

# The Relationship Between Negative Mood and Sexuality In Heterosexual College Women and Men

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*Negative mood states, such as depression and anxiety, are typically associated with decreased sexual interest and arousal. However, there is also some evidence that depressed or anxious mood may increase sexual interest or arousal in some individuals. In this study, 663 female college students (mean age = 18.9 years, SD = 1.21) answered questions regarding the effects of anxious and depressed mood on sexual interest and arousal and completed trait measures of sexual excitation and inhibition, anxiety, and depression. The majority of women reported decreased sexual interest and response when feeling depressed or anxious; a minority (about 10%) of women, however, reported increased sexual interest/response during anxious and depressed mood. This sample of women was compared to a sample of 399 college-aged men. In general, men were more likely than women to report increased sexual interest during negative mood states. Of the variables explored, propensity for sexual excitation was the strongest predictor of the relationship between negative mood and sexuality in women. Individual differences in the effects of negative mood may prove relevant to our understanding of a variety of topics, including "risky" and "compulsive" sexual behavior and sexual dysfunction.*

It is well-recognized that clinical depression is associated with a reduction in sexual interest and response (Beck, 1967; Kennedy, Dickens, Eisfeld, & Bagby, 1999; Schreiner-Engel & Schiavi, 1986), an association that may be more marked in women than in men (Angst, 1998). A few studies have looked at the possibility that in some individuals, paradoxical increases in sexual interest might occur with depression. In a group of 57 clinically depressed men and women, Mathew and Weinman (1982) found that whereas 31% had loss of sexual interest, 22% reported increased sexual interest as compared to their non-depressed state. Similarly, Angst observed that among depressed men, 26% reported decreased and 23% increased sexual interest, compared to 11% and 7%, respectively, of their non-depressed group. In comparison, 9% of the women reported increased interest when depressed, compared to 35% decreased sexual interest (in comparison with 2% and 32%, respectively, of the non-depressed group). This suggests that there are individual differences in the impact of depression on sexual interest, with a reduction in sexual interest for some, but no change or increased interest for others.

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Research on the relationship between anxiety disorders and sexual interest and response, by comparison, has been sparse. In the Angst (1998) study, loss of sexual interest was related to generalized anxiety disorder but not to other anxiety disorders (e.g., panic disorder, agoraphobia, social phobia). In a study by Ware et al. (1996), 61 male and 92 female patients with anxiety disorders had higher rates of sexual dysfunction, as compared to 37 control participants.

In addition to studies on clinical anxiety disorders, there is some experimental evidence that induction of anxious mood and physiological arousal in the laboratory has effects on sexual response. In men, Barlow and colleagues have carried out a series of studies on the relationship between anxiety and sexual functioning (for a review, see Cranston-Cuebas & Barlow, 1990), showing that in sexually functional individuals, anxiety may facilitate sexual arousal. A small number of comparable studies on women have demonstrated similar effects (Beggs, Calhoun, & Wolchik, 1987; Hoon, Wincze, & Hoon, 1976; Palace & Gorzalka, 1990).

Little research has investigated the relationship between more normal fluctuations in mood and sexual interest and arousal. Two recent studies set out to assess the possibility that individuals differ in the effects of more normal variations in mood on sexual interest and response (Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003; Bancroft, Janssen, Strong, & Vukadinovic, 2003). To investigate the relationship between mood and sexual interest and response, the Mood and Sexuality Questionnaire (MSQ) was developed. The MSQ is a self-report measure

that asks respondents to indicate what typically happens to their sexual interest and response when they feel depressed or anxious. In these two studies, Bancroft and colleagues explored to what degree the “dual control model” of sexual response (Bancroft, 1999; Bancroft & Janssen, 2000) could help explain variability in the relation between mood and sexuality. This model postulates that individuals vary in their propensity for both sexual excitation and inhibition. A questionnaire developed to measure these propensities (Janssen, Vorst, Finn, & Bancroft, 2002a) involves three scales: (a) propensity for sexual excitation (SES); (b) propensity for sexual inhibition due to the “threat of performance failure” (SIS1); and (c) propensity for sexual inhibition due to the “threat of performance consequences” (SIS2). In samples of heterosexual and gay men, considerable inter-individual variability was found in how negative mood (i.e., depressed or anxious mood) affected self-reported sexual interest and response. Although the majority of respondents indicated that negative mood states had either no effect or a negative effect on their sexual interest and response, a substantial minority reported an increase in sexual interest and response. In the heterosexual sample, increases in sexual interest during negative mood states were negatively related to age and sexual inhibition scores and positively related to depression proneness and sexual excitation scores (Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003). The above variables were less effective predictors of the effects of negative mood on sexual interest and response in the gay sample (Bancroft, Janssen, Strong, & Vukadinovic, 2003).

We expected that the relationship between negative mood and sexual interest and response, as well as its determinants, would be different in women. Women show higher rates of depression than men (Angst, Gamma, Gastpar, et al., 2002; Piccinelli & Wilkinson, 2000), and recent research suggests gender differences may be particularly marked for atypical depression (Angst, Gamma, Sellaro, Zhang, & Merikanges, 2002). Many women experience fluctuations in both mood and sexual interest during different phases of the menstrual cycle (Hedricks, 1994), and a strong positive link between sexual interest and well-being has been documented in some studies (Warner & Bancroft, 1988). Some women report their highest levels of sexual interest during the premenstrual phase, even when experiencing depressed mood (for a review, see Hedricks), providing evidence that in a subgroup of women, negative mood may be associated with increased sexual feelings.

In summary, there is some evidence of inter-individual variability in the relationship between negative mood and sexual interest and response in non-clinical samples of men. There is some experimental evidence, mainly for men, that induction of anxious mood in the laboratory can facilitate sexual arousal. The primary aim of this study was to investigate inter-individual variability in the relationship between anxious and depressed mood and sexual interest and response in a sample of heterosexual women.

We hypothesized that, as with men, the majority of women in our sample would report either no change or a negative effect on sexual interest and response during negative mood states, but that a proportion would report increased sexual interest. Secondly, we examined whether the same predictors of the relationship between mood and sexuality found to be relevant in men (age, propensity for anxiety and depression, and sexual inhibition and excitation proneness; Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003; Bancroft, Janssen, Strong, & Vukadinovic, 2003) would prove relevant in women. Lastly, we looked at possible gender differences by comparing this female sample with a non-clinical, heterosexual sample of male college students (Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003). We predicted that compared with men, a smaller proportion of women would report this paradoxical increase in sexual interest during negative mood states.

## METHOD

### *Participants*

Heterosexual women ( $N = 663$ ) enrolled in an introductory psychology course participated in this study. Women were excluded if they were currently taking antidepressant medication, because both mood and sexual interest and response are likely to be affected by antidepressants. Participants were awarded research credit as part of course requirements and were fully informed about the study. A subsample of 51 women participated in a subsequent session to examine test-retest reliability of the Mood and Sexuality Questionnaire.

The female sample was compared with a sample of 399 heterosexual undergraduate men. This subsample, taken from the Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al. (2003) study, was comprised of men enrolled in an introductory psychology course and who were not currently taking antidepressant medication. These men received course credit for their participation.

### *Measures*

*Demographic and Sexual History Questionnaire.* This questionnaire, developed for this study, included 33 questions involving broad aspects of a person’s life and sexual behavior, including current health problems and use of medications, sexual orientation, relationship status, number of lifetime sexual partners, and number of lifetime casual one-time partners.

*The Mood and Sexuality Questionnaire (MSQ; Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003; Bancroft, Janssen, Strong, & Vukadinovic, 2003).* The Mood and Sexuality Questionnaire (MSQ) was developed for use in both men and women to investigate the self-reported relationship between negative mood and sexual interest and response. This instrument asks respondents to indicate what typically happens to (a) sexual interest and (b) sexual responsiveness when depressed (MS1 and MS2

items) and when anxious or stressed (MS3 and MS4 items; e.g., “When you have felt anxious/stressed what typically happens to [a] your sexual interest and [b] your sexual arousal?”). Specific definitions for sexual interest, sexual response, depressed, and anxious were not provided in the questionnaire, which allowed the participant to utilize personal definitions of these experiences. A 9-point bipolar scale is used, with 5 indicating no change, 1 indicating marked reduction, and 9 indicating marked increase. A sum score of the 4 items (MS1, MS2, MS3, MS4) was calculated (MS-total), with a range from 4 to 36. For each mood state, there is a box to check if the participant “has never been depressed (or anxious) enough to find out.” Participants who checked one or more of these boxes were not used in the analyses using the MS-total score (as the MS-total score could only be computed for participants who answered all MSQ items). The Mood and Sexuality Questionnaire has demonstrated good internal consistency (Cronbach’s alpha = .78) and test-retest reliability ranging from  $r = .43$  (in the previous heterosexual male sample; Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003) to  $r = .91$  (in the gay male sample; Bancroft, Janssen, Strong, & Vukadinovic, 2003).

*Zemore Depression Proneness Ratings (ZDPR; Zemore, Fischer, Garratt, & Miller, 1990).* The ZDPR is a trait measure of the propensity for depression. The 13-item version was used for this study. All questions ask, “compared to most people you know . . .” Each item is bipolar (1-9) with the midpoint (5) indicating “about the same,” low scores indicating less depression, and high scores indicating more depression. The first three items cover frequency, duration, and intensity, and the remaining 10 items cover common symptoms of depressed mood. The ZDPR has excellent internal consistency (Cronbach’s alpha = .91) and good test-retest reliability ( $r = .82$ ).

*Spielberger Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970).* The STAI is a widely-used trait measure for anxiety, which has 20 items, each with four response options, from *strongly agree* to *strongly disagree*. The range of scores is 20 (low anxiety) to 80 (high anxiety). Cronbach alphas for the STAI have been found to be in the .86-.92 range and test-retest correlations in the .73-.86 range, in various samples of men and women (Spielberger et al., 1970).

*Sexual Inhibition/Sexual Excitation Scale (SIS/SES; Janssen, Vorst, Finn, & Bancroft, 2002a, 2000b).* This questionnaire measures three factors: (a) propensity for sexual excitation (SES; range 20 to 80); (b) propensity for sexual inhibition due to “the threat of performance failure” (SIS1; range 14 to 56); and (c) propensity for sexual inhibition due to “the threat of performance consequences” (SIS2; range 11 to 44). It has good discriminatory validity and only modest overlap with measures of global traits of behavioral inhibition, harm avoidance, and reward responsiveness. Cronbach’s alphas for three male samples (Janssen et al., 2002a) ranged from .88-.89 for SES, from .78-.83 for SIS1, and from .69-.75 for SIS2. Two test-retest stud-

ies (Janssen et al., 2002a; Gaither & Wilson, 1999) found acceptable test-retest correlations (SES:  $r = .73$ -.76, SIS1:  $r = .67$ -.74, SIS2:  $r = .62$ -.74). The SIS/SES questionnaire used in this study has been modified for use with women (e.g., “sexual arousal” and “genital response [e.g., vaginal lubrication, being wet]” are substituted for “erection” in the version used in women). This version has acceptable internal consistency ( $N = 1,040$ ; SES: .87, SIS1: .76, SIS2: .70), test-retest reliability ( $N = 51$ ; SES:  $r = .70$ , SIS1:  $r = .68$ , SIS2:  $r = .60$ ), and comparable levels of discriminant and convergent validity as found previously for men (Carpenter, Janssen, Graham, Vorst, & Wicherts, 2006).

### Procedure

Participants completed the questionnaires in groups of up to 30 men or women. Participants were told at the beginning of the session that they could leave at any time without incurring penalty. If they chose to stay, they signed the informed consent form and completed the questionnaires. The subsample of women for whom test-retest reliability data were collected completed the questionnaires on average two weeks apart.

### Data Analyses

SPSS version 10.0 was used for  $F$ -tests, correlations, and multiple regression analyses. Test-retest reliability of the Mood and Sexuality Questionnaire was assessed by computing Pearson’s correlations for the ratings of MS1, MS2, MS3, and MS4, and MS-total between the two sessions. ANOVAs were used to compare men and women’s responses to questions on the MSQ. Multinomial logit regression analyses were conducted to estimate the effects of age, SES, SIS1, SIS2, ZDPR, and STAI on the four individual MSQ items. For this purpose, subjects were categorized into “no change” in sexual interest or arousal (scores from 4 to 6 inclusive), “decrease” ( $< 4.0$ ), and “increase” ( $> 6.0$ ) groups (Hosmer & Lemeshow, 2000; Long, 1997). Because of the limited reliability inherent in the use of single items as dependent variables, an exploratory forward multiple regression analysis was carried out on the sum score of the MSQ (MS-total) using the same independent variables.

## RESULTS

### Demographic and Sexual History Questionnaire

Mean age for the female sample was 18.9 years ( $SD = 1.2$ , range = 17-32 years); 44.5% were in an exclusive/monogamous relationship, 6% were in a non-exclusive relationship, and 49.5% were not in a sexual relationship. Participants reported having had sexual intercourse with a mean of 1.4 partners ( $SD = 1.6$ , range = 0-11) in the past year and having had unprotected intercourse with an average of 1.1 partners ( $SD = 1.4$ , range = 0-8) during the past three years. Forty-one percent masturbated at least once a month; 61% had sexual intercourse at least once a month, with 40% reporting a frequency of sexual intercourse of once a week or more. Socioeconomic status was as follows:

poverty/lower income, 28%; lower middle/middle, 43%; upper middle/upper, 29%.

Mean age of the men was 19.6 years ( $SD = 1.9$ , range = 16-36 years); 37% were in an exclusive/monogamous relationship, 7% were in a non-exclusive relationship, and 56% were not in a sexual relationship. Socioeconomic status was as follows: poverty/lower income, 35%; lower middle/middle, 38%; upper middle/upper, 27%.

### Mood and Sexuality Questionnaire (MSQ)

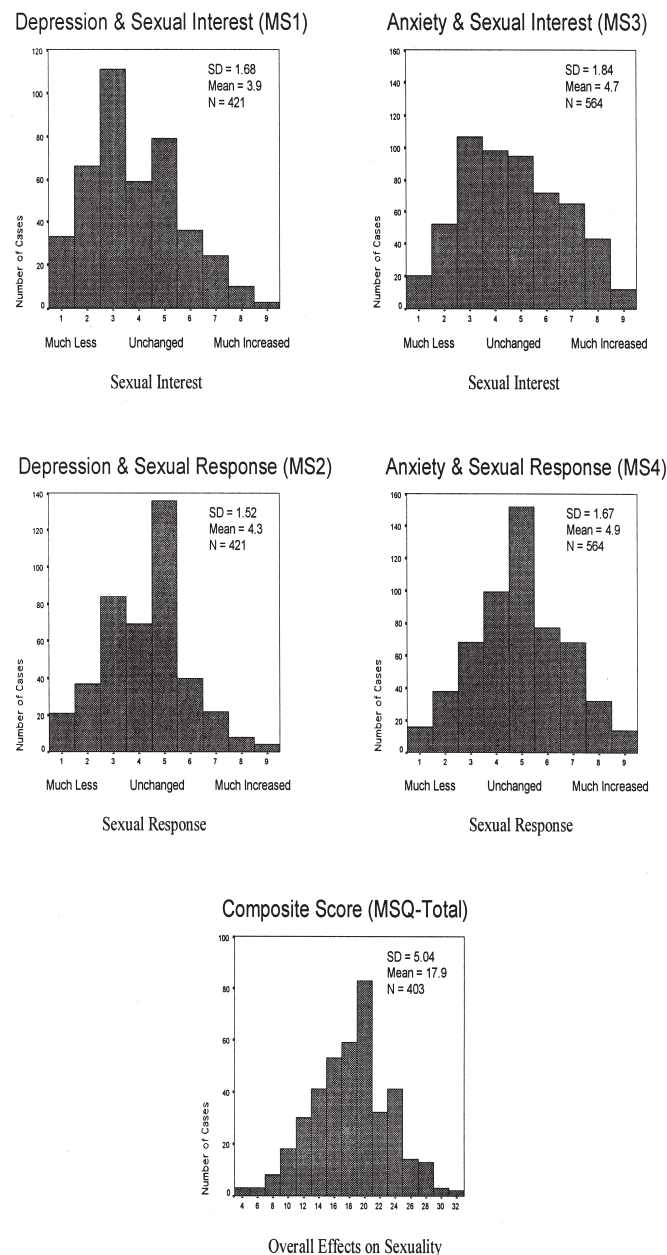
Of the 663 female participants, 36% indicated that they had never been depressed enough and 16% never anxious or stressed enough to respond to the MSQ questions. These participants were compared with those who completed the MSQ, and they scored significantly lower on depression proneness (ZDPR) and trait anxiety (STAI). This finding provides support for their classification. Of the 399 male participants, 33% indicated that they had never been depressed enough and 19% never anxious or stressed enough to respond to the MSQ questions.

Distributions of scores for each of the four individual items (MS1-MS4) and for the sum score for the four items combined (MS-total) are shown in Figure 1. The alpha coefficient for the internal consistency of MS-total was .74, and inter-item correlations ranged from .21 to .78 ( $p < .01$ ).

Because we were interested in the percentages of women who reported decreased vs. no change vs. increased sexual interest and response, we categorized scores 4 to 6 as “no change,” below 4 as “decreased,” and above 6 as “increased.” When feeling depressed, 50.5% of women reported decreased sexual interest, 40% reported no change, and 9.5% reported increased sexual interest. Thirty-four percent of women reported decreased sexual response when feeling depressed, 57% reported no change, and 8% reported increased sexual response when feeling depressed. When feeling anxious, 34% reported decreased sexual interest, 43% reported no change, and 23% reported increased sexual interest. Twenty-three percent reported decreased sexual response when feeling anxious, 56% reported no change, and 21% reported increased sexual response when feeling anxious.

We assessed reliability by computing Pearson’s correlations between the scores for the two sessions on the individual MSQ items and MS-total score. Four participants who gave a response on the second session that differed by a minimum of four points (on a 9-point scale) on at least one item were excluded. Four points was chosen as the cutoff because this difference would have put the individual in a different category (decreased vs. no change vs. increased), and this was how test-retest reliability was conducted in the two companion male papers (Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003; Bancroft, Janssen, Strong, & Vukadinovic, 2003). For MS1, sexual interest when depressed, the correlation was  $r = .77$ ; MS2, sexual response when depressed,  $r = .64$ . For MS3, sexual interest when feeling anxious,  $r = .66$ ; MS4, sexual response when feeling anxious,  $r = .57$ . The

**Figure 1. Sexual interest and response when feeling depressed or anxious.**



test-retest reliability for MS-total was  $r = .83$ . All correlations were significant at  $p < .001$ .

### Relationship Between MSQ Scores and Other Variables

Bivariate correlations between the five MSQ scores (MS1-MS4, MS-total) and other variables were computed. Most correlations were below .1 and nonsignificant. MS2 (sexual response when depressed) was significantly correlated with SIS1 (sexual inhibition due to threat of performance failure),  $r = -.10$ ,  $p < .05$ . MS3 (sexual interest when anxious) correlated with SES (sexual excitation),  $r = .19$ ,  $p < .01$ , and SIS2 (sexual inhibition due to threat of performance consequences),  $r = -.11$ ,  $p < .01$ .

MS4 (sexual response when anxious) significantly correlated with SES,  $r = .20$ ,  $p < .01$ , and with SIS2,  $r = -.14$ ,  $p < .01$ , and MS-total (sum score of items) with SES,  $r = .17$ ,  $p < .01$ , and with SIS2,  $r = -.12$ ,  $p < .01$ .

We conducted regression analyses to examine possible predictors of the relationship between mood and sexual interest in women, using the same set of variables previously explored and found to be relevant in men: age, propensity for anxiety and depression, and sexual inhibition and excitation proneness (Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003; Bancroft, Janssen, Strong, & Vukadinovic, 2003). Since the outcomes are ordinal, we considered the ordinal logit model for the four individual MSQ items; however, we found evidence of violation of this model's assumption of proportional odds (Wolfe & Gould, 1998) necessary for proper use of ordinal regression. Consequently, multinomial logit was used instead to model the effects of independent variables on the individual items, MS-1, 2, 3, and 4.

Results of the multinomial logit analyses for the MSQ are presented in Table 1. For each of the three comparisons (no change vs. decreased, no change vs. increased, and decreased vs. increased), the odds ratio of belonging to the first category is given, as well as the corresponding percentage change in odds and significance levels. Only independent variables for which significant effects were found are included in the table.

For both MS1 (sexual interest when depressed) and MS2 (sexual response when depressed), there were no significant effects for any of the independent variables. For MS3 (sexual interest when anxious), we found an overall effect for sexual excitation propensity (SES;  $SD = 7.2$ ;  $p < .001$ ). An increase of one standard deviation in SES increased the likelihood of being in the increase group versus the no change and decrease groups, by 34% and 40%, respectively. For MS4 (sexual response when anxious), the overall effects of age ( $SD = 1.2$ ;  $p < .02$ ), sexual excitation propensity (SES;  $SD = 7.2$ ;  $p < .001$ ), and propensity for sexual inhibition due to threat of performance consequences (SIS2;  $SD = 4.3$ ;  $p < .03$ ) were found to be significant. An increase of one standard deviation in age increased the likelihood of no change and decrease (both vs. increase) by 38% and 53%, respectively. An increase of one standard deviation in SES increased the odds of no change compared

to decrease by 30%, of increase compared to no change by 34%, and of increased versus decreased by 49%. An opposite pattern was found for sexual inhibition due to threat of performance consequences (SIS2), where a standard deviation increase made it *less* likely for participants to be in the no change than in the decrease group (change in odds by 21%), and more likely to be in the no change or decrease groups (compared to the increase group; with changes in odds of 12% and 43%, respectively).

We used forward multiple linear regression to assess the extent to which the sum score of the four MSQ items (MS-total) could be predicted with other variables. Independent variables were age, propensity for sexual excitation and inhibition, depression proneness, and trait anxiety. The model accounted for 3% of the variance, and SES was the strongest and only significant predictor ( $\beta = .17$ ,  $t = 3.29$ ,  $p < .001$ ).

### Comparison of Men and Women

We used ANOVAs to examine possible gender differences in the scores on the MSQ, SIS/SES, STAI, and ZDPR measures. Percentages for men who reported increased, no change, and decreased sexual interest and response when feeling anxious and depressed are as follows. When feeling depressed, 35% reported decreased sexual interest, 55% reported no change, and 10% reported increased sexual interest. Twelve percent reported decreased sexual response when feeling depressed, 86% reported no change, and 2% reported increased sexual response. When feeling anxious, 17% reported decreased sexual interest, 58% reported no change, and 25% reported increased sexual interest. Eight percent reported decreased sexual response when feeling anxious, 82% reported no change, and 10% reported increased sexual response. Gender differences were found for all but one of the MSQ items (MS4) examined (see Table 2).

### DISCUSSION

The main purpose of this study was to examine inter-individual differences in the relationship between negative mood and sexuality in a non-clinical sample of women. Half of our sample of women reported a decrease in sexual interest when feeling depressed. However, 40% of the women reported no effect and 9.5% reported an *increase* in

**Table 1. Multinomial Logit Analyses**

	No change vs. Decreased			No change vs. Increased			Decreased vs. Increased			SD	Overall Significance Level
	OR	%	p	OR	%	p	OR	%	p		
<b>MS3</b>											
SES	1.09	+9	ns	.66	-34	.00	.60	-40	.00	7.22	<.001
<b>MS4</b>											
Age	.90	-10	ns	1.38	+38	.03	1.53	+53	.01	1.21	.02
SES	1.30	+30	.02	.66	-34	.00	.51	-49	.00	7.22	<.001
SIS2	.79	-21	.03	1.12	+12	ns	1.43	+43	.01	4.31	.03

Note. MS3 = Sexual Interest/Anxiety; MS4 = Sexual Response/Anxiety; SES = Sexual Excitation Scale; SIS 2 = Sexual Inhibition Scale 2.

**Table 2. Comparison of Women and Men on Age and Trait Measures of Anxiety and Depression**

	Women <i>M (SD)</i>	Men <i>M (SD)</i>	ANOVA
Age	18.9 (1.2)	19.6 (1.9)	$F_{(1, 1061)} = 50.0^{**}$
SIS/SES			
SES	50.6 (8.6)	55.6 (7.3)	$F_{(1, 1061)} = 94.8^{**}$
SIS1	30.8 (4.9)	27.9 (4.8)	$F_{(1, 1056)} = 84.1^{**}$
SIS2	31.4 (4.7)	27.4 (3.9)	$F_{(1, 1056)} = 201.3^{**}$
MSQ			
MS1	3.93 (1.69)	4.36 (1.48)	$F_{(1, 688)} = 11.41^{**}$
MS2	4.33 (1.53)	4.73 (.89)	$F_{(1, 753)} = 15.1^{**}$
MS3	4.71 (1.85)	5.12 (1.61)	$F_{(1, 884)} = 10.90^{**}$
MS4	4.92 (1.68)	5.06 (1.10)	$F_{(1, 895)} = 1.80$
MS-total	17.91 (5.0)	19.2 (3.7)	$F_{(1, 641)} = 11.1^*$
ZDPR	58.8 (17.0)	54.3 (16.7)	$F_{(1, 1050)} = 17.4^*$
STAI	45.5 (8.3)	42.5 (7.7)	$F_{(1, 1061)} = 35.3^*$

Note. MS1 = Sexual Interest/Depression; MS2 = Sexual Response/Depression; MS3 = Sexual Interest/Anxiety; MS4 = Sexual Response/Anxiety; MS-total = sum MS scores; SES = Sexual Excitation Scale; SIS1 = Sexual Inhibition Scale 1; SIS 2 = Sexual Inhibition Scale 2; STAI = Spielberger Trait Anxiety Inventory; ZDPR = Zemore Depression Proneness Ratings.

\*\* $p < .001$  \* $p < .01$

sexual interest when feeling depressed. Reports of negative effects on sexual *response* when feeling depressed were less frequent, with approximately one third of the women reporting that their sexual response decreased. For anxiety, smaller percentages of women reported negative effects on either sexual interest (34%) or response (23%) when feeling anxious. Compared to feeling depressed, almost twice as many women indicated that they experienced an *increase* in sexual interest (23%) and response (21%) when anxious.

The finding that a proportion of women reported increases in sexual interest and sexual response when feeling depressed is consistent with previous studies in men (Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003; Bancroft, Janssen, Strong, & Vukadinovic, 2003). In men, the tendency to experience increased sexual interest or response during negative mood states has been linked to sexual risk-taking behaviors (e.g., lack of condom use, higher numbers of casual partners, high numbers of lifetime partners; Bancroft et al., 2004; Bancroft, Janssen, Strong, Carnes, & Long, 2003), sexual compulsivity (Bancroft & Vukadinovic, 2004), and sexual offenses (Hanson & Bussiere, 1998; Proulx, McKibben, & Lusignan, 1996). One possibility is that sexual activity may be used as a coping mechanism for mood regulation. Future research should investigate whether women who report increased sexual interest and response during negative mood states may also be more likely to take sexual risks.

As predicted, women reported more negative effects of anxiety and depressed mood on sexual interest and response than men. Women also scored higher than men on both trait anxiety and depression proneness. This finding is consistent with previous community and clinical studies showing higher prevalence of depression in women than in men (Angst, Gamma, Gastpar, et al., 2002;

Piccinelli & Wilkinson, 2000).

In the multiple regression analysis, the large majority of variance in the relationship between mood and sexual interest and response in women was unaccounted for by our independent variables (age and trait measures of depression, anxiety, sexual inhibition, and sexual excitation). Only one variable (SES) reached significance, suggesting that as propensity for sexual excitation increases, the negative effects of anxiety and depression on a woman's sexual interest and response decrease. The 3% of variance accounted for was much lower than the previous study of heterosexual men, where, using similar independent variables, 19% of variance was accounted for (Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003).

Although age and SIS2 (sexual inhibition due to threat of performance consequences) were relevant, propensity for sexual excitation was found to be the strongest predictor of the relationship between anxiety and sexual interest and response in women in the multinomial regressions. For the two depressed mood items, none of the predictors were significant. This contrasts with findings in heterosexual and homosexual men (Bancroft, Janssen, Strong, Carnes, Vukadinovic, et al., 2003; Bancroft, Janssen, Strong, & Vukadinovic, 2003), where both types of sexual inhibition propensity proved to be more relevant for the relationship between negative mood states and sexual interest and response. The relative importance of sexual excitation for women as compared to the role of inhibition in men is intriguing. However, it should be kept in mind that the SIS/SES questionnaire was originally developed for men and may not be as appropriate for use with women, particularly for assessing sexual inhibition proneness (Graham, Sanders, Milhausen, & McBride, 2004). Inhibition may play a crucial role in predicting the variability in the relationship between mood and sexuality in women; however, we may require a measure that more adequately taps the dimensions relevant to sexual inhibition in women.

The questionnaire used in this study, the Mood and Sexuality Questionnaire, is a simplistic measure that may not have captured the complexity of the relationship between anxious and depressed mood states and sexual interest and response in its entirety. For example, this version of the MSQ does not allow for a distinction between relatively normal mood changes and states of clinical anxiety and depression. Additionally, the MSQ is not sensitive to possible differences in the relationship between mood and sexuality across the various stages of the menstrual cycle. Because a proportion of women experience menstrual cycle-related changes in mood (Hedricks, 1994), one might expect variations in the relationship between mood and sexual interest and response to change across the menstrual cycle.

Another potential limitation is that the MSQ does not differentiate between different types of sexual behavior (e.g., masturbation, sex with a partner). Frohlich and Meston (2002) examined a sample of depressed women and found that, while they reported decreased interest in

sex with a partner, frequency of masturbation was higher, as compared to non-depressed women. Because we did not define "sexual interest" on the MSQ, the women who reported increased sexual interest in our sample may have been reporting an increased interest in masturbation. There is also evidence that women do not clearly differentiate between sexual desire and arousal (Graham et al., 2004; Heiman, 2002). This lack of clear categorization most likely leads to the high correlation between sexual desire and arousal found in previous studies (Beck, Bozman, & Qualtrough, 1991; Rosen et al., 2000) and in turn begs the question: how are women interpreting the questions related to sexual interest and response on the Mood and Sexuality Questionnaire? We are currently developing a more comprehensive mood and sexuality questionnaire that will address some of these issues.

A limitation of the test-retest reliability analysis was that we used a subsample ( $n = 51$ ) of the overall sample of women ( $N = 663$ ), rather than a separate sample. Finally, a limitation not unique to this study but one that is worth addressing is the correlational nature of the data presented. Any hypotheses regarding causation would be, at this point, purely speculative. Although this study clearly demonstrates the existence of a relationship between anxious and depressed mood states and sexual interest and response, only future experimental studies will elucidate the potential causal pathways for non-clinical populations.

This exploratory study found that women and men vary in their experiences of the effects of mood on their sexual interest and response. Future research should explore the relevance of this variability to our understanding of risky sexual behavior and sexual dysfunction in women. In addition to using the more comprehensive mood and sexuality questionnaire under development, future studies should employ prospective methodologies (e.g., daily diaries) to study the relationship between mood and sexual interest and response in women and men.

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