

Women's Endorsement of Models of Female Sexual Response: The Nurses' Sexuality Study

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ABSTRACT

Introduction. The current *Summary of Recommendations on Sexual Dysfunction in Women* [1] is conceptually grounded on a model of women's sexual function that has not been empirically tested in samples of women with and without sexual dysfunction.

Aim. The current research represents an initial effort to assess the extent to which women in a community sample endorse current theoretical models of female sexual function based upon work by Masters and Johnson, Kaplan, and Basson as accurately reflecting their own sexual experience.

Main Outcome Measures. Women's endorsement of brief descriptions of current models of female sexual function (Masters and Johnson, Kaplan, and Basson) as accurately reflecting their own sexual experience and their own levels of sexual function or dysfunction as assessed by the Female Sexual Function Index (FSFI).

Methods. A random sample of 580 Registered Nurses was mailed a 58-item questionnaire which assessed women's perception of the fit of their sexual experience with current models of female sexual response and included the FSFI.

Results. In total, 133 women, of whom 111 had a current man partner, returned responses. Approximately equal proportions of women endorsed the Masters and Johnson, Kaplan, and Basson models of female sexual response as representing their own sexual experience. Women endorsing the Basson model had significantly lower FSFI domain scores than women who endorsed either the Masters and Johnson or Kaplan models.

Conclusion. These are the first data to assess the proportion of a community sample of women who endorse widely accepted models of female sexual response as representing their own sexual experience. Women in this sample were equally likely to endorse each of these different models, emphasizing the heterogeneity of women's sexual response, and highlighting the need for additional research to guide the field's acceptance and application of particular models of female sexuality in particular situations. Women's endorsement of models of female sexual response was correlated with their FSFI scores, and findings suggest that the Basson model, currently advanced by the Second International Consultation on Sexual Medicine, may best reflect women with sexual concerns (e.g., FSFI < 26.55), rather than a single normative sexual response pattern. **Sand M, and Fisher MA. Women's endorsement of models of female sexual response: The nurses' sexuality study. J Sex Med **,**:**-**.**

Key Words. Female Sexual Response; FSFI; FSD

Introduction

Conceptualization of normative female sexual response has undergone significant changes over the past 20 years, based largely on the contributions of new feminist theory [2,3], physiological [4], and psychosexual [5] analyses. Developments in the construct of normative female sexual response have, in turn, led to significant changes in the way that female sexual dysfunctions (FSD) are

characterized and treated [5–8]. Despite widespread acceptance of newer conceptualizations of female sexual function, however, studies on the prevalence and correlates of sexual function and dysfunction in women are relatively sparse [9–17] and of variable quality [18,19]. Moreover, given the paucity of empirical evidence to support any single conceptual model of female sexual response, the recent adoption and publication of consensus statements by the Second International Consulta-

tion on Sexual Medicine, which promulgated such a new conceptualization [20,21], is of potential concern.

Aims

The current *Summary of Recommendations of Sexual Dysfunction in Women* [21] is conceptually grounded on a model of women's sexual function that has not been empirically tested in samples of women with and without sexual dysfunction [22]. Originally developed by an international committee organized by the American Foundation of Urological Disease to revise definitions of women's sexual dysfunction [21], with the aim of recognizing variability in female sexual response without pathologizing such variability, the American Foundation of Urological Disease's Definitions Committee informally vetted, via clinician opinion but without confirmatory data from women, draft definitions of female sexual function and dysfunction. However, the Committee from onset identified and recommended the need for further empirical study, noting "epidemiological research on the prevalence, predictors and outcomes of sexual dysfunction in women is urgently needed" [21]. Presentation of a new conceptualization of female sexual response and new definitions of female sexual function and dysfunction took place at the Second International Consultation on Sexual Medicine: Men and Women's Sexual Dysfunction, in Paris, in July of 2003.

Noting the need to revise current conceptualizations of female sexual function and dysfunction, the authors asserted that linear models of female sexual response originally proposed by Masters and Johnson [23,24], and expanded upon by Kaplan [24] and Lief [25], have serious limitations, stating that "... unfortunately, the concept of one linear sequence of mainly genitally focused events has not proven helpful in assessing and managing women's sexual difficulties and sexual dysfunctions" [20]. In noting limitations of the Masters and Johnson and the Kaplan models, the Definitions Committee asserted that that sexual desire is *not* the most frequent reason women accept or initiate sexual activity (Lunde et al. 1991; Regan, 1996), and that sexually healthy women in established relationships are frequently unaware of spontaneous sexual thoughts (Bancroft, 2003). More sophisticated psychophysiological studies have illustrated that some women's experience of sexual arousal is not primarily linked with genital vasocongestion/vaginal lubrication/perception of

genital swelling (Laan et al. 1994; Morokoff, 1980), and that women's subjective sexual arousal is strongly modulated by emotions and cognitions (Laan, 1995). Recent work by Chivers and Bailey [26] has even suggested that women's genital response may be independent, reflexive, and unrelated to contextual cues.

The Definitions Committee's conceptualization of female sexual experience precludes women whose sexual response and experiences are satisfactory to them from being diagnosed or labeled as dysfunctional or disordered. The authors of the *Summary of Recommendations of Sexual Dysfunction in Women* [21] also challenged definitions of FSD contained within the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision (DSM-IV-TR) [27], currently used as gold-standard diagnostic criteria, as being problematic in a number of respects. While these critiques and assertions unquestionably support further study and identify potential weaknesses in existing models of female sexual response [18,19] and DSM-IV definitions of FSD [27], the weakness of the research data available falls far short of what is necessary to either reject current models of female sexual function and dysfunction, or to support the approach recommended by the *International Guidelines* [20]. Despite these limitations, the *Guidelines* [20] have become widely cited [28]. When models such as these [29] are endorsed by professionals and professional societies [30] without sufficient empirical validation, a narrow view of diagnostic and therapeutic options and research agendas may follow, as may well have been case with earlier models (e.g., Masters and Johnson, Kaplan), whose empirical base is also incomplete.

The current research represents an initial effort to assess, quite simply, the extent to which women in a community sample endorse current theoretical models of female sexual function based upon work by Masters and Johnson [23], Kaplan [24,29], and Basson [29,31] as accurately reflecting their own sexual experience. The current research will also examine whether women's endorsement of current models of female sexual response may be related to their own levels of sexual function or dysfunction as assessed by the Female Sexual Function Index (FSFI) [32].

Methods

This study utilized a sample of 580 female Registered Nurses (RNs) aged 25–69 years, currently

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living in the United States, drawn randomly from a roster of 1,922,135 names, comprising 78% of the population of female RNs in the United States. The sole exclusion criterion was age; women aged under 25 and over 69 years were excluded from study. RNs were chosen for the sample because they represented a defined, relatively knowledgeable, and approachable sample, with a median age of approximately 44 years. A sample drawn from this population should thus include a significant proportion of both pre- and postmenopausal women, many of whom have been in longstanding relationships and are at an age at which sexual concerns in women are reported to be prevalent [9,15,17].

The self-assessment instrument employed included 55 items that tap: women's basic demographic information (age, income, religion, relationship status); women's reports of their current sexual experience; and women's endorsement of narrative descriptions of models of sexual response based up the work of Masters and Johnson [23], Kaplan [24], and Basson [20,29,33]. The Female Sexual Function Inventory [32,34] was included in the self-report inventory as were close-ended items assessing current and past medical history and reproductive health parameters (e.g., menopausal status, contraceptive use), and Likert-type scales assessing attitudes toward, body image, relationship dynamics, experiences of sexual coercion and prepubertal sexual touching, and a number of other factors reported in the literature to be associated with sexual concerns [35]. Data from measures other than women's demographics, their endorsement of current models of sexual response, and their FSFI scores will be the subject of a separate publication.

Women in the sample received multiple mailings over a period of 3–4 weeks following the methodology suggested by Salant and Dillman [36]. An initial letter outlining the study was mailed to each woman sampled, followed 1 week later by the questionnaire and cover letter. Two weeks after the questionnaire was mailed, a "reminder" postcard was mailed.

Data were analyzed using SPSS® v13.0 (Xx, Xx, Xx). Descriptive statistics (means, percentages, standard deviations) were calculated to characterize the parameters under study. To explore the possibility that women's endorsement of models of female sexual response is a function of their level of sexual function, as assessed by FSFI scores (women with FSFI scores below 26.55 are categorized as experiencing sexual dysfunction, while

women above this cutoff are categorized as experiencing normal sexual function [34]), exploratory analyses were conducted utilizing *t*-tests, analysis of variance, and chi-square analyses, employing the Bonferroni calculation for multiple hypothesis testing.

Main Outcome Measures

To assess the fit of women's own sexual experience with current models of female sexual response, two questions were developed offering descriptions of sexual experience based upon the models of Masters and Johnson [23], Kaplan [24], and Basson [29,33]. Women were asked to indicate which one, if any, of these models best described their own pattern of sexual response. To assess female sexual function/dysfunction, the FSFI was included in the survey instrument. The FSFI has been validated in several samples of women with mixed sexual dysfunctions and has been shown to possess excellent psychometric properties. Recent validation studies have demonstrated diagnostic cutoff scores that correctly identify 77% of women with a sexual dysfunction and 85% of sexually functional women [34,37].

Results

Within 6 weeks of mailing, 133/580 (23%) surveys were returned, of which 129 were fully completed and suitable for evaluation. This response rate is in keeping with other recent sexuality surveys [38,39]. Surveys were returned by women in 35 states, representing all geographic regions of the United States. Surveys were completed between May and June 2006.

In keeping with the population demographics of American RNs, the majority (71.3%) of respondents were of middle age (40–59 years); distributions of education, income, alcohol use, reproductive health history, and relationship duration are shown in Table 1. Among those women (N = 111) with a current man partner, 76.8% were in relationships of ≥ 10 years' duration. Nonresponders did not differ from responders with respect to age or regional distribution.

Female Sexual Function Index (FSFI) Scores

The sample was evenly split (N = 64/N = 64, one nonresponse) between women whose FSFI scores were < 26.55 (FSD) and women whose FSFI scores were > 26.55 (no FSD). Of those women with a current man sexual partner (N = 111), the proportion of women with scores indicative of FSD

Table 1 Sample demographics

	Respondents (%)	Total sample (%)
Age		
No response	1.6	
20–29 years	1.6	2
30–39 years	14.0	11
40–49 years	33.3	35
50–59 years	38.0	38
60+ years	11.6	15
Income		
No response	1.6	
<25,000 per year	1.6	
25–50,000 per year	7.8	
50–75,000 per year	31.0	
75–100,000 per year	21.7	
>100,000 per year	36.4	
Units of alcohol per week		
0	43	
1–2	27	
3–5	19	
5–10	7	
>10	3	
Children at home		
0	47.3	
1	21.7	
2	20.2	
3	7.8	
>3	2.3	
Lifetime pregnancies		
0	10.9	
1	14.0	
2	33.3	
3	18.6	
>3	22.5	
Duration of current partnership		
No response	6.2	
<1 year	2.3	
1–5 years	11.6	
5–10 years	9.3	
>10 years	70.5	

dropped to 43% (N = 48), possibly reflecting a focus of the FSFI on partnered sexual activity, and in keeping with prevalence figures obtained from other U.S. samples [9]. In the overall sample, as well as in the sample of women reporting a current sexual partner (Figure 1), women characterized as having FSD reported significantly lower ($P < 0.001$) mean scores for *all* individual domains of the FSFI. The split of women with FSFI scores into the dysfunctional and nondysfunctional range was strongly associated with age and menopausal status, with small differences in mean scores observed between women in their 30s vs. 40s, and women in their 50s vs. 60s, but striking differences in mean scores between women in their 40s and women in their 50s. (Figure 2). The effect of menopause is seen in Table 2, showing that significantly more premenopausal compared with

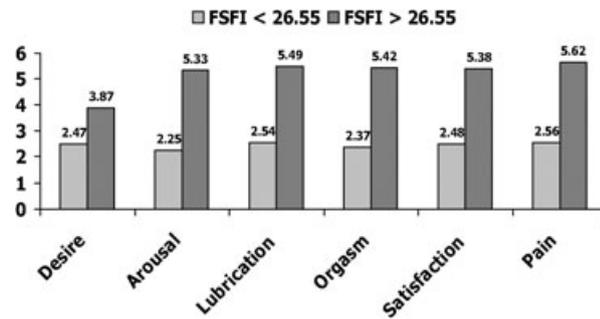


Figure 1 FSFI domain scores by 26.55 cutoff. FSFI = Female Sexual Function Index.

postmenopausal women report scores in the non-dysfunctional range (62.5% vs. 37.5%, $P = 0.004$, Fisher’s exact test).

Endorsement of Current Models of Female Sexual Response

The extent to which women endorsed current models of female sexual response as reflecting their own pattern of sexual experience was explored with two items, reflecting the sexual excitement, sexual desire, and receptivity emphases that differentiate, in part, the Masters and Johnson [18], Kaplan [19], and Basson [20,22] models (see Figure 3). In order to ensure that item wording corresponded to the differential emphases of the Masters and Johnson, Kaplan, and Basson models, they were vetted Dr. Rosemary Basson (personal communication, 2005) by Dr. Michael Perelman, a student and colleague of Dr. Helen Singer Kaplan (Perelman, personal communication, 2005), and modified to incorporate suggested revisions.

The first item read “The following three statements attempt to describe women’s sexual **response, or experience**. Please read them and then check which, if any, you feel BEST describes

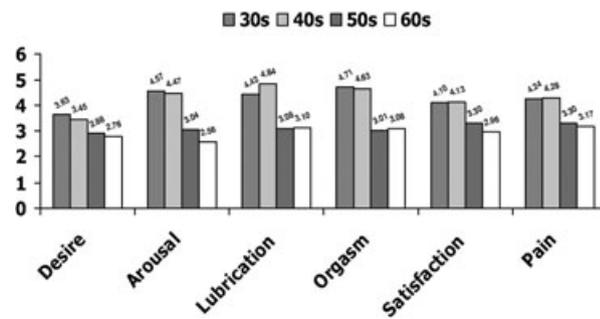


Figure 2 FSFI scores by age. FSFI = Female Sexual Function Index.

Table 2 FSFI scores by menopausal status

	Premenopausal	Postmenopausal	d.f.	F	P
Desire	3.54	2.85	1	10.68	0.0001
Arousal	4.52	2.92	1	18.73	0.0001
Lubrication	4.73	3.08	1	17.71	0.0001
Orgasm	4.67	3.03	1	18.01	0.0001
Satisfaction	4.15	3.22	1	5.35	0.022
Pain	4.30	3.27	1	5.05	0.026

Comparison of the mean FSFI scores endorsing between age groups conducted with *t*-tests.
 FSFI = Female Sexual Function Inventory.

your own sexual response with your current partner” (select only one answer):

- When I'm being sexual with my partner, I become excited, or “turned on,” then those feelings and sensations build through our activity until I may reach orgasm, then I return to a “relaxed” state. (Following Masters and Johnson [23])
- I mostly agree to sexual activity with my partner or initiate it when I am feeling sexual desire, or “in the mood”—meaning I want the sexual sensations, excitement, pleasure, maybe orgasms(s) and the good feelings that follow. Once my partner and I start interacting and touching and stimulating each other, I get aroused—excited, feel the sexual sensations building and maybe have orgasm(s). (Following Kaplan [24])
- I mostly agree to sexual activity with my partner or initiate it for reasons other than sexual desire (for example, I might want to be closer to my partner emotionally). In other words, I am not at the beginning “in the mood.” Once my partner and I start interacting and touching and stimulating each other, I get aroused—excited, feel the sexual sensations building and maybe have orgasm(s) When it gets more intense, I do

feel desire—then I am “in the mood” and I want to continue. (Following Basson [20,29,33])

- None of these describes my sexual current response/experience very well
- Does not apply—I don't currently have a partner

Note that the model identifications in square brackets, above, did not appear in the items as presented to respondents.

As a central tenant of the Basson model is the concept that women frequently approach and engage in partnered sexual activity not from an intrinsic desire for sexual activity, but from what has been termed “sexual neutrality” (Figure 4), characterized more by willingness to be sexual out of a desire for emotional closeness or other non-sexual reasons [21,33]; a second item was con-

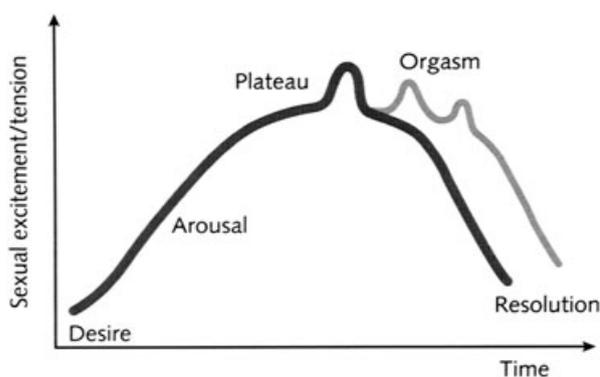


Figure 3 Traditional human sex response cycle of Masters and Johnson [23], and Kaplan [24].

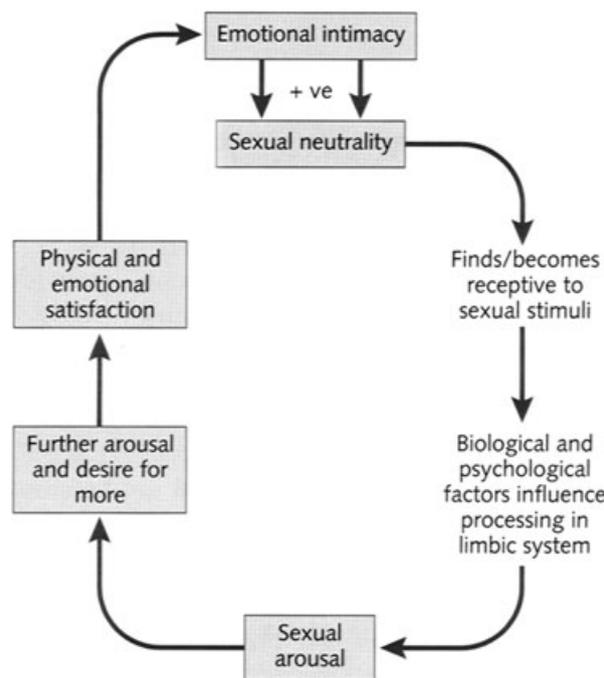


Figure 4 Xxxxx.

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Table 3 Endorsement of models of female sexual response

	Total sample (N = 111)	FSFI < 26.55 (N = 48)	FSFI > 26.55 (N = 63)	P
Masters and Johnson	29.5 (N = 33)	12.5	42.9	0.0001
Kaplan	26.8 (N = 30)	18.8	33.3	0.0329
Basson	28.6 (N = 32)	37.5	22.2	0.0355
None of above	14.3 (N = 15)	29.2	1.6	0.0001
No response	0.8 (N = 1)	1.6	0	ns

Comparison of the proportion of women with normal vs. dysfunctional FSFI scores endorsing the different models conducted with *t*-tests.
 FSFI = Female Sexual Function Index.

structured to assess this component of sexual experience. This item read “Please read the following statements and then check which you feel BEST describes your own reasons for engaging in sexual activity with your current partner:”

- I engage in sexual activity with my partner mostly *because I want to have sexual feelings*, sensations, excitement, maybe orgasm—in other words “I’m in the mood”
- I engage in sexual activity with my partner mostly *because I want to be emotionally close* and that occurs during and after being sexual together
- I engage in sexual activity with my partner, even if I don’t feel physical desire to do so, for *other, nonsexual reasons*
- None of these describes my reasons for engaging in sexual activity very well
- Does not apply—I don’t currently have a partner

While it would be possible to develop psychometrically complex measures to assess the fit of women’s sexual experience with current models of female sexual response, we opted for use of simple items that provide opportunities for women to relate what their sexual experiences are like and what their motivation for sexual activity may be. In part, this decision was based on the investigators’ concern that there may be a surfeit of women’s own directly stated views in our efforts to understand of female sexual function. And, as noted, the straightforward items we used to assess the fit of women’s sexual experience with current models of

female sexual response were vetted by the model’s authors or those professionally associated with them.

Findings demonstrate considerable variation in women’s endorsement of models of female sexual response (see Table 3). Approximately 30% of women endorsed each of the Masters and Johnson, Kaplan, and Basson models, and *no* single model was endorsed by a majority of women as reflecting their own pattern of sexual experience.

The relationship between endorsement of models of female sexual response and women’s level of sexual function was examined by comparing endorsement of the each of the models by women with FSFI scores above and below the sexual dysfunction cut point of the scale. When women’s model endorsement is examined as a function of their FSFI scores, a highly systematic differential relationship emerges. Women with FSFI scores in the sexually functional range are significantly more likely to endorse the Masters and Johnson ($P = 0.0001$) or Kaplan ($P < 0.0329$) models of female sexual response, while women who score as sexually dysfunctional on the FSFI are more likely to endorse the Basson model ($P < 0.035$) (Table 4). Similarly, women who endorse the Basson model have significantly lower FSFI total and domain scores than do women who endorse either Masters and Johnson or Kaplan’s models (Tables 3 and 5). This pattern of results held for the desire, arousal, and orgasm domains even in women with overall FSFI scores in the healthy range (>26.55) (Table 6).

Table 4 Mean FSFI total scores by endorsement of model of sexual response

Model	Mean FSFI total score	P
Masters and Johnson (a)	28.26	vs.: b = ns, c = 0.025, d < 0.001
Kaplan (b)	28.36	vs.: a = ns, c = 0.027, d < 0.001
Basson (c)	22.23	vs.: a = 0.025, b = 0.027, d < 0.001
None of above (d)	10.27	vs.: a < 0.001, b < 0.001, c < 0.001

FSFI = Female Sexual Function Inventory.

Table 5 Mean FSFI domain scores by endorsement of model of sexual response

FSFI domain	Masters and Johnson	Kaplan	Basson	None of above	d.f.	F
Desire	3.69a	3.80a	2.94b	2.00c	3111	12.34
Arousal	4.85a	4.67a	3.81b	1.43c	3111	18.36
Lubrication	4.88a	5.22a	3.86b	1.78c	3111	15.43
Orgasm	5.05a	4.64a	3.94b	1.65c	3110	14.38
Satisfaction	4.82a	4.86a	3.96a	1.76b	3111	15.20
Pain	5.05a	5.20a	3.85a	2.08b	3108	9.95

Comparison of the mean scores conducted utilizing ANOVA. Means in the same row that do not share subscripts differ at $P < 0.05$ in the Tukey honestly significant difference comparison.

FSFI = Female Sexual Function Index.

Exploratory analyses indicated that significantly more pre- than postmenopausal women endorsed the Masters and Johnson model (43.9% vs. 15.4%, $\chi^2 [3, N = 109] = 11.69 P = 0.009$), while the reverse was true for endorsement of the Basson model (21.1% vs. 38.5%, $\chi^2 [3, N = 109] = 11.69 P = 0.009$). However, the same trend noted above held; of the postmenopausal women who endorsed the Basson model, only 33% reported FSFI scores >26.55 , contrasted with the postmenopausal women who endorsed the Masters and Johnson (77.5%) or Kaplan (67%) models ($\chi^2 [4, N = 109] = 15.1, P = 0.005$). An analysis of model endorsement by duration of partnered relationship of <5 years, compared with >5 years, demonstrated no differential effect of duration of relationship among women who endorsed the Masters and Johnson model (31.3% vs. 29.2%); however, women in shorter relationships (<5 years' dura-

tion) were more likely to endorse Kaplan (62.5% vs. 20.8%) and less likely to endorse the Basson model, compared with women in relationships of >5 years (6.5% vs. 32.3%, $\chi^2 [4, N = 112] = 14.99 P = 0.005$).

Women's reports of reasons for engaging in partnered sexual activity demonstrate a similar striking pattern (see Table 7), with the majority (79.4%) of sexually functional women (FSFI scores >26.55) endorsing motivations for partnered sexual activity that center on sexual activity itself, either for the intrinsic physical experience or for the emotional closeness that such activity engenders, with almost no sexually healthy women (6.3%) reporting that their motivation centered on other nonsexual reasons. Conversely, women who reported that their motivation centered on nonsexual reasons were some five times more likely to report FSFI scores <26.55 than those with

Table 6 Mean FSFI domain scores by endorsement of model of sexual response in women with total scores >26.55

FSFI domain	Masters and Johnson	Kaplan	Basson	d.f.	F
Desire	3.92a	4.25a	3.23b	2,62	4.22
Arousal	5.54a	5.53a	4.92b	2,62	6.78
Lubrication	5.54a	5.46a	5.46a	2,62	0.84
Orgasm	5.76a	5.20b	5.21b	2,62	3.40
Satisfaction	5.52a	5.36a	5.17a	2,62	1.06
Pain	5.54a	5.67a	5.60a	2,62	0.12

Comparison of the mean scores conducted utilizing ANOVA. Means in the same row that do not share subscripts differ at $P < 0.05$ in the Tukey honestly significant difference comparison.

FSFI = Female Sexual Function Inventory.

Table 7 Proportion of endorsing models of female sexual motivation

	Total sample (N = 111)	FSFI < 26.55 (N = 48)	FSFI > 26.55 (N = 63)	P
Wanting sexual feelings and sensations	25.2 (N = 25)	10.4	36.5	0.0001
Wanting emotional closeness through sex	40.5 (N = 45)	37.5	42.9	ns
Other nonsexual reasons	17.1 (N = 19)	31.3	6.3	0.0001
None of above	14.4 (N = 17)	14.6	14.3	ns
No response	1.8 (N = 2)	6.1	0	ns

Comparison of the proportion of women with normal vs. dysfunctional FSFI scores endorsing the different motivations was conducted with χ^2 (d.f. 3, N = 111) = 17.47.

FSFI = Female Sexual Function Index.

Table 8 Mean FSFI domain scores by endorsement of sexual motivation

FSFI domain	Wanting sexual feelings and sensations	Wanting emotional closeness through sex	Other nonsexual reasons	None of above	d.f.	F
Desire	3.91a	3.32a	2.49b	3.04a	3107	5.86
Arousal	4.82a	4.16a	3.09b	3.49a	3107	3.48
Lubrication	5.06a	4.13a	4.07a	3.47a	3107	2.24
Orgasm	4.80a	4.43a	3.59a	3.03b	3106	3.30
Satisfaction	4.99a	4.44a	3.10b	3.41b	3107	5.07
Pain	5.17a	4.30a	4.12a	3.65	3104	1.69

Comparison of the mean scores conducted utilizing ANOVA. Means in the same row that do not share subscripts differ at $P < 0.05$ in the Tukey honestly significant difference comparison.
FSFI = Female Sexual Function Index.

FSFI scores >26.55 (31.3% vs. 6.3%, $\chi^2 [3, N = 111] = 17.47, P = 0.0001$).

A pattern of statistically significant differences was also seen with FSFI domain scores, decreasing in linear fashion in a number of domains, as women move from motivation centering on intrinsic sexual pleasure, to motivation for emotional closeness through partnered sexual activity, to engaging in partnered sexual activity for other nonsexual reasons (Table 8).

The association between women’s responses on the sexual motivation item and their endorsement of the various models is also highly informative. Of women who reported “I engage in sexual activity with my partner mostly because I want to have sexual feelings, sensations, excitement, maybe orgasm—in other words ‘I’m in the mood’” as their motivation, 50% endorse the Masters and Johnson, 39.3% the Kaplan, and 7.1% the Basson models, with the remainder (3.6%) endorsing none of these models ($\chi^2 [20, N = 111] = 97.58, P = 0.001$). Of women who report “I engage in sexual activity with my partner mostly because I want to be emotionally close and that occurs during and after being sexual together,” 24.9% endorsed the Masters and Johnson, 28.9% the Kaplan, and 42.2% the Basson models, with the remainder endorsing (4.4%) “none of the above” ($\chi^2 [20, N = 111] = 97.58, P = 0.001$). Of women who reported that their motivation for partnered sexual activity is “I engage in sexual activity with my partner, even if I don’t feel physical desire to do so, for other, nonsexual reasons,” 15.8% endorsed the Masters and Johnson model, and 15.8% the Kaplan model, but 42.1% endorsed the Basson model, with 26.3% citing none of these ($\chi^2 [20, N = 111] = 97.58, P = 0.001$).

Further exploratory analyses assessed the relationship of women’s model endorsement and their sexual functioning in relation to individual FSFI item responses. Women who endorsed either the Masters and Johnson or Kaplan models were sig-

nificantly more likely to state that they were either “very satisfied” or “moderately satisfied” with their sexual relationship, compared with women who endorsed the Basson model (78.8%, 80% vs. 56.3%, $\chi^2 [12, N = 111] = 36.47, P = 0.0001$), and were less likely to report being “moderately dissatisfied” or “very dissatisfied” (3.0%, 3.3% vs. 15.6%, $\chi^2 [12, N = 111] = 36.47, P = 0.0001$) with their sexual relationship. Similarly, women who reported that the Masters and Johnson or Kaplan models reflected their own sexual experience were more likely to report greater overall satisfaction with their sex lives, with 78.8% and 76.6% respectively reporting being “very” or “moderately satisfied,” compared with 59.4% of women endorsing the Basson model ($P = 0.001$). Women endorsing the Basson model were significantly more likely to cite being “very” or “moderately” dissatisfied with their overall sex lives (21.9%), compared with women endorsing either Masters and Johnson (6.6%) or Kaplan (13.3%) ($\chi^2 [20, N = 112] = 45.11, P = 0.001$).

Emotional closeness within women’s relationship was assessed with a single item and was unrelated to FSFI scores, but was positively correlated with endorsement of the various models. Women who endorsed the Basson model were significantly less likely to report satisfaction with emotional closeness and almost twice as likely to report dissatisfaction with emotional closeness in their partnered relationship, compared with women who endorsed either the Masters and Johnson or Kaplan models (see Table 9).

Discussion

The primary objective of this research was to assess the degree to which a community sample of primarily middle-aged women endorse currently accepted models of female sexual function as representing their own sexual experience, and

Table 9 Association of women's emotional satisfaction in their relationship and endorsement of models of sexual response

	Masters and Johnson	Kaplan	Basson	P
Very/somewhat satisfied	87.9	83.3	64.5	0.004
Neither	0	3.3	12.9	0.004
Very/somewhat dissatisfied	12.1	13.3	22.6	0.004

Comparison of the proportions of women endorsing the different motivations was conducted with χ^2 (d.f. 8, N = 111) = 22.29, $P = 0.004$.

to explore the relationship of women's endorsement of these models and their sexual function. The proportion of women reporting FSFI scores in the less-functional range is in keeping with other studies [9], and the finding that this proportion of dissatisfaction is lower among women with a current partner is supported by a recent report by Colson and colleagues [40]. The finding that no model of female sexual response was endorsed by a majority of women strongly suggests that our current models of female sexual response are all, in some ways, incomplete. Current results emphasize the need for comprehensive conceptualizations that recognize heterogeneous patterns of female sexual response, and specify the situations in which particular models may be relevant, and which are supported by considerable additional empirical research. We also note with interest that, although 86% of the respondents had been in a partnered relationship of >5 years, these women were not more likely to endorse the Basson model to a greater extent than the Masters and Johnson model, suggesting that duration of partnership may not discriminate as a variable explaining model endorsement. The finding that there is a clear distinction between women who endorse the Masters and Johnson and Kaplan-inspired models, on the one hand, and the Basson-inspired model, in terms of women's level of sexual function and sexual and relationship satisfaction, strongly suggests that the Basson model is reflective of more dysfunctional and dissatisfied women's sexuality, and may not represent a normative or particularly satisfying model of women's sexual response. This conclusion is supported by analyses well beyond our finding that Basson model endorsement more often typified sexually dysfunctional than functional women. Women who endorse the Basson model, as well as having lower FSFI scores, also directly report substantially and significantly more dissatisfaction with their emotional relationships with their partner, a finding supported by the recent work by Dennerstein and colleagues [41], who reported, in a large survey of European women, that women reporting lower

desire indices also reported greater dissatisfaction with both their sex lives and their partnered relationships. Even in the subset of women whose FSFI scores were above the cutoff for identifying sexual concerns, there was a significant pattern of differences such that women who endorsed the Basson model had lower desire, arousal, and orgasm scores than did women who endorsed either the Masters and Johnson or Kaplan models. Similarly, although postmenopausal women exhibited lower FSFI scores than premenopausal women, postmenopausal women with FSFI scores above 26.55 were still significantly more likely to endorse the Masters and Johnson or Kaplan as compared with the Basson model. Finally, the finding that women who endorse the Basson model are significantly more likely to report dissatisfaction with both their partnered and overall sex lives, as well as their dissatisfaction with the emotional closeness they experience with their partner, supports the assertion that, while the Basson model may accurately describe a relatively common pattern of response, it does not appear to be, as its author has suggested, "a model for women's sexual response that appears to be a more accurate representation of their experiences . . ." [29], nor based on this research, would it appear to be a model which describes a satisfying pattern of functional sexual response for the majority of those women who endorse it. These findings are supported by the recent large study by McCall and Meston aimed at developing a scale examining cues that trigger sexual desire in women [42]. These investigators found that women with lower FSFI scores also scored lower in sexual desire responsiveness to emotional bonding cues, erotic/explicit cues, and implicit/romantic cues. These results, showing that women with lower FSFI scores are less likely to respond with sexual desire to a wide array of cues, are similar to our own findings for a link between Basson model endorsement (indicative of sexual neutrality) and lower FSFI scores.

Limitations of the current research include the likelihood of some degree of sample self-selection, the choice to sample RNs (as these women are

better educated than American women overall), and the relatively small sample size. In addition, our choice to use several single-item, forced-choice measures of fit may have underrepresented the degree to which there is overlap between models, and the items themselves—while created to provide women with an opportunity to report on their sexual experience in straightforward fashion—themselves have limitations. Nonetheless, the findings of this first direct test of the fit or lack of fit of widely accepted models of female sexual response with women's own sexual experience produced highly consistent findings regarding the lack of uniform fit of any model with women's sexual experience, and regarding the association of the models with sexual function and dysfunction. These findings clearly can serve as a basis for further research efforts in this area that may ultimately refine and improve our understanding of female sexuality.

Conclusions

Several conclusions can be drawn from the current results. First, we found that no single model of female sexual response is consistently endorsed by women, and it appears to be premature to assert any single model as a normative description of women's sexual response. Second, results suggest that, for a significant proportion of women who enjoy satisfying, trouble-free sexual response, the model originally proposed by Masters and Johnson, and extended by Kaplan and Lief, is in fact an adequate and accurate description of these women's experience, as reported by women themselves. That is, there are a number of women who, regardless of age, duration of partnership, etc., feel sexual desire, become aroused easily, may reach orgasm, and are satisfied with their sexuality and sexual relationships. Third, it appears that the model proposed by Basson provides an expansion of, and further depth to, the earlier models that may be particularly relevant to women who experience sexual and emotional relationship dissatisfaction. Although commonly endorsed as a conceptualization of female sexual response, the Basson model may be reflective of women who experience more problematic, unsatisfying sexual response. None of these generalizations universally holds, of course, and further research is needed to determine why certain women exhibit FSFI scores in the healthy range yet endorse the model of Basson, while conversely, some women whose

FSFI scores indicate sexual problems endorse the Masters and Johnson model as reflective of their own experience. Ultimately, conceptualizations of female sexual response will have to reflect heterogeneity of patterns of response and will need to specify the situations in which particular conceptualizations have most relevance.

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References

- 1 Basson R, Althof S, Davis S, Fugl-Meyer K, Goldstein I, Leiblum S, Meston C, Rosen R, Wagner G. Summary of the recommendations on sexual dysfunctions in women. *J Sex Med* 2004;1: 23–34. 16
- 2 Tiefer L. Historical, scientific, clinical, and feminist criticisms of “the Human Sexual Response Cycle” model. In: Bancroft J, ed. *Annual review of sex research*. Lake Mill, IA: Society for the Scientific Study of Sex; 1991:000–000. 17
- 3 Tiefer L. Omissions, biases, and nondisclosed conflicts of interest: Is there a hidden agenda in the NAMS position statement? *Medgenmed* 2005;7:59. 18
- 4 Laan E, Everaerd W, Evers A. Assessment of female sexual arousal: Response specificity and construct validity. *Psychophysiology* 1995;32:476–85.
- 5 Basson R. Recent advances in women's sexual function and dysfunction. *Menopause* 2004;11(6 Part 2):714–25.
- 6 Kleinplatz PJ. Adding insult to injury: The classification of dyspareunia as a sexual dysfunction in the DSM. *Arch Sex Behav* 2005;34:36–8, 57–61; author reply 63–7.
- 7 Ussher J. *The construction of female sexual problems: Regulating sex, regulating women* (Baker UJMACD ed.). New York: Routledge; 1993. 19
- 8 Hatzimouratidis K, Hatzichristou D. Sexual dysfunctions: Classifications definitions. *J Sex Med* 2007;4:241–50.
- 9 Laumann EO, Paik A, Rosen RC. Sexual dysfunction in the United States: Prevalence and predictors. *JAMA* 1999;281:537–44.

- 10 Bancroft J, Loftus J, Long JS. Distress about sex: A national survey of women in heterosexual relationships. *Arch Sex Behav* 2003;32:193–208.
- 11 Fisher WA, Dervaitis KL, Bryan AD, Silcox J, Kohn H. Sexual health, reproductive health sexual coercion and partner abuse indicators in a Canadian obstetrics and gynaecology outpatient population. *J SOGC* 2000;22:714–24.
- 12 Abdo CH, et al. Prevalence of sexual dysfunctions and correlated conditions in a sample of Brazilian women—Results of the Brazilian study on sexual behavior (BSSB). *Int J Impot Res* 2004;16:160–6.
- 13 Addis IB, et al. Sexual activity and function in middle-aged and older women. *Obstet Gynecol* 2006;107:755–64.
- 14 Castelo-Branco C, et al. Prevalence of sexual dysfunction in a cohort of middle-aged women: Influences of menopause and hormone replacement therapy. *J Obstet Gynaecol* 2003;23:426–30.
- 15 Dennerstein L, Hayes RD. Confronting the challenges: Epidemiological study of female sexual dysfunction and the menopause. *J Sex Med* 2005;2(suppl 3):118–32.
- 16 Geiss IM, et al. Prevalence of female sexual dysfunction in gynecologic and urogynecologic patients according to the international consensus classification. *Urology* 2003;62:514–8.
- 17 Hayes R, Dennerstein L. The impact of aging on sexual function and sexual dysfunction in women: A review of population-based studies. *J Sex Med* 2005;2:317–30.
- 18 West S. A systematic review of the literature on female sexual dysfunction prevalence and predictors. In: Annual review of sex research. Heiman J, ed. Allentown, PA: Society for the Scientific Study of Sexuality; 2005:000–000.
- 19 Hayes RD, Bennett CM, Fairley CK, Dennerstein L. What can prevalence studies tell us about female sexual difficulty and dysfunction? *J Sex Med* 2006;3:589–95.
- 20 Basson R, et al. Revised definitions of women's sexual dysfunction. *J Sex Med* 2004;1:40–8.
- 21 Basson R, et al. Report of the international consensus development conference on female sexual dysfunction: Definitions and classifications. *J Urol* 2000;163:888–93.
- 22 Segraves R, Woodard T. Female hypoactive sexual desire disorder: History current status. *J Sex Med* 2006;3:408–18.
- 23 Masters WVJ. Human sexual response. Boston, MA: Little, Brown Co; 1966.
- 24 Kaplan HS. The new sex therapy. New York: Brunner/Mazel; 1974.
- 25 Lief HI. Inhibited sexual desire. *Med Aspects Hum Sex* 1977;7:94–5.
- 26 Chivers ML, Bailey JM. A sex difference in features that elicit genital response. *Biol Psychol* 2005;70:115–20.
- 27 A.P. Association, ed. Diagnostic and statistical manual of mental disorders (DSM-IV-TR), 4th edition (Text Revision). Branden-Hill: A.P. Association; 1994.
- 28 Medicine JoS. Most cited articles. 2006. Available at: <http://www.blackwell-synergy.com/action/showMostCitedArticles?journalCode=jsm> (accessed October 3, 2006).
- 29 Basson R. The female sexual response: A different model. *J Sex Marital Ther* 2000;26:51–65.
- 30 Parker Jones K, Xxxxx KS, Whipple B. Women's sexual health in midlife and beyond. ARHP Clinical Proceedings; 2005.
- 31 Basson R. Are the complexities of women's sexual function reflected in the new consensus definitions of dysfunction? *J Sex Marital Ther* 2001;27:105–12.
- 32 Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, Ferguson D, D'Agostino R Jr. The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *J Sex Marital Ther* 2000;26:191–208.
- 33 Basson R. Are our definitions of women's desire, arousal and sexual pain disorders too broad and our definition of orgasmic disorder too narrow? *J Sex Marital Ther* 2002;28:289–300.
- 34 Wiegel M, Meston C, Rosen R. The Female Sexual Function Index (FSFI): Cross-validation and development of clinical cutoff scores. *J Sex Marital Ther* 2005;31:1–20.
- 35 Bitzer J, Platano G, Tschudin S, Alder J. Sexual counseling for women in the context of physical diseases—A teaching model for physicians. *J Sex Med* 2007;4:29–37.
- 36 Salant P, Dillman D. How to conduct your own survey. Toronto: John Wiley & Sons, Inc; 1994.
- 37 Meston CM, Derogatis LR. Validated instruments for assessing female sexual function. *J Sex Marital Ther* 2002;28(suppl 1):155–64.
- 38 Nicolosi A, Glasser D, Kim SC, Marumo K, Laumann EO. Sexual behaviour and dysfunction and help seeking patterns in adults aged 40–80 years in the urban populations of Asian countries. *BJU Int* 2005;95:609–14.
- 39 Mykletun A, Dahl A, O'Leary MP, Fossa SD. Assessment of male sexual function by the Brief Sexual Function Inventory. *BJU Int* 2006;97:316–23.
- 40 Colson M-H, Lemaire A, Pinton P, Hamidi K, Klein P. Sexual behaviors and mental perception, satisfaction and expectations of sex life in men and women in France. *J Sex Med* 2006;3:121–31.
- 41 Dennerstein L, Koochaki P, Barton I, Graziottin A. Hypoactive sexual desire disorder in menopausal women: A survey of Western European women. *J Sex Med* 2006;3:2121–222.
- 42 Mccall K, Meston C. Cues resulting in desire for sexual activity in women. *J Sex Med* 2006;3:838–52.

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