

# Women's Sexual Working Models: An Evolutionary-Attachment Perspective

Gurit E. Birnbaum  
Bar-Ilan University, Ramat-Gan, Israel

Harry T. Reis  
University of Rochester

*In three studies, we developed and validated a self-report measure of women's sexual working models. In a pilot study we created an initial version of the Women's Sexual Working Models Scale (WSWMS), administered it to an exploratory sample of 470 women, and identified its 5-factor structure. Study 1 confirmed the 5-factor structure in a new sample: (1) Fostering commitment; (2) Evaluating a sexual partner's suitability; (3) Promoting frequent sexual activity through positive affect; (4) Restricting sexuality through shamefulness; and (5) Negative emotions that signal incompatibility with relationship goals. In Study 2, 444 Israeli women completed the WSWMS. Confirmatory factor analysis provided cross-national evidence for the generalizability of the underlying factor structure of the WSWMS.*

According to attachment theory, sexual behaviors are regulated by an inborn sexual behavioral system, a species-universal neural program (Bowlby, 1982/1969; Shaver, Hazan, & Bradshaw, 1988) whose major function is to pass one's genes to the next generation (Buss & Kenrick, 1998). However, because impregnation is generally not sufficient for the survival of human offspring, who have a long period of vulnerability, sexual partners often stay with each other long enough to care jointly for their offspring, thereby increasing the offspring's chances of survival (H. E. Fisher, 1998; Hazan & Zeifman, 1994; Mellen, 1981). Accordingly, over the course of human evolution, selection pressures have produced psychological mechanisms regulating the adaptive expression of sexuality. In conceptualizing these functionally adaptive psychological mechanisms, Buss and Kenrick (1998) proposed that these mental representations, which we call "sexual working models" (following attachment theory), should incorporate emotions, cognitions, and motives regulating interaction between sexual partners. These sexual working models reflect experiences with the repeated activation and functioning of the sexual system in diverse social environments and may therefore be the foundation of individual differences in sexual attitudes, responses, and behaviors (see Shaver & Mikulincer, in press).

Research and theory in evolutionary psychology have focused on species-typical adaptations, which have become an integral part of the neural hardware of all humans. Researchers have largely ignored individual differences in the operation of sexual-system psychological mechanisms and their associated motives, emotions, and cognitions (Buss, 2004). Individual differences in adaptive

mechanisms can emerge from a variety of heritable and nonheritable sources and their combination (e.g., viable genetic subtypes whose relative frequency is maintained by dynamic equilibrium within a gene pool; within-family norms; contextually sensitive variations in gene expression; and unique developmental experiences; Bailey, 1998; Buss & Greiling, 1999). These individual differences in sexual working models underlie corresponding individual differences in sexual behavior. The main purpose of our study was to devise a method for measuring individual differences in sexual working models and to provide preliminary evidence for its reliability and validity.

Most studies investigate the sexual system in terms of individual differences in one of three aspects of sexuality: attitudes (e.g., the erotophilia-erotophobia scale; Fisher, Byrne, White, & Kelley, 1988), behaviors (e.g., the willingness to engage in uncommitted sexual relations; Simpson & Gangestad, 1991), and responses (e.g., sexual arousal; Chambless & Lifshitz, 1984). Although in its real-world operation, the sexual behavioral system is generally integrated into relational contexts, few studies have focused on general cognitive representations of sexuality or on their operation in the context of ongoing romantic relationships (for exceptions, see Andersen & Cyranowski, 1994; Cyranowski & Andersen, 1998).

To provide a more comprehensive profile of the multifaceted emotional, cognitive, and motivational aspects of women's mental representations of sexuality, Birnbaum and colleagues (Birnbaum, 2003; Birnbaum, Glaubman, & Mikulincer, 2001) employed a "bottom-up" approach, largely defined by dimensions identified in existing research, and constructed a multidimensional measure assessing women's experience of heterosexual intercourse. These scales included various positive and negative emotions, affective reactions to the sexual response cycle, and thoughts related to the self, the partner, the dyadic relationship, the sexual encounter, and the sexual response cycle, and goals. Although these scales are reliable, valid,

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Address correspondence to Gurit E. Birnbaum, Ph.D., Department of Psychology, Bar-Ilan University, Ramat-Gan, 52900, Israel; e-mail: birnbag@gmail.com.

and able to predict diverse sexual phenomena, their content was not linked explicitly to a functional analysis of the psychological mechanisms formed over human evolutionary history by selection pressures geared to specific problems of survival and reproduction. Such an analysis would reflect a “top-down,” theory-driven approach that may add to our understanding of the complexity of sexual behavior by addressing specific mechanisms and processes whereby the sexual behavioral system, and in particular individual differences in its parameters, contributes to relationship development and maintenance in different stages and varieties of sexual-romantic relationships. Correspondingly, a functional analysis of the evolution of sexuality may help specify the role of sexuality in the female goal system and may shed light on ambiguous findings in the literature concerning the link between sexual activities and relationship satisfaction (e.g., Hassebrauck & Fehr, 2002; Henderson-King & Veroff, 1994). For example, a woman who believes that sex fosters relationship maintenance is more likely to experience an improvement in relationship satisfaction following sexual activity with her romantic partner than a woman who believes that sex is irrelevant to relationship maintenance. The unique profile of women’s sexual working models may therefore moderate the impact of sexual activity on relationship status. Furthermore, this profile may involve conflicting elements. For example, a woman who believes that sex contributes to relationship maintenance but who nevertheless experiences negative affect during sexual activity may feel and act differently than a woman with no such ambivalence.

The research reported here was designed to provide a scale derived systematically from the perspective of evolutionary theories—especially attachment theory—capable of assessing individual differences in women’s sexual working models. The constructs included mental representations of adaptive psychological mechanisms that incorporate functional emotions, cognitions, and motives that may contribute to reproductive success in the context of long-term adult romantic relationships. Thorough examination of the evolutionary literature identified five dimensions of women’s sexual behavioral system that may contribute to reproductive success in the context of long-term romantic relationships and as such would be expected to be represented in innate psychological mechanisms:

*Keeping partners committed to each other to increase the survival and reproductive chances of offspring.* Because, in the evolutionary past, infants and children were more likely to survive and thrive if reared by two parents, human reproductive success was enhanced when sexual partners were not only attracted enough to procreate, but also motivated to remain in a committed relationship (H. E. Fisher, 1998; Hazan & Zeifman, 1994). Several characteristics unique to human sexuality encourage physical proximity and intimate contact (e.g., humans’ tendencies to have sex in private and sleep together after intercourse, concealed ovulation, and oxytocin secretion), implying that the sexual behavioral system may motivate

partners to stay attached to each other by strengthening and maintaining the emotional bond between them (Gonzaga, Keltner, Londahl, & Smith, 2001; Hazan & Zeifman, 1994, 1999).

*Evaluating the suitability and compatibility of a sexual partner.* According to evolutionary models of human sexuality (e.g., Buss, 1998; Buss & Schmitt, 1993; Trivers, 1972), because women invest more in each offspring than men do, they have more to lose from a poor mating choice. Therefore, women should be more selective about their mates, compared to men, and should prefer mates able and willing to provide material and genetic reproductive advantages. Because women’s reproductive success depends upon the accuracy of these predictions, they may use sexual encounters to assess a partner’s reproductive value, intentions, and willingness to maintain a long-term relationship (Buss & Schmitt 1993). Thus, during heterosexual intercourse, women may be attuned to cues implying their partner’s intentions and willingness to invest resources (e.g., expressions of love, affection, and intimacy; Birnbaum & Laser-Brandt, 2002).

*Promoting frequent sexual activity through positive affect (e.g., excitement, fun, passion).* Sexual desire is among the strongest forces that motivate human behavior, and sexual gratification is one of the greatest human pleasures (Shaver et al., 1988). Sex may have acquired the ability to provide such intense joy and pleasure because sexual intercourse is required for reproduction, and frequent intercourse is more likely if it is experienced as highly pleasurable. That is, in a species with no overt cues that signal ovulation, biological systems that enable hedonic pleasure and sexual desire presumably evolved to reinforce and motivate sexual intercourse, thereby maximizing behaviors that increase the probability of conception (J. Diamond, 1997; Gallup, 1986).

*Restricting the expression of sexuality when sexual activity is viewed as sinful or immoral.* Along with its considerable potential for joy and pleasure, human sexuality is sometimes constrained by guilt, shame, and anxiety, manifested in the form of erotophobic attitudes (Fisher et al., 1988) or negative sexual self-schema (Andersen & Cyranowski, 1994). To the extent that sexual activity is culturally viewed as sinful or immoral, women may be likely to restrain behavioral expressions of sexual desire (Goldenberg, Pyszczynski, McCoy, Greenberg, & Solomon, 1999) and have fewer lifetime partners, less sexual experience, and fewer brief sexual encounters (Andersen & Cyranowski; Fisher et al., 1988). This occurs presumably because outward displays of restraint, faithfulness, and chastity may enhance their value as long-term mates in such contexts. Buss and Schmitt (1993), among others, hypothesized that the origin of such norms is men’s uncertainty about paternity, which is increased by characteristics typical of promiscuity, sexual experience, and sexual desire. Thus, signs of commitment and faithfulness, which may be accompanied by ambivalent or even negative attitudes about sex, may help a woman attract and keep desirable long-term mates.

*Negative emotions that signal incompatibility with relationship goals.* When one's sexual goals and desires are violated by a partner, distress and other negative emotions are generated (Buss, 1989a). This follows from the definition of emotion as a signal about environmental events that have consequences for personal well-being (e.g., Mandler, 1975, 1984). Because men and women had to cope with different adaptive problems in both short-term and long-term mating strategies (Buss & Schmitt, 1993), different events would activate negative emotions for men and women (Buss, 1989a). For example, women have evolved a more emotional-interpersonal orientation toward sex, associating sex with expressions of love and affection (e.g., DeLamater, 1987; Gagnon & Simon, 1973). Accordingly, women are more likely than men to expect partners to be responsive to their emotional needs during heterosexual intercourse. When these relational expectations are not fulfilled, reproductive success may be threatened and negative emotions such as disappointment, anger, and resentment, as well as preoccupation with relational concerns, may result. Behaviorally, these affects may be reflected in indifference and emotional detachment from the sexual event and partner (Birnbaum & Laser-Brandt, 2002).

### **Purpose**

The main purpose of this study was to develop a tool for measuring individual differences in the emotional, cognitive, and motivational manifestations of adaptive mechanisms related to women's sexuality and to provide evidence of reliability and validity of this measure. This is an early step toward a more evolutionarily-based understanding of the sexual behavior system and its importance in the study of human relationships. We do not claim that these are the only nor the most important dimensions of women's thoughts and feelings regarding sexuality in close relationships; however, for the reasons described above, this measure was designed to target dimensions that can be linked in a clear and theoretically-meaningful way to evolutionary accounts of the adaptive value of sexuality in close relationships. In a pilot study, we developed a self-report questionnaire of women's sexual working models. Study 1 evaluated the structure of this measure and provided initial evidence for convergent and incremental validity. In Study 2, we present cross-national evidence for the generalizability of the measure's underlying factor structure, as well as additional information about its validity and interpersonal and intrapersonal correlates.

### **PILOT STUDY**

The pilot study was designed to develop and select items that described women's sexual working models from an evolutionary theoretical perspective. First, we reviewed literature on the sexual behavioral system, focusing on behaviors that enable reproductive success in the context of long-term romantic relationships. Second, we developed a self-report questionnaire based on this literature

review. Third, we administered this 57-item draft to a sample of 470 women and submitted their responses to principal components analysis.

### **Method**

#### **Participants**

North American women ( $N = 470$ ) aged 18 to 74 years ( $M = 34.12$ ,  $SD = 11.42$ ) volunteered for the study without compensation. All participants were recruited from community centers, sport clubs, and university sites (medical campus, college). Of the participants, 34.7% were single-never married, 53.6% were married or cohabiting, and 10.0% were separated, divorced, or widowed. All participants had had sexual intercourse with male partners, either in a current or past relationship.

#### **Measures and Procedure**

As discussed above, our reading of evolutionary theories identified five dimensions of women's sexual behavior related to reproductive success in the context of long-term romantic relationships: (a) Fostering commitment; (b) Evaluating a sexual partner's suitability; (c) Promoting frequent sexual activity through positive affect; (d) Restricting sexuality through shamefulness; and (e) Negative emotions that signal incompatibility with relationship goals.

We developed 57 questionnaire items reflecting emotional, cognitive, and motivational components of these five dimensions from three sources. Seventeen items were selected from the Women's Experience of Heterosexual Intercourse Scale (Birnbaum et al., 2001), and 12 items were selected from the Meaning of Heterosexual Intercourse Scale for Women (Birnbaum, 2003). We wrote additional items to embody aspects of our theorizing not yet represented. Twelve psychology graduate students were asked to comment on each item's relevance to the proposed sexual-working-model dimensions and to suggest other items. In all, 88 items were generated for the initial pool. We then eliminated 31 items judged to be unrepresentative or ambiguously representative of the category for which they were proposed. The reduced subset of 57 items was administered to the exploratory sample.

The first author approached participants individually and told them that the study dealt with women's feelings, expectations, and beliefs about sexual activity with a partner. After agreeing to participate (more than 90% of the women approached agreed), participants were given the following instructions: "This survey deals with feelings, expectations, and beliefs about sexual activity with a partner, as perceived by women. The list of sentences describes different feelings, expectations, and beliefs about sexual activity with a partner. Thinking over your personal experiences, indicate the extent to which the following items describe your feelings, expectations, and beliefs about sexual activity with a partner. Try to respond to this questionnaire only from your own personal, subject-

tive viewpoint, and to ignore what you may have heard from others or have read about this subject. At this point, we wish to note that this questionnaire is anonymous and confidential.”

Participants were instructed to rate the extent to which each item characterized their feelings, expectations, and beliefs about sexual activity with a partner, on a 9-point scale ranging from 1 (*not at all characteristic*) to 9 (*very characteristic*). The 57 items (see sample items in Table 1) were presented in random order (the same order for all participants). Completion took most participants about 15 minutes.

**Results and Discussion**

We examined the underlying structure of the 57 items through a series of principal components analyses with Varimax rotation. Eighteen items that cross-loaded on more than one component were eliminated, as were 15 items with low loadings (< .50) on the proposed component, resulting in a 24-item scale. A final exploratory factor analysis with Varimax rotation yielded 5 factors, corresponding to the dimensions described earlier, accounting for 56.13% of the total variance. We also examined the Women’s Sexual Working Models Scale (WSWMS) structure in an exploratory factor analysis with oblimin rotation and obtained a very similar structure and pattern of loadings. These items are shown in Table 1.

The first dimension, Guilt and Shame, includes sinful, shameful, and guilty feelings related to sexual activity. The second dimension, Maintain the Bond, reflects the belief that sexual activity promotes closeness between partners and enhances their emotional bond. The third dimension, Distancing/Distracton, reflects indifference and detachment from the sexual event and partner caused by intruding thoughts. The fourth dimension, Caring Partner, taps the perception of the sexual partner as caring and responsive to one’s needs. The fifth dimension, Excitement, incorporates positive and arousing aspects of sexual activity (e.g., pleasure, passion, and adventure).

**STUDY 1**

Study 1 was designed to evaluate the structure, reliability, and validity of the measure developed in the pilot study. We administered a questionnaire packet that included the revised version of the WSWMS and conceptually-converging relational measures to a confirmatory sample of 248 women. Because of the hypothesized contribution of the sexual behavioral system to the formation and maintenance of intimate romantic relationships, we expected the WSWMS subscales to be correlated with measures of love and romantic involvement. Specifically, we expected Excitement to be primarily related to measures associated with relationship formation, and Maintain the Bond and Caring Partner to be positively correlated with measures of relationship quality. Conversely, we expected Distancing/Distracton to be inversely related to relationship quality. With regard to Guilt and Shame, the current

**Table 1. Factor Structure of Women’s Sexual Working Models (Study 1)**

Item	I	II	III	IV	V
<i>Guilt and Shame</i>					
Sexual activity makes me feel guilty	.86				
Sexual activity makes me feel ashamed	.84				
To me, sexual activity feels like something forbidden	.83				
Sexual activity makes me feel sinful	.70				
I often feel critical of myself during or after sex for doing something morally wrong	.64				
Sexual activity feels like something impure	.36				
<i>Maintaining the Bond</i>					
Sexual activity is a way to strengthen the relationship between two people		.89			
To me, sex is an important part of becoming really close to my partner		.81			
Sexual activity helps me feel understood by my partner		.78			
To me, sexual activity is a way of forming an affectionate relationship		.73			
To me, sexual activity can strengthen a committed relationship		.66			
Sexual activity gives me the feeling of being loved		.64			
<i>Distancing/Distracton</i>					
During sexual activity, intruding thoughts often distract me			.80		
During sexual activity, my thoughts often wander to other unrelated things			.65		
During sexual activity, I sometimes feel apathetic			.59		
While having sex, I sometimes feel like I am not involved but instead I am watching myself from outside			.54		
<i>Caring partner</i>					
My partner is considerate of me during sexual activity				.92	
I feel that my partner is concerned and caring during sex				.85	
During sexual activity, I feel that my partner accepts me as I am				.76	
When I have sex, I feel that my partner is responsive to my needs				.70	
<i>Excitement</i>					
During sexual activity, I feel pleasantly excited				.83	
During sexual activity, my physical desires are very intense				.70	
During sexual activity, I lose control of my inhibitions				.64	
During sexual activity, I feel a sense of adventure				.58	
Cronbach’s alpha	.90	.85	.72	.87	.76

state of research renders it difficult to make specific predictions. On the one hand, restricting sexuality through shamefulness may help attract desirable long-term mates. On the other hand, it may inhibit sexuality, which in turn may lead to problematic relationships. In addition, we

sought to determine whether our sexual-working-models measure accounted for variance in relational outcomes over and above variance attributed to the attachment behavioral system (the only other working-model theory derived from evolutionary considerations).

### Method

#### Participants

North American women ( $N = 248$ ) aged 19 to 58 years ( $M = 33.7$ ,  $SD = 9.85$ ) volunteered for the study without compensation. All participants were recruited from community centers, sport clubs, and university sites (medical campus, college). Of the participants, 31.0% were single-never married, 54.8% were married or cohabiting, and 12.1% were separated, divorced or widowed. Seventy-two percent of all participants were currently involved in a romantic relationship, and 28.0% were not currently involved in a romantic relationship. Education level ranged from 12 to 24 years of schooling ( $M = 16.1$ ,  $SD = 2.35$ ). Caucasians accounted for 79.8% of the sample; African Americans, 7.7%; Asians, 4.0%; and Hispanics, 2.0%. All participants had had sexual intercourse with male partners, either in a current or past relationship. The refusal rate was about 10%.

#### Measures and Procedure

The first author approached participants individually and administered a questionnaire packet, which included the revised version of the WSWMS, shown in Table 1. The instructions and rating scale were identical to those described in the pilot study. Completion took most participants about 30 minutes. The packet included the following measures.

*Experience in Close Relationships Scale* (ECR; Brennan, Clark, & Shaver, 1998). The ECR consists of 36 items assessing attachment anxiety and avoidance. Participants rated the extent to which each item described their feelings in close relationships, on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Eighteen items tapped attachment anxiety (e.g., "I worry about being abandoned"), and 18 items tapped attachment avoidance (e.g., "I get uncomfortable when a romantic partner wants to be very close"). In this sample, Cronbach's alphas were high for anxiety (.92) and avoidance (.91). Higher scores indicated greater attachment-related avoidance or anxiety.

*Relationship Assessment Scale* (RAS; Hendrick, 1988). We used the RAS to measure relationship satisfaction. Participants completed this scale only if they were involved in a current romantic relationship. This scale consists of 7 items rated on a 5-point Likert scale (e.g., "In general, how satisfied are you with your relationship?" and "To what extent has your relationship met your original expectations?"). The RAS is unidimensional, and we obtained an internal consistency estimate of .91 (Cronbach's alpha). Higher scores represented greater relationship satisfaction.

*Passionate Love Scale* (PLS Short Form; Hatfield & Sprecher, 1986). The PLS is designed to assess the ten-

dency to be passionate in love relationships. Participants rated 7 statements regarding cognitive, emotional, and behavioral aspects of yearning for their romantic partner (e.g., "My partner always seems to be on my mind" or "I eagerly look for signs of my partner's attraction for me"). Items were rated from 1 (*not at all true*) to 9 (*definitely true*). The PLS is unidimensional, and we obtained an internal consistency estimate of .87 (Cronbach's alpha). Higher scores represented a greater tendency to be passionate in love relationships.

*Companionate Love Scale* (Reis, 1998). The Companionate Love Scale closely resembles the PLS in format. This self-report scale was designed to assess the tendency to enjoy one's partner as a close and respected friend. Participants rated 7 statements regarding the cognitive, emotional, and behavioral aspects of friendship love (e.g., "What I most enjoy about my relationship with my partner is the way that we do ordinary things together" or "My partner and I are great companions for each other"). Items were rated on a 9-point scale from 1 (*not at all true*) to 9 (*definitely true*). This scale is factorially unidimensional, and we obtained an internal consistency estimate of .89 (Cronbach's alpha) in this sample. Higher scores represented a greater tendency to enjoy one's partner as a close friend.

*Emotional Intimacy Scale*. We selected this scale from the Personal Assessment of Intimacy in Relationships (PAIR; Olson & Schaefer, 1981). This 5-item self-report scale assesses the level of emotional intimacy in relationships (e.g., "My partner can really understand my hurts and joys" or "My partner listens to me when I need someone to talk to"). Items were rated on a 9-point scale from 1 (*not at all true*) to 9 (*definitely true*). This scale is unidimensional, and we obtained an internal consistency estimate of .89 (Cronbach's alpha) in the current sample. Higher scores reflected greater emotional intimacy.

*Responsiveness Scale*. This self-report scale, currently being developed by Reis (2006), is designed to assess the perception that partners understand, appreciate, and care for the self (Reis & Shaver, 1988). Participants rated 10 statements, such as "My partner is aware of what I am thinking and feeling" or "My partner really listens to me." Items were rated on a 9-point scale from 1 (*not at all true*) to 9 (*definitely true*). This scale is factorially unidimensional, and we obtained an internal consistency estimate of .95 (Cronbach's alpha) in our sample. Higher scores indicated greater perceived responsiveness.

*Sociosexual Orientation Inventory* (SOI; Simpson & Gangestad, 1991). This self-report scale measures willingness to engage in uncommitted sexual relations. Four items assess overt sexual behavior (e.g., "With how many different partners have you had sex on one and only one occasion?"), and 3 items assess attitudes toward casual, uncommitted sexual relations (e.g., "I can imagine myself being comfortable and enjoying 'casual' sex with different partners"). The attitudinal items were rated on a 9-point scale from 1 (*strongly disagree*) to 9 (*strongly agree*). To

create a unit-weighted index, responses to each item were standardized through *z*-scores. The SOI is factorally unidimensional, and we obtained an adequate internal consistency estimate of .75 (Cronbach's alpha) in the current sample. On this basis and in line with the original scoring of the instrument, one global SOI score was computed by summing across the *z*-scores of individual items, with higher scores reflecting a greater likelihood toward engaging in casual, uncommitted sexual relations.

*Background.* These items asked about demographic and relationship information, including age, ethnicity, current relationship status, and length of current relationship.

## Results

We conducted confirmatory factor analysis using the Analysis of Moment Structures (AMOS) program (Arbuckle, 1999) to determine the goodness-of-fit between the scale developed in the pilot study and our theoretical model. To avoid capitalizing on chance, we *a priori* assigned all 24 items to one and only one of the five factors identified earlier. This procedure helps determine that fit of the data to the model is not an artifact of idiosyncrasies in either the pilot or current samples (MacCallum & Austin, 2000).

The chi-square test of goodness-of-fit was significant,  $\chi^2(235) = 342.26, p < .001$ , indicating significant deviation of the data from the proposed model. This is a likely outcome due to the large sample size. Other model-fit statistics less sensitive to sample size yielded high values, GFI = .90 and CFI = .96, and the root mean square error of approximation (RMSEA) was .04, indicating acceptable fit of the model in relation to its degrees of freedom. As these model fit indices meet or exceed suggested levels (Bentler, 1995), we concluded that the hypothesized model provided good fit for the data. All items loaded significantly on their respective factors,  $p < .05$ . Factor loadings are reported in Table 1. (Although the loading of the "impure" item on the Guilt and Shame subscale is rather low (.36) in Study 1, we decided to retain it, because its loading on the Guilt and Shame subscale in Study 2 is higher (.45). Dropping this item does not change the pattern of results).

We tested and compared the hypothesized five-factor model to two plausible alternative models. In Model 1, we treated the 24 items as loading on a single factor, corresponding to evaluation of sexual cues along a negative-positive unidimensional continuum (e.g., the erotophilia-erotophobia scale; Fisher et al., 1988). In Model 2, we treated the items as loading on two factors, reflecting the relative independence of positivity and negativity dimensions of sexuality

(e.g., approach and avoidance sexual motives; Impett, Peplau, & Gable, 2005). These results are reported in Table 2. Neither of the alternative models provided an adequate fit to the data. Furthermore, on all indices, the 5-factor model provided a significant and substantial improvement in fit over both the single- and two-factor models.

Cronbach's alpha coefficients for the five WSWMS subscales ranged from .72 to .90, implying adequate internal consistency. On this basis, we computed scores for each participant by averaging the items loading on each factor. The magnitude of the correlations among these five scores was small to moderate (see Table 3), ranging from .11 to .38, and indicating that the WSWMS dimensions assess relatively unique information.

To examine convergent validity of the WSWMS, we correlated the subscales with theoretically-related constructs representing various aspects of relational measures. Table 4 reports these correlations. As expected, Maintain the Bond exhibited small positive correlations with most of the relational measures. Distancing/Distractio was positively correlated with attachment anxiety and avoidance and negatively associated with passionate love. Caring Partner exhibited the opposite pattern; it was negatively correlated with attachment anxiety and avoidance, strongly and positively correlated with responsiveness, and moderately correlated with the remaining relationship measures. Excitement was moderately associated with passionate love. The tendency to experience guilt and shame in sexuality was positively correlated with attachment avoidance and attachment anxiety. Importantly, although the WSWMS factors were significantly associated with romantic relationship qualities, these correlations ranged from small to moderate, supporting the WSWMS's convergent validity but indicating that it cannot be equated with these measures.

To determine the degree to which variance in cognitive, affective, and behavioral responses to romantic relationships can be explained by sexual working models over and above models of attachment, we conducted a series of hierarchical multiple regression analyses. In each analysis, on step 1, attachment (avoidance and anxiety) scores were entered along with the RAS score to rule out a sentiment override (i.e., global, nonspecific positivity or negativity) explanation. Incremental validity of the WSWMS was then established by entering all five subscales at the next step. As shown in Table 5, women's sexual working models accounted for significant increments in explained variance beyond attachment and RAS scores in predicting companionate love, passionate love, and responsiveness. Guilt and Shame ( $\beta = -.15$ ,

**Table 2. Comparison of Alternative Models of the WSWMS**

Model	$\chi^2$	<i>df</i>	$\chi^2$ diff	<i>df diff</i>	GFI	CFI	RMSEA	Comparison
1. Single-factor	1877.33*	252	1535.07*	17	.50	.44	.16	Model 1 and 3
2. Two-factor	1265.23*	252	922.97*	17	.63	.65	.13	Model 2 and 3
3. Five-factor	342.26*	235	2834.35*	41	.90	.96	.04	Null and Model 3
4. Null	3176.61*	276						

\*  $p < .001$

**Table 3. Intercorrelations Among WSWMS Scores for Study 1 ( $N = 248$ ) and Study 2 ( $N = 444$ )**

	WSWMS Scores			
	Guilt and Shame	Maintain the Bond	Distancing	Caring Partner
Maintain the Bond				
Study 1	-.21**			
Study 2	.00			
Distancing				
Study 1	.34***	-.11		
Study 2	.40***	-.05		
Caring Partner				
Study 1	-.34***	.37***	-.28***	
Study 2	-.32***	.20**	-.30***	
Excitement				
Study 1	-.23***	.39***	-.35***	.38***
Study 2	-.24***	.32***	-.33***	.42***

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

$p < .01$ ), Distancing/Distracton ( $\beta = -.17, p < .001$ ), and Caring Partner ( $\beta = .13, p < .05$ ), were associated with companionate love; Distancing/Distracton ( $\beta = -.16, p < .01$ ) and Excitement ( $\beta = .24, p < .001$ ) were associated with passionate love; and Guilt and Shame ( $\beta = -.11, p < .05$ ) and Caring Partner ( $\beta = .16, p < .01$ ) were associated with responsiveness. For emotional intimacy and the SOI, the WSWMS scales did not add significant incremental variance.

To further explore why women's sexual models did not add significantly over and above attachment and relationship satisfaction to predicting the SOI and emotional intimacy, we conducted an additional series of hierarchical multiple regression analyses. On step 1, either the RAS or attachment (avoidance and anxiety) scores were entered, followed by WSWMS scores. These analyses revealed that for both SOI and emotional intimacy, the WSWMS captured shared variance with relationship satisfaction but not with attachment anxiety and avoidance.

### Discussion

These analyses supported the five-dimensional conceptualization of women's sexual working models and provided preliminary evidence for the reliability and validity of the WSWMS, even though its subscales are deliberately short. The WSWMS demonstrated convergent validity with cognitive, behavioral, and affective aspects of romantic relationships and incremental validity in predicting relational beliefs and emotions beyond variance associated with attachment and general relationship satisfaction.

**Table 4. Correlations between WSWMS and Relationship Measures (Study 1;  $N = 248$ )**

	Relationship Measure							
	Avoidance	Anxiety	RAS	CLS	PLS	EI	Responsive	SOI
Guilt and Shame	.32***	.34***	-.07	-.14*	.02	-.16**	-.20**	-.06
Maintaining the Bond	-.23***	.03	.18**	.15*	.25***	.10	.20**	-.05
Distancing	.31***	.23***	-.19**	-.04	-.27***	-.18**	-.17**	.00
Caring Partner	-.43***	-.28***	.42***	.41***	.25***	.44***	.49***	-.06
Excitement	-.18***	.10	.08	.08	.38***	.07	.19*	.13*

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

These findings support Bowlby's (1982/1969) assertion that although there are important connections between the attachment and sexual behavior systems, they are distinct operating systems, have different functional roots, and involve separate cognitive and emotional processes. To explore these issues more thoroughly, we designed Study 2 to obtain additional information about convergent, discriminant, and incremental validity and to provide evidence for the generalizability of the underlying factor structure of WSWMS outside of North America.

### STUDY 2

Study 2 examined associations between the WSWMS and theoretically-related constructs representing a broad range of sexuality measures, including attitudinal-evaluative dimensions, sexual functioning, and sexual affects. We also sought to distinguish the WSWMS from the potentially relevant, nonsexual domain of personality. We administered a questionnaire packet that included the WSWMS and conceptually-converging sexual and relational measures, as well as measures of response bias and self-esteem, to a sample of 444 Israeli women. A cross-national replication of the WSWMS structure with a linguistically different sample provides a stringent test of the generality of the five-factorial structure and validity of the WSWMS. Because individual differences in sexual working models should lead to corresponding individual differences in sexual attitudes, behavioral intentions, and actual sexual behavior, we predicted that Maintain the Bond, Caring Partner, and Excitement would be positively associated with positive sexual attitude, positive self-schema, and sexual functioning, and would be inversely related to negative views or emotions about sexuality. We also expected Distancing/Distracton and Guilt and Shame to converge with negative sexual attitude and negative self-schema, and to be inversely related to positive emotions or views about sexuality and sexual functioning. Our remaining predictions were the same as in Study 1.

### Method

#### Participants

Israeli women ( $N = 444$ ) aged 18 to 58 years ( $M = 27.1, SD = 7.62$ ) volunteered for this study without compensation. All participants were recruited from universities, colleges, community centers, and sport clubs in the central area of Israel. Of the participants, 69.4% were single, 23.9% were

**Table 5. Regression of Relationship Measures on WSWMS, RAS, and Attachment Scores (Study 1)**

	$R^2$ change	$F$ change of equation	Adjusted $R^2$	$F$
<b>Companionate Love</b>				
Step 1: Attachment	.20***	20.42*** (2,164)	.19***	20.42*** (2,164)
Step 2: Relationship Satisfaction	.50***	270.39*** (1,163)	.69***	126.10*** (3,163)
Step 3: Sexual Working Models	.05***	5.50*** (5,158)	.73***	57.24*** (8,158)
<b>Passionate Love</b>				
Step 1: Attachment	.20***	20.80*** (2,164)	.19***	20.80*** (2,164)
Step 2: Relationship Satisfaction	.29***	94.51*** (1,163)	.49***	53.27*** (3,163)
Step 3: Sexual Working Models	.09***	7.18*** (5,158)	.57***	28.25*** (8,158)
<b>Emotional Intimacy</b>				
Step 1: Attachment	.27***	30.78*** (2,164)	.26***	30.78*** (2,164)
Step 2: Relationship Satisfaction	.40***	200.70*** (1,163)	.67***	112.40*** (3,163)
Step 3: Sexual Working Models	.02	2.06 (5,158)	.68***	44.81*** (8,158)
<b>Responsiveness</b>				
Step 1: Attachment	.23***	25.10*** (2,164)	.22***	25.10*** (2,164)
Step 2: Relationship Satisfaction	.46***	255.60*** (1,163)	.69***	127.91*** (3,163)
Step 3: Sexual Working Models	.04***	5.19*** (5,158)	.73***	57.37*** (8,158)
<b>SOI</b>				
Step 1: Attachment	.07**	6.22** (2,163)	.06**	6.22** (2,163)
Step 2: Relationship Satisfaction	.02	3.48 (1,162)	.07*	5.37*** (3,162)
Step 3: Sexual Working Models	.04	1.28 (5,157)	.08**	2.83** (8,157)

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

married, and 5.4% were separated, divorced, or widowed. Seventy-nine percent of all participants were currently involved in a romantic relationship, and 21.0% were not currently involved in a romantic relationship. Education level ranged from 10 to 25 years of schooling ( $M = 13.6$ ,  $SD = 2.04$ ). All participants had had sexual intercourse with male partners, either in a current or past relationship.

### Measures and Procedure

Participants individually completed a Hebrew version of the WSWMS. A team of four bilingual psychologists translated the full 24-item WSWMS and the other measures, except the Israeli Sexual Behavior Inventory (ISBI; Kravetz, Drory, & Shaked, 1999), into Hebrew, using the forward-backward translation technique. Instructions and ratings scales were identical to those used and described in the earlier studies. In addition, participants were given measures of (a) response bias and self-esteem; (b) sexual functioning and behaviors, sexual self-schema, sexual attitudes and evaluations, and sexual anxiety; and (c) relationship satisfaction. Self-esteem was included to establish discriminant measure because of its association with vol-

unteer bias in sex research (see review by Catania, Gibson, Chitwood, & Coates, 1990). The measures were presented in random order. Completion took most participants about 30 minutes.

We used Hebrew version of the Rosenberg's Self-Esteem Scale (SES; 1979), consisting of 10 statements responded to on a scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). The scale measures general self-esteem (e.g., "I feel I have a number of good qualities"). We obtained an internal consistency estimate of .87 (Cronbach's alpha). Higher scores reflected greater self-esteem.

A Hebrew version of the 33-item Marlowe-Crowne social desirability scale (Crowne & Marlowe, 1964) was used. Participants rated whether or not each item was self-descriptive. Cronbach's alpha was .74. Higher scores represented more socially desirable responding.

Hebrew versions of the RAS (Hendrick, 1988) and SOI (Simpson & Gangestad, 1991), both described in Study 1, were used. Internal consistencies were .86 and .79, respectively (Cronbach's alpha). Higher scores represented greater relationship satisfaction and a stronger tendency toward engaging in casual, uncommitted sexual relations.

We also administered the Israeli Sexual Behavior Inventory (ISBI; Kravetz et al., 1999). Participants answered a 13-item version tapping four areas of sexual functioning. Three items dealt with sexual satisfaction (e.g., "I feel satisfied with my sexual life"), two items with sexual arousal (e.g., "I feel aroused during sexual intercourse"), three items with orgasmic responsivity (e.g., "how frequently your sexual activities with your partner resulted in orgasm"), and five items with intimacy during sexual intercourse (e.g., "My partner and I display signs of affection during sexual intercourse"). Participants rated the extent to which these items were self-descriptive on a 5-point scale, from 1 (*not at all*) to 5 (*very much*). Coefficient Alpha reliabilities and inter-item correlation were adequate for the four categories of sexual functioning (.70 for sexual satisfaction, .82 for orgasmic responsivity, .70 for intimacy, and  $r = .26, p < .01$  for the two sexual arousal items). On this basis, we computed four scores by averaging items in each category.

A Hebrew version of the Expanded Sexual Arousability Index (SAI-E; Chambless & Lifshitz, 1984), a modified version of the SAI, was used to measure perceived sexual anxiety (feelings of nervousness, tension, uneasiness, or worry during various sexual experiences). Its 28 items describe sexual experiences and situations, which are rated along a 7-point Likert scale according to how anxious the respondent feels, or would feel, when engaged in the described activity (e.g., "When a loved one undresses you" or "When your partner has an orgasm"). Response options range from 0 (*pleasant/relaxing*) to 6 (*extremely anxiety-provoking*). The SAI-E obtained an internal consistency of .96 (Cronbach's alpha). Higher scores represented greater sexual anxiety.

In a Hebrew version of Women's Sexual Self-Schema Scale (Andersen & Cyranowski, 1994), participants rated 50 trait adjectives (26 scored and 24 fillers) reflecting a range of cognitive representations of sexual self-schema for women (e.g., "romantic," "embarrassed," or "direct"). Participants rated each item on a 7-point Likert scale ranging from 0 (*not at all descriptive of me*) to 6 (*very much descriptive of me*). This scale has three factors, two positive (romantic/passionate and open/direct self-views, 10 and 9 items, respectively), and one negative (embarrassment/conservatism, 7 items). In our study, principal components with Varimax rotation replicated Andersen and Cyranowski's three factors, excluding 4 items from "romantic/passionate" (stimulating, arousable, sympathetic, and revealing), 2 items from "open/direct" (uninhibited, casual), and 2 items from "embarrassment/conservatism" (self-conscious, prudent) that loaded less than .40, and which were dropped from subsequent analyses. Cronbach's alphas indicated adequate internal consistency for the three factors (.81 for the romantic/passionate; .78 for the open/direct; .68 for the embarrassment/conservatism; and .81 for the total scale). Following Andersen and Cyranowski's suggestion, we also calculated a total score by summing items for the two positive components

and subtracting values for the negative component.

We used a Hebrew version of the Sexual Opinion Survey (SOS; Fisher et al., 1988), a 21-item self-report measure of erotophobia-erotophilia (evaluation of sexual cues along a negative-positive dimension). Participants rated their affective responses to a variety of autosexual (e.g., "Masturbation can be an exciting experience"), heterosexual (e.g., "I personally find that thinking about engaging in sexual intercourse is arousing"), and homosexual situations (e.g., "If I found out that a close friend of mine was a homosexual, it would annoy me") on 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The SOS was translated into Hebrew by W. A. Fisher (1998). The SOS obtained an internal consistency estimate of .86 (Cronbach's alpha), and higher scores represented a greater erotophilic tendency.

Finally, we used a Hebrew version of the series of background questions described in Study 1 that solicited basic demographic and relationship information, including age, current relationship status, and length of current relationship.

## Results

Analysis of Moment Structures (AMOS; Arbuckle, 1999) was again used to conduct a confirmatory factor analysis of the factor structure derived in the pilot study and confirmed in Study 1. Again, the overall chi-square test was significant,  $X^2(235) = 603.56, p < .001$ , likely reflecting the large sample size. Model fit indices that adjust for sample size indicated good fit (GFI = .90 and CFI = .91) and low RMSEA of .06. These values indicate good fit to the model (Bentler, 1995) and convergence across the geographically distinct samples.

Cronbach's alpha coefficients indicated adequate internal consistency for the five WSWMS subscales (from .72 to .88). On this basis, five scores were computed for each participant by averaging the items corresponding to each factor. In this sample, the correlations between these five factors scores were again small to moderate (see Table 3), indicating that the WSWMS scores were relatively independent of one another.

To address convergent and discriminant validity, we examined correlations with conceptually-related sexual and relational measures, as well as with self-esteem and social desirability. Table 6 reports these correlations. Correlations with social desirability response set (Crowne & Marlowe, 1964) were low (less than .18). As expected, Guilt and Shame and Distancing/Distracton were positively associated with negative sexual self-schema and sexual anxiety and negatively associated with sexual functioning. Maintain the Bond exhibited small correlations with positive sexual attitude, positive self-schema, and sexual functioning. Caring Partner was positively associated with sexual functioning and positive sexual self-schema and negatively associated with sexual anxiety. Excitement exhibited moderate correlations with positive sexual attitude, positive self-schema, and sexual functioning, and a

**Table 6. Correlations between WSWMS and Measures Used for Assessment of Response Bias, Convergent and Discriminant Validity (Study 2;  $N = 444$ )**

Dimension Measure	WSWMS Scores				
	Guilt & Shame	Maintain the Bond	Distancing	Caring Partner	Excitement
Self-Esteem	-.36***	.03	-.35***	.29***	.24***
Social Desirability	.08	-.10*	.14**	-.17***	-.07
RAS	-.26***	.14**	-.33***	.36***	.21***
SAI-E	.46***	-.03	.38***	-.29***	-.32***
SOI	-.08	-.04	.01	-.12*	.18***
SOS	-.24***	.10*	-.14*	.09	.29***
Sexual Self-Schema					
Romantic/passionate	-.20***	.22***	-.32***	.28***	.37***
Open/direct	-.20***	.21***	-.16***	.24***	.32***
Embarrassment	.27***	.04	.22***	-.10*	-.24***
Total score	-.31***	.16***	-.32***	.27***	.42***
Sexual Functioning					
Orgasmic Responsivity	-.18***	.18***	-.34***	.35***	.46***
Sexual Intimacy	-.21***	.17***	-.24***	.51***	.37***
Sexual Arousal	-.12**	.20***	-.27***	.25***	.28***
Sexual Satisfaction	-.27***	.10*	-.37***	.39***	.34***

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

negative correlation with sexual anxiety. Overall, the sexuality measures manifested somewhat different pattern of associations across the WSWMS factors, indicating that the five factors represent discriminable aspects of women's sexual working models. Importantly, although the WSWMS factors were significantly associated with attitudinal, emotional, and behavioral aspects of sexuality, the strength of the correlations was mostly small to moderate, implying considerable non-shared variance.

To establish further that the predictive power of the WSWMS was unrelated to social desirability, we conducted a series of hierarchical regression analyses. In each analysis, the Rosenberg Self-Esteem Scale (Rosenberg, 1979) and the Marlowe-Crowne social desirability scale (Crowne & Marlowe, 1964) were entered as the first predictors, followed by the five WSWMS scales. The attitudinal and behavioral sexual measures and relationship satisfaction served as outcome measures. As Table 7 shows, for all variables the WSWMS added significant incremental prediction after self-esteem and social desirability had been controlled.

To assess incremental validity of the WSWMS over existing sexuality measures, we conducted a series of hierarchical regression analyses. We examined four areas of sexual functioning (orgasmic responsivity, intimacy during sexual intercourse, sexual arousal, and sexual satisfaction), as tapped by the ISBI (Kravetz et al., 1999). In each analysis, the sexual measures (SAI-E, SOI, SOS, Sexual Self-Schema) and the RAS were entered as the first set of predictor variables, followed by the set of five WSWMS scores. As shown in Table 8, the WSWMS predicted all four sexual functioning scales over and above the other measures; that is, the WSWMS exhibited significant incremental validity in predicting orgasmic responsivity, intimacy during sexual intercourse, sexual arousal, and sexual satisfaction. Distancing/ Distraction ( $\beta = -.13, p < .05$ )

and Excitement ( $\beta = .28, p < .001$ ) were associated with orgasmic responsivity; Caring Partner ( $\beta = .33, p < .001$ ) and Excitement ( $\beta = .13, p < .05$ ) were associated with sexual intimacy; Guilt and Shame ( $\beta = .12, p < .05$ ), Maintain the bond ( $\beta = .11, p < .05$ ), and Distancing/Distracton ( $\beta = -.16, p < .01$ ) were associated with sexual arousal; and Maintain the bond ( $\beta = -.10, p < .05$ ), Distancing/Distracton ( $\beta = -.11, p < .05$ ), Caring Partner ( $\beta = .14, p < .05$ ), and Excitement ( $\beta = .22, p < .001$ ) were associated with sexual satisfaction.

### Discussion

The findings showed excellent convergence across the samples from both North America and Israel, implying that the WSWMS has comparable validity in these two cultures. Furthermore, Study 2's findings provided additional evidence about construct validity of the WSWMS. Specifically, the WSWMS demonstrated convergent validity with cognitive, behavioral, and affective aspects of sexuality and incremental validity in predicting sexual functioning beyond variance associated with other measures of sexuality and with measures of response bias.

### GENERAL DISCUSSION

In these studies, we developed a self-report scale of women's sexual working models based on a functional-evolutionary analysis of the sexual behavioral system. Our findings showed that the WSWMS is reliable and valid. The pilot study and Study 1 revealed that women's sexual working models consist of well-differentiated dimensions of feelings, expectations, and beliefs about sexual activity in the context of romantic relationships. Studies 1 and 2 indicated that our theoretical model represented good fit to the obtained data and that the WSWMS displayed convergent validity with measures of cognitive, behavioral, and affective aspects of romantic relationships and sexuality.

**Table 7. Regression of Sexual Measures on WSWMS, Self-Esteem, and Social Desirability Scores (Study 2)**

	$R^2$ change	$F$ change	Adjusted $R^2$ of equation	$F$
SAI-E; Step 1: Self-Esteem, and Social Desirability	.11***	26.08*** (2,434)	.10***	26.08*** (2,434)
Step 2: Sexual Working Models	.19***	23.45*** (5,429)	.29***	26.13*** (7,429)
SOI; Step 1: Self-Esteem, and Social Desirability	.05***	12.49*** (2,437)	.05***	12.49*** (2,437)
Step 2: Sexual Working Models	.09***	9.49*** (5,432)	.15***	10.70*** (7,432)
SOS; Step 1: Self-Esteem, and Social Desirability	.07***	16.05*** (2,439)	.06***	16.05*** (2,439)
Step 2: Sexual Working Models	.09***	8.73*** (5,434)	.14***	11.22*** (7,434)
Sexual Self-Schema; Step 1: Self-Esteem, and Social Desirability	.19***	50.88*** (2,437)	.19***	50.88*** (2,437)
Step 2: Sexual Working Models	.12***	15.57*** (5,432)	.30***	28.08*** (7,432)
Orgasmic Responsivity; Step 1: Self-Esteem and Social Desirability	.06***	13.24*** (2,439)	.05***	13.24*** (2,439)
Step 2: Sexual Working Models	.22***	25.60*** (5,434)	.26***	23.13*** (7,434)
Sexual Intimacy; Step 1: Self-Esteem and Social Desirability	.06***	14.07*** (2,433)	.06***	14.07*** (2,433)
Step 2: Sexual Working Models	.23***	28.26*** (7,428)	.28***	25.47***
Sexual Arousal; Step 1: Self-Esteem and Social Desirability	.03**	6.22** (2,449)	.02**	6.22** (2,439)
Step 2: Sexual Working Models	.12***	11.84*** (5,434)	.13***	10.46*** (7,434)
Sexual Satisfaction; Step 1: Self-Esteem and Social Desirability	.12***	31.08*** (2,439)	.12***	31.08*** (2,439)
Step 2: Sexual Working Models	.15***	17.35*** (7,434)	.26***	22.93***
Relationship Satisfaction; Step 1: Self-Esteem and Social Desirability	.12***	23.48*** (5,434)	.12***	23.48*** (2,345)
Step 2: Sexual Working Models	.12***	10.28*** (5,340)	.22***	14.96*** (7,340)

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

This scale also demonstrated incremental validity in predicting relational beliefs and emotions beyond variance associated with attachment dimensions and relationship satisfaction, and in predicting beliefs and emotions related to sexual functioning beyond key individual differences. In addition, Study 2 provided cross-national evidence for the generalizability of the underlying factor structure in Israel. Finally, Study 2 established that the predictive power of the WSWMS was essentially unrelated to social desirability and self-esteem.

Women's sexual working models represent sexual experiences, feelings, expectations, and beliefs about the self, the sexual partner, and sexual activity with the partner.

Sexual working models also reflect sex-related goals and needs and the resulting psychological mechanisms that have evolved for regulating their expression in committed romantic relationships. On the basis of evolutionary theorizing, we identified five dimensions of sexual behaviors that are related to reproductive success in the context of long-term romantic relationships. Our analyses supported this conceptual scheme and, more broadly, the value of adopting an evolutionary-attachment perspective to understand sexuality. Evolutionary theories have sometimes overlooked the relational component of sexuality, an irony considering that in humans, most sexual experience takes place in the context of ongoing relationships (Reis,

**Table 8. Regression of ISBI on WSWMS and Sexual Measures Scores (SAI-E, SOI, SOS, Sexual Self-Schema) and RAS**

	<i>R</i> <sup>2</sup> change	<i>F</i> change	Adjusted <i>R</i> <sup>2</sup> of equation	<i>F</i>
<i>Orgasmic Responsivity</i>				
Step 1: Sexual Measures and RAS	.19***	15.94*** (5,336)	.18***	15.94*** (5,336)
Step 2: Sexual Working Models	.12***	11.03*** (5,331)	.29***	14.67*** (10,331)
<i>Sexual Intimacy</i>				
Step 1: Sexual Measures and RAS	.28***	26.43*** (5,336)	.27***	26.43*** (5,336)
Step 2: Sexual Working Models	.12***	12.78*** (5,331)	.38***	21.92*** (10,331)
<i>Sexual Arousal</i>				
Step 1: Sexual Measures and RAS	.15***	11.95*** (5,336)	.14***	11.95*** (5,336)
Step 2: Sexual Working Models	.07***	5.62*** (5,331)	.19***	9.20*** (10,331)
<i>Sexual Satisfaction</i>				
Step 1: Sexual Measures and RAS	.26***	23.45*** (5,336)	.25***	23.45*** (5,336)
Step 2: Sexual Working Models	.08***	8.10*** (5,331)	.32***	17.02*** (10,331)

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

Collins, & Berscheid, 2000). We hope that this measure will help remedy this oversight.

### *The 5 Dimensions of the WSWMS*

Readers may find it useful to briefly review our findings in relation to our functional-evolutionary analysis of the five dimensions of the WSWMS. The first dimension, Guilt and Shame, was associated with negative sexual self-schema and sexual anxiety and negatively associated with sexual satisfaction, in line with prior findings on negative themes that may be involved in women's heterosexual experience (e.g., Birnbaum, 2003; Birnbaum et al., 2001), as well as with cultural views implying that sex may be sinful. Why might sex, with its potential for joy and pleasure, create distress that can impair activities that contribute to reproductive success and the perpetuation of the species? Buss (1998) has proposed that different reproductive strategies may exist in a kind of a stabilized dynamic equilibrium. Guilt and Shame describes one psychological mechanism that may help to control sexual desire and its behavioral manifestations, in particular through displays of faithfulness and chastity that enhance a woman's long-term mate value in the eyes of men wishing to be certain of their paternity (Buss & Schmitt, 1993). Women with negative sexual attitudes and values, such as those embodied in our Guilt and Shame items, tend to have fewer lifetime partners, less sexual experience, and fewer brief sexual encounters than women with positive sexual attitudes (Andersen & Cyranowski, 1994; Fisher et al., 1988). Hence, this dimension may reflect a mechanism evolved to maximize the benefits of a monogamous sexual strategy. However, because this dimension was not correlated with sexual restrictiveness, which includes the unwillingness to engage in uncommitted sexual relations (Simpson &

Gangestad, 1991), further studies are needed to determine how experiencing sexual activity as sinful or immoral act relates to actual sexual behavior in ongoing relationships. It may be that systems promoting monogamy in ongoing relationships are independent from those that regulate the behavior of uncommitted persons.

The second dimension, Maintain the Bond, which reflects the belief that sexual activity promotes closeness between partners and enhances their emotional bond, was correlated significantly with all of the relational measures (e.g., passionate love, companionate love, emotional intimacy, responsiveness). L. M. Diamond (2003) and Fisher and colleagues (H. E. Fisher, 1998; Fisher, Aron, Mashek, & Brown, 2002) contended that although sexual desire and romantic love are often experienced in concert, they serve different evolutionary goals (motivating reproductive acts versus keeping partners attached to each other, respectively) and therefore make distinctive contributions to reproductive success. Whereas sexual attraction and excitement may be more important in the initial phase of relationships, processes involved in "maintaining the bond" may be more important in later stages (e.g., Berscheid, 1984; Gonzaga et al., 2001; Sprecher & Regan, 1998). For this reason, conceptualizations of the sexual mating system must consider relationship maintenance processes, which foster a context in which sexual partners may jointly care for and protect their offspring through infancy and childhood (Hazan & Zeifman, 1994). In this stage, processes related to the provision of mutual support, warmth, responsiveness, and interdependence may make a greater contribution to relationship maintenance than sexual desire does (Kotler, 1985; Reedy, Birren, & Schaie, 1981; Sternberg, 1986).

The third dimension, Distancing/Distracton, reflects indifference and detachment from the sexual event and

partner by the occurrence of intruding thoughts. This dimension was positively correlated with attachment-related avoidance and anxiety as well as sexual anxiety, and negatively associated with passionate love, relationship satisfaction, and most of the affective and behavioral sexuality measures. Kaplan (1974) noted that persons who are afraid to trust others and anxious about sexuality often turn themselves off and keep tight control over their emotions by "spectatoring" and by obsessive, intruding thoughts, both of which are likely to impair sexual enjoyment and function. Indeed, Distancing/Distractioin was associated with less passionate love and relational satisfaction, implying that the distress leading to, or created by, distancing may at least in part reflect broader relationship concerns. For example, conscious or unconscious distancing may alert women to interference with their desires and sexual goals during sexual activity, thereby directing attention to the source of distress and motivating them to prevent similar interference in the future (Buss, 1989a). Sexual encounters may serve as a sort of diagnostic test of a partner's intentions and willingness to commit (as perceived by the woman; Buss & Schmitt, 1993). Distressed sexual intercourse may motivate women to seek resolution of these interpersonal problems, either with the current partner or by looking for a more suitable partner.

The fourth dimension, Caring Partner, taps the perception of a sexual partner as caring and responsive to one's needs. This dimension was negatively associated with attachment-related avoidance and anxiety and sexual anxiety, and positively associated with the other relationship measures, as well as with all sexual functioning and sexual self-schema measures. These findings support Buss and Schmitt's (1993) claim that sexual encounters contribute to women's evaluation of (or re-evaluation, in case of ongoing relationships) the suitability and compatibility of sexual partners for both short-term and long-term mating strategies. Perceiving a sexual partner as caring and responsive during sexual intercourse predicts both sexual and relational satisfaction; perceiving the sexual partner as insensitive or unresponsive contravenes important sexual and relational goals (see Buss, 1989a). In this latter case, the sexual encounter may engender distressing doubts regarding the long-term suitability and commitment of the sexual partner. Many studies have shown that such caring is an important mate selection criterion for women (as well as for men; e.g., Buss, 1989b; Kenrick & Simpson, 1997). If so, doubts about caring and responsiveness are likely to disrupt sexual functioning. Thus, the dimensions Distancing/Distractioin and Caring Partner may represent complementary mechanisms that attune women to negative and positive signs, respectively, of the desirability of their sexual partner as a long-term mate. The relative independence of positive and negative systems is consistent with research on most other aspects of relationship functioning (Reis & Gable, 2003).

The fifth dimension, Excitement, represents intense sexual desire, which is among the strongest forces that

motivate human behavior (Shaver et al., 1988). Excitement was negatively associated with sexual anxiety and positively associated with passionate love and the other cognitive and behavioral measures of sexual satisfaction. Consistent with our theorizing, this factor was not significantly correlated with companionate love. A sense of excitement likely contributes to more frequent sexual intercourse and a corresponding increase in reproductive success (J. Diamond, 1997; Gallup, 1986). It may also foster the development of emotional bonds (Hazan & Zeifman, 1994). Clinical studies suggest that the absence of sexual desire and excitement is an important index of disrupted relational harmony (Kaplan, 1979; Leiblum & Rosen, 1988). Similarly, lack of sexual desire for a romantic partner is related to the frequency of thoughts of ending the current relationship and seeking alternative partners (Regan, 2000).

### *Implications and Limitations*

Our findings revealed different pattern of associations between sexual working models and relational and sexual measures across the five sexual working models dimensions and affirmed that each dimension represented a conceptually-unique aspect of women's sexual working models. Each dimension makes a distinctive contribution to understanding the role of sexuality in women's romantic relationships. For example, although sexual desire and pleasure motivate sexual activity, which promotes attachment formation (Hazan & Zeifman, 1994), our findings indicated that their contribution to relationship satisfaction was marginal in comparison to perceiving sexual partners as caring and responsive to one's needs. We designed the WSWMS scales with the explicit purpose of allowing researchers to address questions of this sort – that is, about the specific mechanisms and processes whereby sexual working models contribute to the initiation and maintenance of close relationships. Indeed, it is our impression that although growing empirical evidence has indicated that sexual satisfaction contributes to relationship quality and stability (see review by Sprecher & Cate, 2004), past studies have yielded mixed or ambiguous results (e.g., Hassebrauck & Fehr, 2002; Henderson-King & Veroff, 1994). Many variables and processes appear to moderate the impact of sexuality on close relationships (e.g., differential importance at different stages of development; the meaning couples attribute to their sex lives; the functional significance of sexuality within romantic relationship; and the link between sexuality and other aspects of the relationship). The WSWMS may be helpful in future research to shed light on these and other similar questions. It will also be useful to examine the influence of sexual working models among men and in different kinds of sexual-romantic relationships (e.g., uncommitted affairs, long-term extra-dyadic relationships, adolescent romance, cohabitation), through different stages of relationship development, and among different groups (e.g., distressed couples, couples with sexual dysfunction).

Our findings are consistent with Bowlby's (1982/1969) proposal that although there is a reciprocal relation between the attachment and sexual systems, they represent distinctive systems, have different primary functions, and involve varied cognitive operations in their functioning. Accordingly, our research suggests important questions about the interplay between the attachment and sexual behavioral systems within romantic relationships. For example, are different relationships goals, shaped by interaction with attachment figures, manifested distinctively in the sexual behavioral system (e.g., overt sexual behavior versus sexual fantasies)? In what ways do a woman's attachment orientation and sexual working models impinge on her partner's sexual expression, and vice versa? Does attachment insecurity promote sexual anxiety, or can unmet attachment needs be addressed through sexual interactions? Does sexual interaction help fulfill attachment needs in avoidant individuals? Although a growing body of research links attachment orientations with actual sexual behaviors (see review by Mikulincer & Shaver, 2003; Shaver & Mikulincer, in press), much more research is needed to explore the complex interplay between these two behavioral systems.

This research has several noteworthy limitations. For one, it will be necessary to extend the impact of sexual working models to actual sexual behavior, both as experienced by individuals and by their partners. Additionally, several characteristics of our sample may limit the generalizability of our findings. The use of volunteers introduces bias (see review by Catania et al., 1990), and although we used samples from two distinct cultures, North America and Israel, both are grounded in Caucasian-European cultures and values. Further studies should examine these constructs among diverse ethnic groups and in non-Western cultures, especially those that ascribe different meaning to women's expression of sexuality in marriage and other committed sexual relationships. Future research is also needed to examine these constructs in clinical settings. For example, a follow-up study could employ a longitudinal prospective design, administering the currently developed scale in multiple waves to women attending sexual therapy clinics, and assessing whether the reconstruction of their sex-related emotions and cognitions during therapy may lead to changes in sexual functioning as well as relational outcomes. Finally, the current research provided only preliminary evidence on the reliability and validity of the WSWMS. Future studies should further examine the associations between the WSWMS and other existing scales that assess the sex-relationship linkage (e.g., the perceptions of love and sex scale; Hendrick & Hendrick, 2002), as well as its test-retest reliability and discriminant validity.

We see this research as an important step toward shedding light on the complex and critical role of sexual behavior in close relationships. We hope this measure will promote future studies examining the contribution of individual differences in sexual working models to relationship

maintenance, and the social, personal, relational, and sexual experiences that mold these differences at different stages of relationship development over an extended period of time in more diverse samples. In addition, the measure should encourage future studies of the dual potential of the sexual system for both joy and distress, and for both satisfying and dysfunctional relational interaction.

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