remember it. As soon as you are done, press the space bar.

After completing this task, participants completed Immediate Recognition tasks consisting of 10 multiple choice questions regarding the sexual story. The multiple choice questions were based on each of five categories of the sexual story (i.e., Love/Emotional Bonding, Implicit/Romantic, Visual/Proximity, Erotic/Explicit, and Neutral) such that there were two questions from each category. Participants then completed a 30-minute distracter task (i.e., a non-sexual word finding puzzle), followed by the Delayed Recall task with procedures identical to those used for the Immediate Recall task. Following completion of all study procedures, which took approximately 60 min, each participant saved his

Table 1 Participant characteristics

Sexual functioning status	Men ($n = 31$)		Women ($n = 46$)		Between-group statistics
	M	SD	M	SD	
Desire	4.39	.15	3.61	0.17	− 3.23*
Arousal	4.26	.36	3.99	0.30	− 0.56
Orgasm	4.18	.42	2.94	0.32	− 2.38*
Satisfaction	3.91	.31	4.53	0.21	1.73

*$p < .05$.

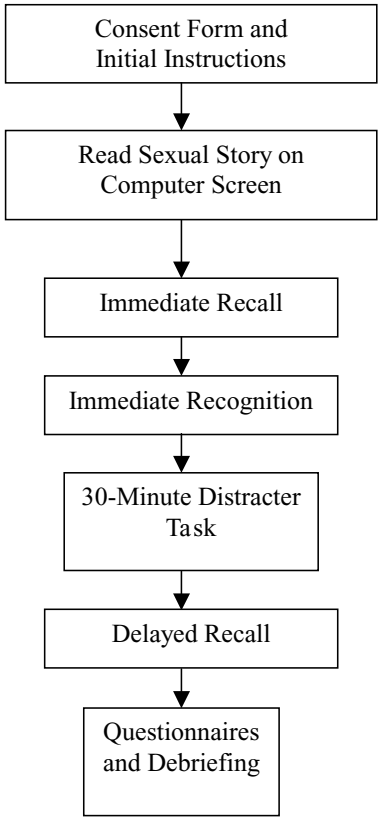

Fig. 1 Flow diagram of the methodology

or her own computer data with a pre-assigned code number to ensure confidentiality, and was then debriefed by the researcher and awarded course credit for participation. To view a flow diagram depicting the study methodology, see Fig. 1.

Experimental stimuli

Sexual Story. The sexual story was created in our laboratory and consisted of 60 sentences depicting a consenting heterosexual encounter, beginning with foreplay and including oral sex and intercourse. Our sexual story expanded upon the previously used categories of erotic, romantic, and neutral (e.g., Geer & McGlone, 1990; Kirsch-Rosenkrantz & Geer, 1991). Based on the domains of the Cues for Sexual Desire Scale (CSDS; McCall & Meston, 2004), our sexual story included sentences falling into one of the following five categories: (1) Love/Emotional Bonding (11 sentences; e.g., "He asked, 'Do you love me?' and she answered, 'Of course I do.'"), (2) Implicit/Romantic (12 sentences; e.g., "It had been a wonderfully romantic evening, with a delicious meal that they had prepared together"), (3) Visual/Proximity (14 sentences; e.g., "He looked at her, loving the way her clothes hugged the curves of her body"), (4) Erotic/Explicit (15 sentences; e.g., "He noticed how wet she was as he started to move his fingers over her clit and into the walls of her vagina"), and (5) Neutral (8 sentences; e.g., "She walked over to the stereo and selected some music to play"). Attempts were made to depict equal pleasure and equal initiation of sexual contact for both the male and female characters in the story, to include approximately equal sentence length across each of the five categories, to disperse sentences from each of the categories throughout the story, and to refrain from repeating words throughout the story. After the initial development of our sexual story, six coders reached unanimous agreement for each of the five categories indicating that the story clearly reflected the intended categories.

Text analysis program. A computerized text analysis was computed using a software program designed to count the number of words that fell within the preset categories used as the basis for the sexual story in this study: Love/Emotional Bonding, Implicit/Romantic, Visual/Proximity, Erotic/Explicit, and Neutral. In addition, other exploratory categories were developed in an attempt to provide for further examination of the aspects of the sexual story that were expected to show significant sex differences. Based on findings from Geer (1996), we developed categories for male body parts (e.g., penis), female body parts (e.g., breasts, vagina), sexual words high in social acceptability (e.g., sex, erect), and sexual words low in social acceptability (e.g., dick, fuck). To further explore potential differences between men and women in memories for non-explicit aspects of a sexual story, we developed a category for reference to the characters in the story which included the following words: *she, he, her, his, him, woman, girl, boy, man*. The decision to include this category was based on the fact that the original sexual story presented to participants had repeated references to the characters involved in the story. All the words used in the sexual story and their synonyms were included in a dictionary and each word in this dictionary was assigned to one of the listed categories. The text analysis program used the dictionary to compute the percentage of the words used from each category in comparison to the number of words used in each writing sample for each individual participant (e.g., number of words used from the Implicit/Romantic category/number of total words of text written by participant).

Measures

Sexual function

The Female Sexual Function Index (FSFI; Rosen et al., 2000) was used to assess current levels of sexual function in women. The FSFI consists of 19 items divided into factor-analytic derived subscales: desire (2 items), arousal (4 items), lubrication (4 items), orgasm (3 items), satisfaction (3 items), and pain (3 items). Wiegel, Meston, and Rosen (2005) recently reported internal consistency within each

subscale to reflect values in an acceptable range (Cronbach's $\alpha = 0.82$–0.98). Rosen et al. (2000) reported inter-item reliability values within the acceptable range for sexually healthy women (Cronbach's $\alpha = 0.82$–0.92), as well as for women with diagnosed female sexual arousal disorder (FSAD; Cronbach's $\alpha = 0.89$–0.95). Test-retest reliabilities assessed using a four week interval ranged between Pearson's $r = 0.79$–0.86 (Rosen et al., 2000). Additionally, Wiegel et al. (2005) provided strong evidence of discriminant validity between women with and without sexual dysfunction for FSFI total score and each subscale score, although a high degree of overlap was present across various diagnostic groups.

In our subsample of women, the domains of desire, arousal, lubrication, orgasm, satisfaction, and pain showed coefficients Cronbach's α of .90, .85, .71, .73, .70, and .94, respectively. To allow for comparison across the sexes, the FSFI was adapted, based on questions from the International Index of Erectile Function (IIEF; Rosen et al., 1997), to assess sexual function in men. This adapted version consisted of 18 questions divided into five subscales, including desire (2 items), arousal (4 items), erection (4 items), time to ejaculation (2 items), orgasm (3 items), and satisfaction (3 items). In our subsample of men, the internal consistency for the domains of desire, arousal, satisfaction and orgasm showed moderate to low coefficients α: .78, .68, .66, and .61, respectively. For the sake of making comparisons across men and women, only the desire, arousal, orgasm, and satisfaction subscales of the sexual functioning measures were used in the present study as these included the exact same questions for both men and women. Additionally, these subscale factors were converted into z-scores separately for men and women to allow for comparisons to be made between the two groups.

Sexual experience

The sexual experience and frequency measure utilized in the present study included 32 items and was loosely based on the Experience Subscale of the Derogatis Sexual Function Inventory (DSFI; Derogatis & Melisaratos, 1979). This subscale requires participants to indicate if they have engaged in a list of 24 distinct sexual behaviors (e.g., deep kissing, sexual intercourse). In addition to inclusion of these questions, if participants indicated that they had previously engaged in sexual kissing, sexual caressing/petting, oral sex, and/or sexual intercourse, we included eight questions which assessed age of first occurrence for these activities (e.g., age of first sexual intercourse) and the current frequency of engaging in these sexual activities (e.g., frequency of sexual intercourse).

Response to the sexual story

An adapted version of the Film Scale (Heiman & Rowland, 1983) was used for the assessment of participant's responses to the sexual story. The scale included four subscales assessing for positive affect, negative affect, mental sexual arousal, and physiological sexual arousal.

Results

Recall

Repeated-measures ANCOVAs were computed using sex as the between-subject variable and time (immediate vs. delayed) as the within-subject variable for each of the following outcome variables: Love/Emotional Bonding, Romantic/Implicit, Erotic/Visual, Erotic/Explicit, Neutral, Clothing, Female Body Parts, Male Body Parts, Sexual Words High in Social Acceptability, Sexual Word Low in Social Acceptability, and Characters. In order to control for variations in exposure to the sexual story, both time spent reading the story and time spent writing the recalled story (immediate and delayed) were added as covariates into the analyses.

For Recall data presented by group and time, see Table 2. For each dependent variable, a 2 (Sex) × 2 (Time: Immediate vs. Delayed) ANCOVA was conducted, with time spent reading the story and time spent writing the recalled story covaried. Significant effects of sex were observed for Recall of the categories of Love/Emotional Bonding, $F(1,76) = 4.62$, $p = .04$, and Erotic/Explicit, $F(1,76) = 5.57$, $p = .02$. Specifically, women recalled more aspects of the story depicting Love and Emotional Bonding, whereas men recalled more aspects of the story depicting the Erotic/Explicit elements. Additionally, women recalled significantly more characters from the sexual story as compared to men, $F(1,76) = 3.82$, $p = .05$. There were no significant differences between men and women in the recall of Visual/Proximity elements, Romantic/Implicit elements, Neutral elements, body parts, and high vs. low socially acceptable sexual words (all p's $> .05$). A significant main effect for time was found for Erotic/Explicit recall data, $F(1,76) = 6.82$, $p = .01$, such that the percentage of Erotic/Explicit words was higher during the delayed time condition as compared to the immediate time condition, $F(1,76) = 8.28$, $p < .05$. No significant interactions were observed between time and sex in any of the repeated measures ANCOVAS.

Separate regression analyses were conducted to investigate the potential predictors of the significant sex differences observed in the recall data. Three blocks were utilized for the following regressions. Block 1 included time spent reading and time spent writing the recall data, Block 2 added sex, and Block 3 added one of the following variables: sexual

Table 2 Recall findings by group

Recall	Men ($n=31$)				Women ($n=46$)				Men	Women			
	Immediate		Delayed		Immediate		Delayed		Combined Immediate + Delayed				
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*d*
Love/emotional bonding	1.48	1.20	1.54	1.12	2.15	1.47	2.40	1.72	3.07[a]	1.90	4.54[a]	2.46	0.67
Implicit/romantic	3.92	1.46	3.84	2.46	3.89	2.06	3.43	1.23	7.78	3.47	7.07	2.10	−0.25
Visual/proximity	2.64	2.21	3.00	1.61	2.92	1.61	3.35	1.86	5.62	3.08	6.41	2.91	0.26
Erotic/explicit	5.89	2.80	6.70	2.63	4.94	1.96	5.43	1.81	12.72[a]	4.81	10.35[a]	3.23	−0.58
Neutral	1.42	1.38	1.50	0.90	1.07	0.75	1.52	0.79	2.88	1.96	2.60	1.30	−0.17
Male body parts	0.54	0.60	0.51	0.53	0.57	0.55	0.63	0.44	1.07	1.05	1.21	0.84	0.15
Female body parts	0.84	0.86	1.00	0.81	0.55	0.56	0.76	0.56	1.90	1.58	1.31	0.91	−0.45
Word high in social acceptability	1.25	1.35	1.32	1.20	0.91	0.89	1.04	0.74	2.66	2.37	1.98	1.30	−0.36
Words low in social acceptability	0.92	0.87	1.10	1.02	0.72	0.68	0.88	1.04	2.00	1.86	1.64	1.49	−0.22
Characters	13.5	7.08	16.10	7.09	15.84	6.34	18.8	4.54	28.96[a]	13.58	35.06[a]	10.02	0.51

[a]Indicates a significant sex difference.

desire, arousal, orgasm or satisfaction as measured by the FSFI (or the adapted male-version of the FSFI), questions derived from the measures of sexual experience and frequency and the responses to the sexual story. The change from a significant to a non-significant finding in the β coefficient for the sex variables in Block 3 was interpreted as an indication of overlap in predictive power between sex and the variable included in the third block.

Sex differences accounted for 7.0% of the variance ($F[1,65]=5.95$, $p<.05$) in Love/Emotional Bonding recall ($\beta=.25$, $t=-2.04$, $p<.05$) and this finding was no longer significant when sexual desire was added into the third block, $\beta=-.19$, $t=-1.50$, *ns*). However, sexual desire accounted for only 2% of the variance in Love/Emotional Bonding recall, which alone was not significant, $F(1,64)=1.25$, *ns*. Measures of sexual arousal, orgasm, sexual satisfaction, sexual experience, and responses to the sexual story did not change the effect of sex in the recall of Love/Emotional Bonding aspects of the story. Sex differences accounted for 6.4% of the variance in Erotic/Explicit recall ($F(1,66)=5.56$, $p<.05$, $\beta=.24$, $t=1.98$, $p=.05$) and this finding was no longer significant when frequency of intercourse ($\beta=.22$, $t=1.85$, $p=.07$) was included in the third block. Measures of sexual arousal, orgasm, sexual satisfaction, and responses to the sexual story did not change the effect of sex in the recall of Erotic/Explicit aspects of the story. None of the examined variables predicted the recall of references to characters from the sexual story.

Recognition

For Recognition data presented by group, see Table 3. A multivariate analysis of co-variance (MANCOVA) with sex as the between-subject variable was computed to examine immediate recognition memory, with time spent reading the sexual story added as a covariate. Outcome variables included the percent of correct multiple choice questions from each of the five categories of the sexual story: Love/Emotional Bonding, Romantic/Implicit, Visual/Erotic, Erotic/Explicit, and Neutral. After determining an overall multivariate main effect, the analyses were decomposed for each outcome variable. When controlling for reading time, only Love/Emotional Bonding recognition tasks indicated a significant sex difference ($F[1,74]=3.85$, $p=.05$), such that women answered correctly to more questions on Love/Emotional Bonding than did the men.

Further analyses were conducted to assess potential predictors of the sex difference observed on the Love/Emotional Bonding recognition measure. A three step hierarchical linear regression was computed on Love/Emotional Bonding recognition questions. Time spent reading was entered in the first block and sex was added to the second block. The third block included one of the following variables: sexual desire, arousal, orgasm or satisfaction as measured by the FSFI (or the adapted male-version of the FSFI), and questions derived from the measure of sexual experience and frequency and responses to the sexual story. The change from a significant to a non-significant finding in the β coefficient for the sex variables in block three was interpreted as an indication of overlap in predictive power between sex and the variable included in the third block.

Table 3 Recognition findings by group

Recognition	Men ($n=31$)		Women ($n=46$)	
	Mean % Correct	*SD*	Mean % Correct	*SD*
Love/Emotional Bonding	.66[a]	.21	.76[a]	.15
Implicit/Romantic	.71	.22	.72	.20
Visual/Proximity	.78	.19	.83	.14
Erotic/Explicit	.68	.20	.70	.21
Neutral	.80	.20	.84	.16

[a]Indicates a significant sex difference.

Sex ($\beta = -.26$, $t = -2.20$, $p < .05$) accounted for 5% of the variance in recognition of Love/Emotional Bonding material ($F[1,68] = 4.85$, $p < .05$); however, the sex difference did not remain significant ($\beta = -.17$, $t = -1.55$, *ns*) when sexual satisfaction was included in the model. None of the other variables entered into regression analyses affected the significance of the sex difference in recognition memory of Love/Emotional Bonding.

Discussion

The present study was conducted in an attempt to examine potential differences between men and women in memory for sexually relevant information. Participants completed both immediate recall and recognition tasks and delayed recall tasks in response to reading a sexual story. Based on previous research, we hypothesized that differences would exist between men and women for different types of sexual information and we hoped to understand whether specific variables could help to explain any significant sex differences that were found (Geer, 1996; Geer & McGlone, 1990; Kirsch-Rosenkrantz & Geer, 1991).

Consistent with our hypotheses, women performed better on recognition tasks and recalled more information relevant to Love/Emotional Bonding compared to men. This is congruent with Geer and McGlone's (1990) finding that women performed more quickly and more accurately on recognition tasks of romantic sentences compared to men. This finding and the finding that women were also more likely to reference characters in their recall of the sexual story could be considered in the context of Geer's (1996) finding that women had more clusters in the interpersonal relationships category compared to men. Although the category of interpersonal relationships from Geer's (1996) study only contained three words (affectionate, caring, and tender), these words are comparable to our category of Love/Emotional Bonding. Further, women's increased mention of characters in the recall of the sexual story could be interpreted as additional evidence of attention to elements related to interpersonal relationships.

Follow-up regression analyses to examine potential predictors of differences between men and women indicated that recall of Love/Emotional Bonding aspects could be explained by levels of sexual desire, whereas recognition of Love/Emotional Bonding aspects could be explained by levels of sexual satisfaction. Inspection of the data indicated that higher levels of sexual desire were related to lower levels of Love/Emotional Bonding Recall, whereas higher levels of sexual satisfaction were related to better performance on Love/Emotional Bonding Recognition tasks. Although the finding that higher levels of sexual desire were related to less recall is surprising, a possible explanation could be that higher levels of sexual desire interfered with an individual's ability to focus on, and thus recall, aspects of the story indicating Love/Emotional Bonding. The finding that higher levels of sexual satisfaction were related to increased performance on multiple choice questions related to Love/Emotional Bonding could be interpreted as evidence that participants found this type of information more consistent with their own experiences related to sexuality and intimate relationships.

Also consistent with our hypotheses was the finding that men recalled more Erotic/Explicit details of the sexual story compared to women. This was congruent with Geer and McGlone's (1990) finding that men performed more quickly and more accurately on recognition tasks of erotic sentences compared to women. Our finding could also be compared to Geer's (1996) results indicating that men had more clusters for sexual words low in social acceptability compared to women. Specifically, Geer's category of low social acceptability included the words *fucking, cunt,* and *cock*, which were words that were also included in our Erotic/Explicit Category. However, contrary to Geer's finding, although our data were in the direction consistent with our predictions, we did not find significant sex differences in recall of sexual words high in social acceptability and sexual words low in social acceptability. Also, inconsistent with our hypotheses and Geer's (1996) finding that men reported more associations within the female genitals cluster, we did not find significant sex differences in recall of same-sex or opposite-sex body parts.

Follow-up regression analyses to examine potential predictors of differences between men and women in the recall of the Erotic/Explicit details of the sexual story indicated that an individual's reported frequency of sexual intercourse altered the sex finding, rendering it non-significant. Inspection of the data indicated that higher frequencies of sexual intercourse were related to higher recall of Erotic/Explicit elements of the story. This finding can be interpreted in the context of research linking familiarity with increased memory (e.g., Anderson et al., 1977). That is, given that the category of Erotic/Explicit contained information depicting a couple's sexual interaction leading up to the act of intercourse, it is likely that individuals engaging in more frequent sexual intercourse were more "familiar" with the Erotic/Explicit aspects of our story. Consistent with this interpretation are findings from a study by Lewis, Gibbons, and Gerrard (1986). In this study, recall of both sexual and non-sexual information was examined in 120 male and female undergraduates. Participants read four vignettes describing a moral dilemma (two of which focused on sexual issues and two of which focused on non-sexual issues) and completed questions regarding each vignette. Results indicated that sexually experienced individuals made significantly fewer mistakes in recall of sexual information

compared to sexually inexperienced individuals, whereas there were no significant group differences in recall of non-sexual information.

Our predictions that men would perform better on memory tasks relevant to Visual/Proximity elements of the story and that women would perform better on memory tasks relevant to Romantic/Implicit elements of the story were not supported. Based on past research linking heightened arousal to increased memory function and evidence that positive experiences are remembered with greater clarity than negative experiences (Libkumen, Stabler, & Otani, 2004), we hypothesized that sex differences in these variables would partially explain sex differences in sexual memory. Men and women did not report significantly different affective or arousal reactions to the sexual story and these factors did not help explain sex differences. Given the null findings, we assumed that sex differences in the memory of Love/Emotional Bonding elements and Erotic/Explicit elements of our story occurred independently of participants affective or emotional reactions to the sexual story. Post-hoc exploratory analyses indicated significant correlations across men and women between positive affect and subjective arousal with several of the memory variables examined in this study (e.g., positive affect and Love and Emotional Bonding recall). Based on these exploratory analyses and subsequent preliminary findings, future studies of this nature should investigate the role of affect and arousal in the recall and recognition of sexual information, independent of one's sex.

Significant sex differences could have also resulted from differential allocation of attentional focus to the elements of the sexual story depicting Love/Emotional Bonding and/or Erotic/Explicit details. That is, men may have attended more to the Erotic/Explicit details of the story resulting in increased recall of these elements, whereas women may have attended more the Love/Emotional Bonding aspects of the story resulting in increased recall of these elements. In the present study, we controlled for the amount of time spent reading and the amount of time spent writing about the sexual story; however, we did not control for the amount of time spent focusing on each specific aspect of the story. In a study which assessed the time spent reading each individual aspect of a sexual story, Geer et al. (2001) found that, although participants spent more time reading erotic sentences compared to romantic or neutral sentences, recognition memory was not predicted by the time spent reading each sentence.

The current study has a number of limitations that should be addressed in future studies of this nature. Demand characteristics could have played a role in the reported recall and recognition memory tasks. Once participants were oriented to the study, it was likely obvious that sexuality was a main focus of the experimenter's interest and this might have affected participants responses. Social desirability could have impacted participants responses in that the degree to which each participant found the information "socially appropriate" could have impacted how information regarding the sexual story was processed, the amount of rehearsal, and the likelihood of subsequent reporting during recall and recognition tasks. Although we did not specifically assess for social desirability in this study, we feel that this hypothesis is unlikely given that men and women did not differentially recall words deemed high in social acceptability (e.g., sex, erect) or words deemed low in social acceptability (e.g., dick, fuck). A potential limitation of our study design involved the inclusion of Immediate Recognition tasks. It is possible that presentation of these questions cued participants to remember more information about the sexual story during the Delayed Recall condition. Based on this notion, one would have expected an effect of time indicating increased Recall during the Delayed condition. Other than increased Recall of Erotic/Explicit details during the Delayed condition, there were no other significant time effects. Additionally, there was not a significant interaction between the increase in Erotic/Explicit Recall over time and sex. Also important to note, that although significant sex differences were noted in this study, these differences were small. That is, only 7% of the variance in Love/Emotional Bonding Recall, 6.4% of the variance in Erotic/Explicit Recall, and 5% of the variance in Love/Emotional Bonding Recognition was explained by differences between men and women. Although these differences are considerably small, they are still statistically significant, and indicate that an individual's sex may play a role in memory related to sexual information. Previous studies have reported that differences between men and women were approximately 2% in recognition of erotic and romantic sentences (Geer & McGlone, 1990), therefore the 10% difference (on Love/Emotional Bonding recognition) observed in the present study can be interpreted as a relatively large effect of sex. As for the examination of the potential predictors of differences between men and women on memory tasks, the power estimated to detect a medium to large effect size ($r = .30$) utilizing single regressions in a sample of 77 participants is $\delta = 2.6$, which corresponds to a power of 0.83 when using $\alpha = .05$ and according to Cohen's guidelines (Howell, 1997) is considered adequate power. Additionally important to note, the variability of sexual functioning scores (as assessed by the FSFI for women and the adapted FSFI for men) in our sample was relatively low. This low range in variability is most likely attributable to the young age of our sample and could have impacted the results in that significant correlations may be harder to judge due to a restricted range of scores for these variables.

Despite the limitations outlined above, the results from the present study add to the literature investigating sex differences in memory of sexual information. The significant results obtained in this study correspond to previously established sex stereotypes (e.g., Gagnon & Simon, 1973;

Schmidt, Sigusch, & Schafer, 1973; Wiseman, 1976) which suggest that women are more attuned to relationship-oriented material, whereas men are more attuned to explicitly sexual information. The results of this study also add to the literature by examining the predictors of sex differences in memory for sexual information and by the inclusion of more categories included in our sexual stimuli. These findings call attention to the need for caution when generalizing findings from sexuality research across men and women. Additionally, given that models of sexual functioning clearly rely on what an individual remembers about previous sexual scenarios, it would seem fruitful to understand sex differences in memory for sexual information and how these might influence sexual behavior and factors associated with intimate relationships, such as an individual's perception of the relationship and communication factors. By utilizing the memory bias paradigm, the current study demonstrates the value of using methodologies derived from cognitive research to increase the understanding of human sexuality.

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