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When Sex Goes Wrong: A Behavioral Systems Perspective on Individual Differences in Sexual Attitudes, Motives, Feelings, and Behaviors

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In the research program summarized here, we adopted a behavioral systems approach to explain individual differences in human sexual behavior. In the 1st stage, we developed the Sexual System Functioning Scale (SSFS)—a self-report instrument for assessing hyperactivation and deactivation of the sexual system. Sexual hyperactivation involves intense but anxious expressions of sexual desire, whereas sexual deactivation includes inhibition of sexual inclinations. In subsequent stages, we administered the SFSS to 18 samples to determine its structural, convergent, discriminant, and predictive validity as well as its nomological network. We found that SSFS deactivation and hyperactivation scores are meaningfully associated with existing measures of sexual attitudes, motives, feelings, and behaviors and with measures of personal and interpersonal well-being. Moreover, the scores predict cognitive, affective, physiological, and behavioral responses to sexual stimuli. Implications of our findings for understanding the potential of sex for both joy and distress are discussed.

Keywords: attachment, behavioral systems, individual differences, sexuality, sexual functioning

According to attachment theory (Bowlby, 1982; Shaver, Hazan, & Bradshaw, 1988), sexual behaviors are regulated by an inborn sexual behavioral system that evolved to facilitate the passing of one's genes to the next generation (D. M. Buss & Kenrick, 1998). The sexual behavioral system motivates and reinforces reproductive acts by arousing sexual desire and providing hedonic pleasure (Diamond, 2003). Indeed, sexual desire is among the strongest forces that motivate human behavior, and sexual gratification is one of the greatest human pleasures. Yet some people have mixed emotions about sexuality (e.g., Birnbaum, 2003; Birnbaum & Laser-Brandt, 2002; Janssen, Vorst, Finn, & Bancroft, 2002), which may interfere with their desire to have sex and their ability to enjoy it. In the research described here, we have applied Bowlby's (1982) behavioral-system concept to explain some of the individual differences in human sexual behavior, including their effects on mental health and adjustment.

The Sexual Behavioral System

In an attempt to understand how evolved mechanisms shaped various kinds of human behavior, Bowlby (1982) borrowed the ethological concept of *behavioral systems*. These goal-oriented neural programs organize an individual's behavior in ways that increase the likelihood of survival and reproductive success in the face of specific environmental demands. Different behavioral systems (e.g., attachment, caregiving) have distinct adaptive functions (e.g., self-protection, kin-care), proximal goals (e.g., maintaining a sense of security, providing protection), and characteristic cognitive-behavioral patterns that constitute the primary strategy of the system for attaining its goal. These strategic patterns are automatically activated by situations that make a particular goal salient, are directed toward goal attainment, and are deactivated by stimuli that signal the attainment of this goal or its perceived unattainability. Successful goal attainment depends on actual transactions with the social world, making it necessary for individuals to adjust their behavioral systems to fit changing contextual demands.

Because different people experience different social interactions, their expectations about strategies conducive to goal attainment may be different as well, and so may be the emotions and attitudes resulting from these experiences. These unique expectations (*internal working models of self and others*, in Bowlby's, 1973, terms) are integrated into the behavioral system's cognitive-behavioral "programming" and constitute the basis for individual differences in the components of the system: triggers, motives, cognitions, emotions, and behaviors (Bowlby, 1982). Hence, the extent to which particular tactics succeed in reaching the system's goal may affect cognitions and attitudes in the system's particular domain. The reverse causal direction is also likely to operate: Attitudes about one's functioning in the specific domain may exert an influence on the selection of strategic behaviors. In particular,

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recurrent failure to attain the system's goal may create negative expectations, thereby encouraging the adoption of alternative ("secondary") strategies for coping with the ensuing negative affect.

Applying Bowlby's (1982) theory to sexual behaviors, we propose that human mating is governed by an inborn sexual behavioral system and that individual differences in sexual motives, cognitions, emotions, and behaviors reflect variations in the functioning of this system. The sexual system is part of the developmental plan of human beings, as it is of all sexually reproducing species. Hence, its basic existence is not dependent on socialization processes or environmental triggers. This is not to suggest that the sexual system operates in a vacuum. Clearly, the regulation of the sexual system may be shaped by the attachment system, which is the earliest developing social behavioral system in humans (Bowlby, 1982; Shaver et al., 1988), and joint operation of these two systems is typical of ongoing romantic relationships (Birnbaum, 2010; Hazan & Zeifman, 1994). Still, sexual mating and attachment are governed by separate motivational systems that are presumed to have arisen during human evolution (Fisher, 1998; Fisher, Aron, Mashek, Li, & Brown, 2002). The processes underlying sexual desire and affectional bonding are therefore functionally distinct and their activation is mediated by different physiological processes (see review by Diamond, 2013).

In evolutionary terms, the sexual system serves the function of reproduction by facilitating sexual intercourse and pregnancy (D. M. Buss & Kenrick, 1998). Accordingly, encountering a sexually desirable partner may activate the sexual behavioral system and launch motivated, goal-directed behavioral tactics for attaining sexual access (Fisher, 1998). Once the system is activated, the primary strategy is typically to approach the desirable partner, entice her or him to have sex, and engage in sexual intercourse (Fisher, 1998; Fisher et al., 2002). The behaviors that constitute this primary strategy involve asserting one's sexual interest while being sensitive to a partner's signals. Optimal functioning of the sexual system requires coordination of the two partners' desires and responses and typically involves a gradual rise in physical and emotional intimacy (Rubin & Campbell, 2012). Such mutually coordinated sexual interactions may promote feelings of being desired along with feelings of mutual affection (e.g., Birnbaum, 2014) and therefore have the potential to affect well-being (Levin, 2007; Stephenson & Meston, in press). Furthermore, optimal functioning of the sexual system contributes to the quality of romantic relationships, which are also important for overall well-being (see reviews by Impett, Muise, & Peragine, 2013; Sprecher & Cate, 2004).

Despite its considerable potential for gratification and delight, human sexuality is sometimes constrained by aversive feelings (Brauer et al., 2012; Fisher, Byrne, White, & Kelley, 1988) and negative mental representations of sexual experiences (Birnbaum & Gillath, 2006; Birnbaum & Laser-Brandt, 2002; Birnbaum & Reis, 2006). Such negative sexual responses can result from cumulative unpleasant sexual experiences or sexual experiences with negative outcomes (e.g., sexually transmitted diseases, unwanted pregnancy), which lead to associating sex with negative feelings (e.g., pain, anxiety, disappointment; Janssen et al., 2002). These negative outcomes often include doubts about one's sexual desirability and skill (Andersen, Cyranowski, & Espindle, 1999) and are likely to generate relationship conflict and erode relationship satisfaction (Birnbaum, 2007a; Hassebrauck & Fehr, 2002). In theoretical terms, these negative processes can interfere with the primary strategy of the sexual system. Consequently, alternative strategies of responding to sexual arousal may replace the primary strategy. As with dysfunctions of other behavioral systems, these strategies can be conceptualized in terms of hyperactivation and deactivation, both of which put a person at risk for emotional problems (Mikulincer & Shaver, 2007, 2012; Shaver & Mikulincer, 2006).

Hyperactivation of the sexual system involves intensifying the primary strategy (i.e., increasing one's mating efforts) and keeping it chronically activated by maintaining an intense desire for sex. This desire is accompanied by performance anxieties and worries about sexual rejection. Sexual hyperactivation is best conceptualized as a regulatory strategy that is centered on avoiding the negative affect associated with perceived sexual inadequacy by pursuing the positive affect associated with sexual consummation. Thus, sexual hyperactivation is characterized by low activation and high deactivation thresholds of the sexual system. This strategy may be rooted in repeated experiences of rejection by mating targets that are interspersed with occasional experiences of sexual acceptance. Sexual hyperactivation may have various cognitive, emotional, and behavioral manifestations. Specifically, people who pursue hyperactivating strategies tend to overemphasize the importance of sex in their relationships and, at the same time, tend to be preoccupied with worries about their sexual desirability and performance. This psychological constellation may induce a sense of urgency for sexual fulfillment that fuels impulsive and intrusive behavior, without adequate consideration of a partner's wishes and concerns. Such insensitive behavior may bother potential partners and lead to further failures in the sexual realm (e.g., experiences of rejection and sexual frustration), creating a vicious cycle of heightened sexual arousal and sex-related anxiety.

In contrast, deactivation of the sexual system involves suppression of sexual needs and rejection of sex as a valuable source of pleasure. Such avoidance responses may result from consistent disappointments in the sexual domain (e.g., recurrent rejections by potential sexual partners) or from being punished for expressions of sexual desire. These aversive experiences may teach a person to suppress sexual needs in order to avoid the pain associated with their expression. As a result, the sexual behavioral system is likely to be kept chronically deactivated despite not having attained its goal. Adopting such strategies often leads an individual away from the desired sense of felt sexual security by inhibiting her or his sexual desires. People who pursue deactivating strategies tend to deemphasize the importance of sex in their relationships, experience sexual indifference, and distance themselves from erotic stimuli, including sexually desirous partners, so as to avoid sexual frustration. In so doing, they are likely to deny themselves the opportunity to alter their construal of sex as unfulfilling. This is not to say that sexually deactivated individuals avoid sex altogether but, rather, that their sexual activities are less motivated by sexual pleasure.

Dysfunctions of the sexual system and individual differences in its functioning have been conceptualized previously within other theoretical models (e.g., Basson, 2000; Janssen & Bancroft, 2007; Toates, 2009). Although such models provide some insight into the underlying mechanisms and complexity of human sexuality, they suffer from theoretical fragmentation, and to date, relatively little

effort has been made to link the existing models in an integrated framework (Finkel & Baumeister, 2010; Toates, 2009). Moreover, these models, and the studies they have instigated, are not adequately grounded in major relationship theories (Dewitte, in press), which is surprising, given that sexual activity often occurs in the context of ongoing romantic relationships (see review by Willetts, Sprecher, & Beck, 2004). This lack of theoretical grounding detracts from a deep understanding of the ways in which sexual functioning affects relationship processes, and the ways in which nonsexual relational dimensions compensate for, or contribute to, dysfunctions of the sexual system (Impett et al., 2013).

The Present Research

In the research described here, we used sexual hyperactivation and deactivation as organizing constructs within an overarching behavioral systems framework, and conducted several studies to test our reasoning about the sexual behavioral system. Most previous studies of individual variations in sexuality have examined one or more of five domains: *sexual attitudes*, such as the tendency to respond to sexual stimuli along a continuum from negativity (erotophobia) to positivity (erotophilia; e.g., Fisher et al., 1988); *sexual motives*, such as the reasons for engaging in sex (e.g., Cooper, Shapiro, & Powers, 1998; Hill & Preston, 1996); *physiological aspects of sexuality*, such as sexual arousal (e.g., Chambless & Lifshitz, 1984); *sexual behaviors*, such as the willingness to have sex without relational commitment (e.g., Simpson & Gangestad, 1991); and *cognitive representations of sexuality,* such as the sexual self-concept (e.g., Andersen et al., 1999) or conceptions of sexual intercourse (e.g., Birnbaum & Laser-Brandt, 2002).

Although none of these existing measures have been explicitly designed to assess sexual-system hyperactivation and deactivation, we can gain important insights from what is measured by these scales. For example, the Erotophilia-Erotophobia scale assesses the tendency to respond to sexual stimuli in approach or avoidance terms, and this comes close to our understanding of the sexual deactivation dimension (e.g., "I feel no pleasure during sexual fantasies"). The Experience of Heterosexual Intercourse scale assesses some of the anxiety that we propose to be associated with sexual hyperactivation (e.g., "Bothersome thoughts disturb my concentration during sexual intercourse") and some of the distancing aspects of sexual-system deactivation (e.g., "During sexual intercourse, I feel alienated and detached"). But these measures do not adequately capture the various cognitive, emotional, motivational, and behavioral aspects of the two secondary sexual strategies we conceptualize within a behavioral systems framework.

In the research reported here, we used the constructs of sexual hyperactivation and deactivation to organize the many kinds of individual differences in sexuality within one parsimonious theory that can account for various psychological phenomena in a theoretically coherent way. In particular, we pursued a multistage program of research aimed at assessing individual differences in the functioning of the sexual behavioral system and the implications of these differences for personal and interpersonal well-being.

In the first stage of the research program, we constructed a two-factor scale tapping individual differences in sexual hyperactivation and deactivation, the Sexual System Functioning Scale (SSFS). The two-factor structure of this scale is parallel to that of the Experiences in Close Relationships scale (ECR; Brennan, Clark, & Shaver, 1998), which measures hyperactivation and deactivation of the attachment system. Specifically, we developed a pool of items that assess either anxious hyperactivation or avoidant deactivation of the sexual system. We then administered the new scale to 17 independent Israeli samples and one American sample (see Table 1 for demographic features of these samples). Due to

Table 1
Sample Demographics

Sample	*N*	Percentage of women	Percentage of participants in a serious relationship	Years of education		Age	
				M	*SD*	*M*	*SD*
1	278	74.10	58.63	14.57	1.95	25.70	5.23
2	238	53.36	48.74	12.56	1.12	23.67	2.49
3	168	53.57	31.54	13.97	2.37	24.45	3.15
4	118	54.24	31.36	14.62	2.33	25.72	3.36
5	130	54.62	34.11	14.05	2.56	25.62	3.40
6	122	56.56	33.61	14.63	2.20	25.93	3.46
7	115	58.26	39.13	14.28	2.98	26.12	3.54
8	125	60.80	31.45	14.61	2.50	26.25	4.70
9[a]	229	67.26	41.48	12.74	1.54	20.81	2.31
10	92	54.17	36.96	14.65	1.80	26.04	3.50
11	29	27.59	100	14.86	2.20	27.93	3.60
12	65	48.22	78.79	14.88	1.86	29.53	5.08
13	40	67.50	37.50	14.00	1.93	26.45	3.57
14	17	0	54.23	13.92	2.45	25.34	3.31
15	105	51.43	35.24	13.36	1.72	25.45	5.95
16	87	51.72	40.23	12.51	1.31	23.81	2.58
17	125	51.20	100	14.39	2.31	30.87	10.30
18 (men)[b]	58	0	100	13.99	1.74	25.81	2.85
18 (women)	58	100	100	13.78	1.45	24.14	2.53

[a] Sample 9 consisted of American undergraduates. [b] Sample 18 consisted of 58 dating couples, so we provided demographic data separately for women and men.

the large number of samples and materials used in our research, we did not structure the remaining sections of this article in the standard way of reporting findings from each sample separately in a study-by-study sequence. Rather, we structured the article according to the specific issues we examined in each section. Therefore, after describing the generation of the SSFS items, we report findings evaluating the two-factor structure of the scale, its replicability across samples and cultures, and its stability over time and across reporters and measure type. Next, we report findings concerning the convergent, discriminant, and construct validity of the SSFS. Finally, we report findings concerning the extent to which SSFS scores can predict responses to sexual stimuli and the involvement of sexual desire in dyadic exchanges.

Scale Construction

Developing the Sexual System Functioning Scale (SSFS)

Item generation. In the first stage of scale development, we constructed a pool of 52 items designed to tap the two secondary sexual strategies: hyperactivation and deactivation. In writing these items we attempted to capture the various cognitive, emotional, motivational, and behavioral aspects of sexual hyperactivation and deactivation described earlier in this article. For example, the 26 items designed to assess sexual hyperactivation focused on the urgent and exaggerated need for sex as well as the experience of sex-related anxieties, worries, and doubts (e.g., "Being sexually desirable is extremely important to me"; "I worry about not being 'good enough' in bed"; "When I haven't had sex for a while, I begin to feel anxious and insecure"). The 26 items designed to assess sexual deactivation focused on uneasiness with sex, attempts to avoid sexual activities, and deemphasizing one's own sex-related feelings, thoughts, and needs (e.g., "During sexual activity, I sometimes feel uninvolved and uninterested"; "I often find it hard to experience pleasure during sexual activity"; "I usually have sex only when my partner pressures me or really wants me to"). These items were written to capture feelings and thoughts not only during sexual acts but also before and after sexual activities.

Eight independent judges (Israeli psychology students), who had been taught our conception of the sexual system, rated the goodness of fit of each item to each theoretical dimension (hyperactivation or deactivation) as a check on its face validity. Ratings were made on a 7-point scale. Items that averaged lower than 5.5 across the eight judges were omitted. This resulted in 48 items (24 items for each strategy) with high face validity.

Items were written in Hebrew and immediately translated into English by two bilingual psychologists. The English items were then translated back into Hebrew by two bilingual psychologists. This back translation yielded items similar to those in Hebrew, confirming the congruence of the Hebrew and English versions.

Scale reduction. A sample of 278 Israeli undergraduates (Sample 1 in Table 1) completed the 48 SSFS items. For each item, participants rated the extent to which it was descriptive of their feelings during sexual activities. The ratings were made using a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The items did not refer to a specific situation or relationship partner but, rather, to one's typical sex-related thoughts, feelings, and behaviors. That is, the SSFS measures a person's general orientation to sex rather than feelings and thoughts in a particular situation or relationship, although the items could easily be adapted to assess relationship-specific sexual strategies, as is sometimes done with the ECR scale (Brennan et al., 1998; Fraley, Heffernan, Vicary, & Brumbaugh, 2011) when measuring attachment patterns in specific relationships.

A principal components analysis with varimax rotation indicated the existence of two robust factors (eigenvalues > 1), with sexual hyperactivation items loading strongly on one factor (loadings $> .40$) and sexual deactivation items loading strongly on the other factor. This analysis explained 35.97% of the variance in the item scores, with the hyperactivation factor explaining 20.33% and the deactivation factor explaining 15.64%. We then reduced the number of items on each subscale following two guiding principles: maintain good content validity and adequate scale reliability. We first identified within each subscale pairs of items that were similarly worded and highly correlated ($r > .50$). Such items were considered redundant, and the item with the lower item-total correlation was discarded. Second, item-total correlations were recalculated for the remaining items, and items that had the weakest correlations with their subscale were discarded. This process continued until we were left with 12 items on each subscale (see the Appendix for the 24-item SFSS). Third, we conducted a principal components analysis with varimax rotation of the 24 items (see Table 2). As expected, sexual hyperactivation and deactivation items loaded high ($>.45$) on their respective factors and relatively low ($<.25$) on the other factor. Moreover, both subscales had adequate Cronbach α coefficients (see Table 2).

Evaluating the Two-Factor Structure of the SSFS

Replicability of the SSFS factorial structure across samples. Principal components analyses with varimax rotation of the 24 SSFS items were conducted separately in nine other samples of Israeli participants with *N*s greater than 100 (Samples 2–8, 15, and 17; see Table 1). Scree plots for the nine samples consistently indicated two factors with eigenvalues > 1, with the 12 deactivation items loading highly on one factor and the 12 hyperactivation items loading highly ($>.40$) on the other factor. Proportions of variance explained by the two factors ranged from 38.68% to 51.08%, and both subscales exhibited high internal consistency in each of the nine samples (see Table 2). Moreover, the two-dimensional structure was fully replicated when factor analyses were conducted separately for men and women in the various samples, thereby supporting the invariance of the two-factor structure across sexes. We therefore computed two total scores—sexual hyperactivation and deactivation—by averaging items on each subscale.

As intended, the correlation between the hyperactivation and deactivation scores was not statistically significant in most of the samples (*r*s ranging between .01 and .18; see Table 2). Moreover, the significant correlations in six of the samples were not high (*r*s ranging between .21 and .34; see Table 2). Overall, the two SSFS subscales seem to be nearly orthogonal and to form a two-

Table 2
Descriptive Statistics for SSFS Subscales, Percentage of Variance Explained by Each Factor After Rotation, Cronbach Alpha Coefficients, and Pearson Correlations Between Subscales

	Hyper		Deact		Cronbach α			% explained variance[a]		
Sample	*M*	*SD*	*M*	*SD*	Hyper	Deact	*r*	Hyper	Deact	Total
1	3.25	1.00	2.54	0.88	.83	.84	.13	18.69	20.71	39.40
2	3.23	1.03	2.68	0.98	.87	.87	.24**	23.96	21.96	45.91
3	3.17	0.96	2.06	0.73	.85	.84	.13	19.49	19.18	38.67
4	2.91	0.86	2.25	0.88	.80	.87	.13	17.79	21.75	39.54
5	2.72	0.95	2.06	0.78	.87	.88	.23**	22.13	22.51	44.64
6	2.87	1.00	2.05	0.70	.87	.85	.17	22.55	19.90	42.46
7	2.91	0.95	2.07	0.73	.88	.87	.24**	23.22	20.89	44.11
8	3.27	1.17	2.87	0.88	.89	.86	.21*	28.72	18.53	47.25
9	3.41	1.08	2.69	0.92	.83	.81	.11	27.76	16.98	44.75
10	2.90	0.85	2.22	0.87	.80	.85	.09			
11	2.74	0.90	1.95	0.55	.86	.83	.01			
12	3.12	1.05	2.41	1.10	.87	.92	.08			
13	2.92	1.04	2.06	0.74	.91	.89	.08			
14	2.94	1.08	2.28	1.29	.89	.88	.17			
15	2.89	0.96	2.45	0.82	.91	.88	.14	30.27	20.81	51.08
16	3.14	1.06	2.23	0.76	.87	.84	.22*			
17	2.83	1.01	2.19	0.85	.82	.86	.15	26.59	16.33	42.92
18 (men)[b]	3.57	0.70	1.70	0.56	.70	.76	.34**			
18 (women)	3.35	1.03	1.81	0.86	.81	.91	.18			

Note. SSFS = Sexual System Functioning Scale; Hyper = hyperactivation; Deact = deactivation.
[a] Factor analyses were conducted only in samples that included more than 100 participants. [b] Sample 18 consisted of 58 dating couples, so we provided relevant statistics separately for women and men.
* $p < .05$. ** $p < .01$.

dimensional space in which different sexual system patterns can be represented. This relative independence of the two SSFS scores resembles the independence of attachment hyperactivation (anxiety) and attachment deactivation (avoidance) scores on the ECR scale. In both cases, the independence may stem from two forces operating in opposite directions. First, both hyperactivation and deactivation of the sexual or attachment systems represent problems in the system's functioning, which may push their correlation in a positive direction. Second, they reflect opposite strategies—more intense engagement in sex/attachment activities or withdrawal for these activities—which may push their correlation in a negative direction. The opposite forces may result in near-zero correlations between the two scales.

Confirmatory factor analysis. To further validate the SSFS structure, we combined Samples 2–8 and conducted a confirmatory factor analysis ($N = 1{,}016$). Fit indices for the two-factor model indicated good fit (comparative fit index [CFI] = .94, standardized root-mean-square residual [SRMR] = .05, root-mean-square error of approximation [RMSEA] = .05). Moreover, this model outperformed other models, including a single-factor model, $\Delta\chi^2(1) = 1677.09$, $p < .001$.

Cross-cultural replicability of the SSFS factor structure. To assess the cross-cultural replicability of the SSFS factor structure, we conducted a principal components analysis of the English version of the scale in a sample of American undergraduates (Sample 9 in Table 1). As can be seen in Table 2, the two-factor structure of the SSFS was fully replicated in the American sample. That is, the underlying constructs of sexual hyperactivation and deactivation appear to be relatively invariant across the two societies.

Stability Over Time and Across Reporters and Measure Type

In an examination of the temporal stability of the SSFS scores, a sample of 92 Israeli undergraduates (Sample 10 in Table 1) completed the SSFS four times at 1-month intervals. Both SSFS scores demonstrated high test–retest reliability over 3 months. For deactivation, *r*s between consecutive measurements ranged from .80 to .84, and the correlation between the first and fourth measurements was also high (.72). For hyperactivation, *r*s between consecutive measurements ranged from .78 to .81, and the correlation between the first and fourth measurements was high (.70). In Sample 18 (see Table 1), both members of 58 Israeli dating couples completed the SSFS three times at 4-month intervals. Both SSFS subscales were temporally stable over a period of 8 months. Among women, *r*s ranged from .78 to .88 for hyperactivation and from .70 to .75 for deactivation. Among men, *r*s ranged from .60 to .72 for hyperactivation and from .64 to .82 for deactivation.

For another sample of 29 Israeli undergraduates who completed the SFSS (Sample 11, Table 1), we asked their romantic partners to use the SFSS items to describe the participants. Significant correlations were found between self-reports and partner-reports regarding both the hyperactivation and deactivation dimensions (*r*s of .54 and .50, *p*s $< .01$). That is, the SFSS seems to measure, in part, behavioral tendencies that can be observed by a romantic partner.

In an additional sample of 65 Israeli undergraduates (Sample 12, Table 1), we conducted a two-session study to see whether SFSS scores were related to people's open-ended accounts of their experiences during sexual activities. In the first session, partici-

pants completed the SFSS, and in the second session, they recalled three instances of having sex, and described what happened in each case. Two judges (graduate students in a clinical psychology program), blind to participants' SSFS scores but familiar with the theoretical dimensions of sexual hyperactivation and deactivation, read each participant's narratives and rated (on a 7-point scale) the extent to which cognitive, motivational, affective, and behavioral signs of hyperactivation and deactivation appeared in each narrative. Correlations between ratings of the two judges were reasonably high (.59 for hyperactivation ratings and .65 for deactivation ratings), thereby allowing us to average ratings across judges. Significant associations were found between these ratings and participants' SFSS scores ($r = .52$ for deactivation and $r = .47$ for hyperactivation, all $ps < .01$). Thus, a person's self-reports on the SFSS appear to be valid indicators of sex-related thoughts and feelings, at least as reflected in narratives about sexual experiences.

Scale Validation

Convergent Validity

To assess convergent validity, we correlated the SSFS with existing measures of (a) sex-related feelings and attitudes, (b) sex-related self-views, (c) sexual functioning, (d) sexual fantasies, (e) sex-related personality traits, and (f) sex-related motives in six Israeli samples (Samples 3–8) and the American sample (Sample 9). Our predictions were as follows:

1. The SSFS hyperactivation score would be positively associated with measures of sexual arousal, sexual desire, frequency of sexual fantasies, erotophilia (liking sex), and sex-related worries and anxieties, as well as with measures of coercive and opportunistic sexuality aimed at securing immediate rewards (e.g., casual sex, short-term mating). Moreover, because sexual hyperactivation is also characterized by highly valuing sex as one of life's most important activities, the SSFS hyperactivation score would be associated with the perception of sex as a means of achieving a wide array of personal motives, such as self-affirmation and enhancement, relationship maintenance, and distress regulation.

2. The SSFS deactivation score would be positively associated with measures of restrictive and withdrawn sexuality, erotophobia, sexual inhibition, and lack of interest in short-term mating and casual sex. Moreover, people scoring high on sexual deactivation would fantasize about sexual themes less frequently and would not tend to perceive sex as a means of achieving other personal motives beyond procreation.

3. The two SSFS scores would be associated with sexual dysfunctions, negative sex-related self-views, sex-related negative emotions, and sexual dissatisfaction.

Associations with sex-related feelings and thoughts. To measure sex-related attitudes and feelings, we used the Sexual Opinion Survey (SOS; Fisher et al., 1988), the Anxiety subscale of the Sexual Arousability Inventory—Expanded (SAI-E; Chambless & Lifshitz, 1984), and the Experience of Heterosexual Intercourse Scale (EHIS; Birnbaum & Laser-Brandt, 2002). Based on the acceptable Cronbach αs we found for all of the scales (see Table 3), we computed (a) the total SOS score tapping negative attitudes toward sex ("erotophobia"); (b) the SAI-E sexual anxiety score; and (c) three EHIS scores tapping worry-centered, relationship-centered, and pleasure-centered feelings during sexual intercourse.

As can be seen in Table 3, Pearson correlations indicated that participants scoring relatively high on either sexual hyperactivation or sexual deactivation scored higher on sexual anxiety and were more likely to experience worries and negative affect during sexual intercourse (EHIS score). In addition, participants scoring higher on sexual deactivation scored higher on erotophobia and were less likely to experience warm feelings toward their partner and pleasure-orgasmic feelings during sexual intercourse (EHIS scores). In contrast, participants scoring higher on sexual hyperactivation were more likely to experience warm feelings toward their partner during sexual intercourse (EHIS scores), although they also reported relatively high levels of anxiety and worry during sex (see Table 3).[1]

Associations with sex-related self-views. Variations in sexual-system functioning should be manifested in a person's sex-related self-views. Therefore, we administered the SFSS together with the Self-Perceived Mate Value scale (SPMV; Landolt, Lalumiere, & Quinsey, 1995), the Sexual Esteem scale from the Sexuality Scale (Snell & Papini, 1989), and the Sexual Desire scale (Andersen, Anderson, & deProsse, 1989). Based on the acceptable Cronbach αs we found for all of the scales (see Table 3), we computed the following scores for each participant: (a) self-perceived value as a mate, (b) positive sexual self-esteem, and (d) sexual desire.

Participants scoring higher on either sexual hyperactivation or deactivation were less likely to perceive themselves as an attractive mate and scored lower on positive sexual self-esteem (see Table 3). In addition, sexual hyperactivation was positively associated with sexual desire, whereas sexual deactivation was negatively associated with desire (see Table 3). Thus, although both SSFS scores were associated with negative sexual self-views, participants scoring higher on hyperactivation still reported relatively high levels of sexual desire.

Associations with sexual functioning and arousal. The convergent validity of the SSFS was further examined by correlating it with measures of sexual functioning and arousal: the Sexual Arousability Inventory (SAI; Hoon, Hoon, & Wincze, 1976), the Israeli Sexual Behavior Inventory (ISBI; Kravetz, Drory, & Shaked, 1999), the Sexual Inhibition and Sexual Excitation scales (SIS/SES; Janssen et al., 2002), and the Sexual Satisfaction scale (Gonzaga, Turner, Keltner, Campos, & Altemus, 2006). Based on the acceptable Cronbach αs we found for all of the scales (see Table 3), we computed (a) a total SAI score tapping sexual arousal; (b) seven ISBI scores measuring sexual arousal, sexual satisfaction, sexual intimacy, orgasmic dysfunction, penile erection dysfunction (for men), premature ejaculation (for men), and vaginismus (for women); (c) three SIS/SES scores tapping propensities for sexual excitation, sexual inhibition due to threat of performance failure (e.g., losing an erection), and sexual inhibition due to threat of performance consequences (e.g., unwanted pregnancy); and (d) a total sexual satisfaction score.

[1] The SOS, Sex Anxiety, SAI, SIS/SES, SOI, Sexual Mating Preferences, SBSS, ECR, BFI, the BIS/BAS, Sensation Seeking, PANAS, and Self-Esteem scales were completed by both Israeli and American participants, and the correlations with the SSFS scores were similar in the two countries (see Tables 3, 5, and 6).

Table 3
Pearson Correlations Between SSFS Subscales and Sex-Related Measures

Scale	Cronbach α	Hyperactivation	Deactivation	Sample
SOS Erotophobia	.80, .85	−.07, −.04	.43**, .39**	3, 9
SAI-E anxiety	.97, .95	.34**, .39**	.46**, .37**	3, 9
EHIS relationship-centered	.93	.41**	−.32**	4
EHIS worries-centered	.89	.34**	.32**	4
EHIS pleasure-centered	.91	.05	−.36**	4
Self-perceived mate value	.84	−.28**	−.35**	8
Sexual self-esteem	.85	−.29**	−.33**	8
Sexual desire	.89	.30**	−.30**	8
SAI Sexual Arousal	.92, .91	.09, .13	−.31**, −.40**	7, 9
ISBI Sexual arousal	.81	.07	−.33**	3
ISBI Sexual satisfaction	.83	−.22**	−.24**	3
ISBI Sexual intimacy	.87	.01	−.18*	3
ISBI Orgasmic dysfunction	.84	.06	.34**	3
ISBI Penile erection dysfunction	.84	.04	.12	3
ISBI Premature ejaculation	.79	.49**	.25	3
ISBI Vaginismus	.78	.05	.28**	3
Sexual Excitation	.94, .88	.46**, .38**	−.29**, −.20**	7, 9
Sexual inhibition (failure)	.68, .78	.08, .11	.45**, .45**	7, 9
Sexual inhibition (consequences)	.82, .77	−.18, −.01	.39**, .33**	7, 9
Sexual satisfaction	.68	−.33**	−.29**	8
Sexual Coercion	.77	.40**	−.13	4
SOI total score	.79, .89	.10, .05	−.19*, −.29**	4, 9
Long-term mating preference	.69, .78	−.13, −.06	−.04, −.01	7, 9
Short-term mating preference	.82, .79	.41**, .30**	−.38**, −.27**	7, 9
Number of sexual partners		.34**	−.41**	7
Frequency of sexual activities		.22*	−.45**	7
Mating Effort	.92	.27**	−.29**	8

Note. The value(s) in each cell refer to the respective sample(s) in the far right column. SSFS = Sexual System Functioning Scale; SOS = Sexual Opinion Survey (Fisher et al., 1988); SAI-E = Sexual Arousability Inventory—Expanded (Chambless & Lifshitz, 1984); EHIS = Experience of Heterosexual Intercourse Scale (Birnbaum & Laser-Brandt, 2002); SAI = Sexual Arousability Inventory (Hoon, Hoon, & Wincze, 1976); ISBI = Israeli Sexual Behavior Inventory (Kravetz, Drory, & Shaked, 1999); SOI = Sociosexual Orientation Inventory (Simpson & Gangestad, 1991).
* $p < .05$. ** $p < .01$.

Participants scoring higher on either sexual hyperactivation or deactivation scored lower on sexual satisfaction (see Table 3). In addition, participants scoring higher on sexual deactivation scored lower on sexual excitation, sexual arousal, and sexual intimacy and were more likely to report orgasmic dysfunction, vaginismus, and sexual inhibition due to either threat of performance failure or threat of performance consequences. Although the hyperactivation score was not significantly associated with reports of sexual arousal, participants scoring higher on sexual hyperactivation scored higher on sexual excitation and were more likely to report premature ejaculation problems (perhaps due to their high level of sexual excitation).

Associations with mating strategies. We examined associations between the SSFS and measures of mating preferences and behaviors: the Sexual Coercion in Intimate Relations scale (Shackelford & Goetz, 2004), the Sociosexual Orientation Inventory (SOI; Simpson & Gangestad, 1991), the Sexual Mating Preferences scale (SMPS; Gillath & Schachner, 2006), and the Mating Effort scale (MES; Rowe et al., 1997). In addition, participants in Sample 7 provided information about the number of sexual partners they had in the previous 5 years and the frequency of sexual activities (number of sexual acts per week) during the last year. Based on the acceptable Cronbach αs we obtained for all of the scales (see Table 3), we computed (a) a total sexual coercion score; (b) a total SOI score indicating willingness to engage in casual, uncommitted sex; (c) two SMPS scores tapping long-term and short-term mating preferences, and a total MES score indicating the perceived effort allocated to attracting sexual partners.

As can be seen in Table 3, participants scoring higher on sexual deactivation were less willing to engage in casual, uncommitted sex and to allocate time and energy to attracting sexual partners. Moreover, they were less likely to prefer short-term sexual relationships and reported having fewer sexual partners and less frequent sexual activities. Participants scoring higher on sexual hyperactivation scored higher on sexual coercion, preferred more short-term sexual relations, and were more likely to invest efforts in attracting sexual partners. In addition, they reported having more sexual partners and more frequent sexual activities.

Associations with sexual fantasy. People's sexual fantasies can provide a window on their sex-related desires, goals, and preferences that may not always be acted on. Therefore, we administered the SSFS together with the Sexual Fantasy Checklist (Birnbaum, 2007b), which assesses the frequency of sexual fantasies and the themes that dominate a person's sexual fantasies (emotionally detached fantasies, emotionally invested fantasies, control-related fantasies). As expected, sexual hyperactivation was associated with a higher frequency of sexual fantasies (see Table 4), reflecting heightened sexual arousal and desire. Moreover,

Table 4
Pearson Correlations Between SSFS Subscales, Sexual Fantasies, and the Sexy Seven Scales

Subscale	Cronbach α	Hyperactivation	Deactivation	Sample
Sexual Fantasy Checklist				
Frequency of sexual fantasizing	.70	.49**	−.15	5
Emotionally detached fantasies	.87	.39**	−.12	5
Emotionally invested fantasies	.82	.03	−.14	5
Control-related fantasies	.82	.29**	−.09	5
Sexy Seven Scale				
Sexual attractiveness	.91	.10	−.41**	5
Relationship exclusivity	.81	−.28**	.09	5
Feminine gender orientation	.93	−.29**	.21*	5
Sexual restraint	.60	−.02	.33**	5
Erotophilic disposition	.82	.36**	−.36**	5
Emotional investment	.75	.02	−.35**	5
Sexual orientation	.73	.11	.05	5

Note. SSFS = Sexual System Functioning Scale.
* $p < .05$. ** $p < .01$.

participants scoring higher on sexual hyperactivation were more likely to report emotionally detached and control-related (e.g., exerting dominance over one's sexual partner) sexual fantasies. Unexpectedly, deactivation was not associated with frequency of sexual fantasies (see Table 4). Future studies should explore potential moderators (e.g., objective ratings of sexual attractiveness, recent exposure to sexual stimuli) to help explain whether and why only some people scoring high on sexual deactivation are less likely to fantasize about sexual themes.

Associations with sex-related personality dimensions. We also examined associations between the SSFS subscales and the Sexy Seven Scale (Schmitt & Buss, 2000), tapping seven sex-related personality dimensions (see Table 4). As expected, participants scoring higher on sexual hyperactivation were more likely to perceive themselves as erotophilic (liking sex) and less likely to report a feminine orientation and a preference for exclusivity in sexual relations. In contrast, participants scoring higher on sexual deactivation were more likely to report a feminine orientation and to perceive themselves as sexually restrained. In addition, they were less likely to perceive themselves as sexually attractive and erotophilic and less likely to be emotionally invested in sexual relations (see Table 4).

Associations with sexual motives. The motives underlying people's sexual behavior can be revealing about the functioning of their sexual system. Hence, we examined the associations between SSFS subscales and measures of sexual motivation: the Sexual Behavioral System Subgoals scale (SBSS; Birnbaum & Gillath, 2006), the Sex Motives scale (SMS; Cooper et al., 1998), and the Affective and Motivational Orientation Related to Erotic Arousal questionnaire (AMORE; Hill & Preston, 1996). Based on the acceptable Cronbach αs we obtained for all of the scales (see Table 5), we computed (a) four SBSS scores tapping beliefs related to the pursuit of sexual-system subgoals, (b) six SMS scores indicating specific reasons for having sex, and (c) eight AMORE scores assessing specific desired sex-related outcomes.

Pearson correlations indicated that although both SSFS hyperactivation and deactivation scores were positively associated with viewing sex as a cause of negative feelings, they had quite different associations with sex-related motives (see Table 5). Sexual hyperactivation was positively associated with self-serving sexual motives (i.e., using sex to affirm one's self, to gain in social reputation, to enhance one's power, and to feel valued by a partner), relationship-oriented sexual motives (i.e., using sex to maintain a relationship, to enhance emotional intimacy, to experience the power of a partner, and to value and nurture a partner), and affect-regulation motives (i.e., using sex to cope with distress, to reduce relational insecurities, to reduce negative affect). Sexual deactivation was positively associated with the use of sex for the sake of procreation (see Table 5). It was also positively associated with using sex for instrumental reasons (i.e., to avoid losing love or to enhance social reputation), but negatively associated with using sex for romantic purposes or pleasure.[2]

Discriminant Validity

To assess discriminant validity, we correlated the SSFS with demographic variables and social desirability measures in Samples 3–9. We expected no significant associations between SSFS scores, social desirability measures, and sociodemographic variables. We also expected that these variables would not be able to explain the associations between SSFS scores and measures of sex-related attitudes, feelings, cognitions, and behaviors.

We first assessed associations between SSFS scores and demographic variables: sex, age, relationship status (whether participants were currently in a romantic relationship), and education. For this purpose, we calculated a weighted average of these correlations across all the samples. SSFS hyperactivation and deactivation scores were not significantly associated with a participant's

[2] It is important to note that all of the reported associations (see Tables 3–6) remained the same when the two SSFS scores were simultaneously entered into a multiple regression analysis. That is, the reported findings represented well-differentiated patterns of associations between each SSFS score and other assessed variables while controlling for the other SSFS score. It is also worthy of note that due to the correlational design of the studies conducted with Samples 3–9, we do not have evidence about the direction of causality of the correlations or about whether the assessed variables are antecedents, correlates, or consequences of SSFS scores. Therefore, we treated all of the variables as correlates of SSFS scores and as means of strengthening our confidence in the validity of the SSFS. We were not attempting to establish causality.

Table 5
Pearson Correlations Between SSFS Subscales and Sexual Motives

Scale	Cronbach α	Hyperactivation	Deactivation	Sample
Sexual Behavioral System Subgoals				
Sex for relationship initiation	.87, .86	.16, .27**	−.34**, −.18**	6, 9
Sex for relationship maintenance	.87, .82	.40**, .42**	−.29**, −.18**	6, 9
Sex as a source of negative feelings	.88, .86	.29**, .36**	.48**, .61**	6, 9
Sex as a source of pleasure	.69, .75	.07, .09	−.32**, −.57**	6, 9
Sex Motives Scale				
Self-affirmation motives	.87	.50**	−.05	6
Intimacy motives	.87	.32**	−.06	6
Hedonism motives	.90	.17	−.34**	6
Sex to enhance social reputation	.94	.27**	.27**	6
Sex to avoid losing love	.89	.27**	.30**	6
Sex to relieve from distress	.86	.36**	−.05	6
AMORE Scale				
Experiencing the power of partner	.92	.25*	−.13	6
Expressing value for partner	.81	.22*	.02	6
Obtain relief from distress	.80	.37**	−.13	6
Procreation	.76	.07	.24*	6
Enhance one's power	.80	.34**	−.03	6
Feeling valued by partner	.81	.54**	.03	6
Providing nurturance to partner	.83	.49**	−.13	6
Experiencing physical pleasure	.66	.07	−.32**	6

Note. The value(s) in each cell refer to the respective sample(s) in the far right column. SSFS = Sexual System Functioning Scale; AMORE = Affective and Motivational Orientation Related to Erotic Arousal questionnaire (Hill & Preston, 1996).
* $p < .05$. ** $p < .01$.

age, relationship status, years of education, or sex (*r*s ranging from .01 to .09), supporting the discriminant validity of the scale.

Although many sex-related self-report measures have been shown to be valid and reliable, some of such measures may be susceptible to social desirability biases. Hence, we measured SSFS scores together with scores on the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964) and the Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1984). No significant associations were found between SSFS scores and the measures of socially desirable responding, including social desirability, impression management, and self-deception (*r*s ranging from –.09 to –.18, all *p*s > .05), implying that responses to SSFS items are not much affected by social desirability or impression management biases.

Strengthening our confidence in the discriminant validity of the SSFS, partial correlations (not reported here for the sake of parsimony) revealed that the associations reported in Tables 3–6 between SSFS scores and other related constructs remained significant after statistically controlling for social desirability scores or age, relationship status, education, and sex. That is, the observed patterns of correlations for each SSFS score could not be explained by social desirability or sociodemographic variables.

Construct Validity

We sought to broaden our understanding of individual differences in the functioning of the sexual system by examining the nomological network of SSFS scores. Specifically, we examined associations between these scores and measures of relational orientations, personality traits, affect, psychological well-being, and psychological resources. Because sexual hyperactivation and deactivation reflect problems in enjoying sex; are thought to result from a history of sexual failure, pain, and frustration; and are associated with sex-related worries, anxieties, and dysfunctions, we predicted that the two SSFS scores would be associated with relationship insecurities, stronger negative affectivity, higher neuroticism scores, lower psychological well-being, and poorer psychological resources for managing distress and dealing with life's problems.

Associations with relational orientations. To examine the network of associations between SSFS scores and relational orientations, participants completed the Passionate Love Scale (PLS; Hatfield & Sprecher, 1986) and the ECR attachment scales (Brennan et al., 1998) measuring attachment anxiety and avoidance (see Cronbach αs in Table 6). As expected, participants scoring higher on either sexual hyperactivation or deactivation were more likely to report relational insecurities, as evidenced by higher attachment anxiety and avoidance scores (see Table 6). That is, problems in sexual-system functioning were positively associated with more general relational insecurities. In addition, participants scoring higher on sexual hyperactivation scored higher on passionate love (see Table 6), suggesting that passionate love involves, to some extent, sexual hyperactivation and the worries associated with it.

Due to similarity in the ways of coping with attachment-related and sex-related problems, one could expect a one-to-one mapping of sexual hyperactivation to anxious attachment and sexual deactivation to avoidant attachment. However, our findings indicated that both SSFS scores are positively correlated with both attachment anxiety and avoidance. This finding, which we also observed when examining associations between attachment insecurities and dysfunctions in the power-dominance system (Shaver, Segev, & Mikulincer, 2011), suggests that a specific dysfunction in a behavioral system should not necessarily be reflected in a similar dys-

Table 6
Pearson Correlations Between SSFS Subscales and Measures of Relational Orientations, Personality, Affect, and Psychological Resources

Scale	Cronbach α	Hyperactivation	Deactivation	Sample
Relational orientations				
ECR attachment anxiety	.93, .92	.52**, .57**	.24**, .16**	5, 9
ECR attachment avoidance	.89, .91	.28**, .27**	.25**, .38**	5, 9
Passionate love	.90	.33**	.04	7
Personality				
BFI extraversion	.74, .86	−.17, −.04	−.40**, −.28**	4, 9
BFI neuroticism	.89, .78	.35**, .26**	.33**, .29**	4, 9
BFI openness to experience	.86, .82	−.02, .02	−.37**, −.35**	4, 9
BFI conscientiousness	.84, .85	−.20*, −.16*	−.17, −.10	4, 9
BFI agreeableness	.78, .85	−.33**, −.28**	−.13, −.12	4, 9
Sensation seeking	.93, .91	.40**, .41**	−.30**, −.36**	6, 9
Behavioral inhibition	.75, .79	.39**, .36**	.01, .07	7, 9
Behavioral activation	.87, .89	.18, .27**	−.39**, −.31**	7, 9
ZKPQ activity level	.73	−.06	.08	7
ZKPQ aggressiveness	.64	.09	−.02	7
ZKPQ sociability	.76	−.23**	−.36**	7
ZKPQ impulsivity	.75	.42**	−.40**	7
ZKPQ neuroticism	.82	.31**	.25**	7
NPI total score	.82	.02	.09	9
Affect and well-being				
PANAS positive affect	.90, .91	−.29**, −.26**	−.39**, −.31**	6, 9
PANAS negative affect	.91, .92	.38**, .32**	.34**, .31	6, 9
MHI well-being	.92	−.21*	−.46**	4
MHI distress	.96	.35**	.40**	4
TOSCA Shame	.79	.27**	.24**	9
Anger	.83	.24**	.30**	9
Hostility	.85	.47**	.27**	9
Depression	.91	.30**	.39**	9
Trait anxiety	.92	.29**	.34**	9
Psychological resources				
Sense of Mastery	.75	−.21*	−.18*	5
Self-Esteem	.89, .90	−.25*, −.31**	−.22*, −.32**	5, 9
Sense of Vitality	.91	−.27**	−.29**	6
Self-Actualization	.72	−.37**	−.37**	6
Optimism	.84	−.38**	−.34**	4
Hardiness	.86	−.23*	−.39**	7

Note. The value(s) in each cell refer to the respective sample(s) in the far right column. SSFS = Sexual System Functioning Scale; ECR = Experiences in Close Relationships scale (Brennan, Clark, & Shaver, 1998); BFI = Big Five Inventory (John & Srivastava, 1999); ZKPQ = Zuckerman-Kuhlman personality questionnaire (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993); NPI = Narcissistic Personality Inventory (Raskin & Hall, 1979); PANAS = Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988); MHI = Mental Health Inventory (Veit & Ware, 1983); TOSCA = Test of Self-Conscious Affect (Tangney, Wagner, & Gramzow, 1989).
* $p < .05$. ** $p < .01$.

function in other behavioral systems. Rather, dysfunctions in different systems can be more complexly associated, suggesting that each domain and its pattern of associations should be examined carefully and systematically. For example, sexual hyperactivation may be associated with the two attachment scores because, like attachment anxiety, it is associated with negative affectivity and neuroticism, and, like avoidant attachment, is associated with a preference for casual, noncommitted sex. Sexual deactivation may be associated with the two attachment scores because, like avoidant attachment, it reflects a restrained, withdrawal orientation toward others, and, like anxious attachment, is associated with negative self-views and distress.

In Samples 5 and 9, we conducted multiple regression analyses examining unique effects of SSFS scores on sex-related measures while controlling for attachment orientations (ECR scores). Standardized regression coefficients (not reported here for the sake of parsimony) revealed that the associations reported in Tables 3–5 between SSFS scores and sex-related measures remained significant after statistically controlling for attachment anxiety and avoidance. That is, it seems that the SSFS taps unique aspects of sexuality not captured by measures of attachment insecurities, thus supporting the incremental validity of the scale.

Associations with personality measures. To explore the personality correlates of SSFS scores, participants completed various personality scales: The Big Five Inventory (BFI; John & Srivastava, 1999), the Behavioral Inhibition/Behavioral Activation Scales (BIS/BAS; Carver & White, 1994), the Zuckerman-Kuhlman personality questionnaire (ZKPQ; Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993), the Sensation Seeking Scale (SSS; Zuckerman, Eysenck, & Eysenck, 1978), and the Narcissistic

Personality Inventory (NPI; Raskin & Hall, 1979). Based on the acceptable Cronbach αs obtained for all of the scales (see Table 6), we computed the following scores for each participant: (a) BFI extraversion, neuroticism, openness to experience, conscientiousness, and agreeableness scores; (b) behavioral inhibition and behavioral activation scores; (c) ZKPQ activity level, aggressiveness, sociability, impulsivity, and neuroticism scores; (d) a total sensation-seeking score; and (e) a total narcissism score.

As can be seen in Table 6, both sexual hyperactivation and deactivation were positively associated with neuroticism (BFI and ZKPQ scores), highlighting the negative affectivity associated with suboptimal functioning of the sexual system. In addition, participants scoring higher on sexual deactivation scored lower on extraversion, sociability, openness to experience, sensation seeking, and behavioral activation. These associations imply that sexual deactivation is part of a nomological network of restricted and withdrawn personality characteristics, which manifests itself in drive inhibition, including inhibition of the sexual drive, and withdrawal from enjoyable, rewarding activities in the social, cognitive, and sexual domains.

Participants scoring higher on sexual hyperactivation scored higher on sensation seeking, impulsivity, and behavioral inhibition and lower on conscientiousness and agreeableness (see Table 6). These associations highlight the dual nature of sexual hyperactivation, which can also explain its association with both attachment anxiety and avoidance. On the one hand, it is part of a nomological network of impulsive and expansive personality characteristics, which manifests itself in sensation seeking, impulsivity, and immediate drive gratification, even at the cost of quarreling with and creating tension for partners. On the other hand, sexual hyperactivation is part of a nomological network of anxious, neurotic personality characteristics dominated by worries, negative affect, and a heightened focus on potential threats (behavioral inhibition score), mapping onto the anxious attachment pattern (Mikulincer & Shaver, 2007). Findings also revelaed no significant associations between SSFS scores and narcissism, implying that sexual hyperactivation and deactivation are not necessarily associated with grandiose narcissism.

In Samples 4 and 9, we conducted multiple regression analyses examining unique effects of SSFS scores on sex-related measures while controlling for the variance explained by the Big Five personality traits (BFI scores). In Sample 7, we conducted the same regressions while controlling for either BIS/BAS scores or ZPKQ scores. Standardized regression coefficients (not reported here for the sake of parsimony) revealed that the associations reported in Tables 3–5 between SSFS scores and sex-related measures remained significant after statistically controlling for personality traits. That is, SSFS scores tap unique aspects of sexuality not captured by personality trait measures, thereby supporting the incremental validity of the scale.

Associations with affect and well-being. To examine the affective correlates of SSFS scores, participants completed various measures of affect and well-being: the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), the Mental Health Inventory (MHI; Veit & Ware, 1983), the Test of Self-Conscious Affect (TOSCA; Tangney et al., 1989), the anger and hostility subscales of the Aggression Questionnaire (A. H. Buss & Perry, 1992), the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1980), and the Trait subscale of the State and Trait Anxiety Index (STAI; Spielberger, Gorsuch, & Lushene, 1970).

Based on the acceptable Cronbach αs obtained for all the scales (Table 6), we computed the following scores for each participant: (a) two PANAS scores reflecting positive mood and negative mood; (b) two MHI scores indicating psychological well-being and psychological distress; (c) TOSCA scores for shame-proneness; and (d) total scores on anger, hostility, depression, and trait anxiety. As can be seen in Table 6, participants scoring higher on either sexual hyperactivation or deactivation were more likely to report negative mood, psychological distress, shame-proneness, anger, hostility, depression, and anxiety. In addition, they were less likely to report positive mood and psychological well-being. Importantly, standardized regression coefficients (not reported here for the sake of parsimony) revealed that the reported associations between SSFS scores and measures of affect and well-being remained significant after statistically controlling for attachment scores, neuroticism, or self-esteem (Sample 9). That is, SSFS scores tap unique aspects of affect and well-being not captured by attachment, neuroticism, or self-esteem, thereby supporting the incremental validity of the scale.

Associations with psychological resources. The psychological distress associated with both sexual hyperactivation and deactivation can be manifested in impoverished psychological resources for dealing with obstacles, failures, and frustrations. Therefore, we examined associations between SSFS subscales and various measures of psychological resources: Sense of Mastery (Pearlin & Schooler, 1978), Self-Esteem Scale (Rosenberg, 1979), Subjective Vitality Scale (Ryan & Frederick, 1997), Self Actualization Scale (Jones & Crandall, 1986), a measure of optimism (Life Orientation Test; Scheier & Carver, 1985), and a measure of psychological hardiness (Personal Views Survey II; Maddi, 1997). As can be seen in Table 6, both sexual hyperactivation and deactivation scores were significantly and inversely associated with participants' sense of mastery, self-esteem, sense of vitality, self-actualization tendencies, optimism, and psychological hardiness. In line with our expectations, the two secondary sexual strategies were associated with impoverished psychological resources that make it more difficult to cope with life threats and to manage distress.

Predictive Validity

Beyond examining the nomological networks of the SSFS variables, we also examined the predictive validity of these scores. Specifically, we examined the extent to which hyperactivation and deactivation scores predicted a person's cognitive, affective, physiological, and behavioral reactions to actual sexual stimuli in controlled laboratory settings. Notably, small samples were involved in some of these studies due to the complexities of conducting experiments in laboratory settings. In examining the predictive validity of the SSFS scores, we also examined the incremental contribution of SSFS scores above and beyond the contribution of (a) other scales that assess sexual cognitions, emotions, motives, and behaviors; (b) attachment orientations; and (c) other relevant personality variables such as neuroticism and sociosexuality.

Predicting cognitive reactions to sexual stimuli. According to our conceptualization of the two secondary sexual strategies,

hyperactivation strategies should predispose people to monitor and rapidly detect sex-related stimuli, and deactivation should predispose them to ignore and dismiss such stimuli. Therefore, we predicted that people scoring higher on the SSFS hyperactivation scale would show faster detection and processing of sex-related words. In contrast, people scoring higher on the SSFS deactivation scale would show slower detection and processing of sex-related words.

To test these predictions, we had 40 Israeli undergraduates (Sample 13; see Table 1) complete the SSFS and other questionnaires (ECR, SAI) during regular lecture time; then 2–3 weeks later they came to a laboratory and performed a computerized lexical-decision task in which they read each of several strings of letters and were asked to decide whether each was or was not a word. The task was run on a Pentium IBM-PC, with an SVGA color monitor, and was programmed using DirectRT software. The letter strings were displayed in black lettering on a white background in the middle of the monitor screen. Each participant completed 120 trials. Each trial consisted of the presentation of one of 24 target letter strings (for 1,000 ms). Participants judged as quickly as possible whether the letter string was or was not a word by pressing "1" on the keyboard number pad if they thought the string was a word or "3" if they thought it was not a word.

The target letter strings were divided into three categories: (a) 12 nonwords (e.g., tonobkoe, nowdiw) presented in 60 trials; (b) six neutral words (e.g., notebook, chair, pencil) presented in 30 trials; (c) and six sex-related words (e.g., Hebrew for intercourse, penis, orgasm) presented in 30 trials. Each word was presented in five trials. The letter strings were presented in different random orders to different participants. The words in each category were equally long (in Hebrew; $F < 1, p > .10$). The reaction time (RT) for each trial was used as a measure of the time it took to process a letter string. For each participant, we averaged RTs for each letter-string category (sex-related words, neutral words, and nonwords). RTs shorter than 300 ms or longer than 1,500 ms were omitted, as were erroneous responses (identifying nonwords as words or vice versa). Strong correlations were found between RTs in the three categories (rs from .71 to .76), strengthening our confidence in the reliability of the RTs.

The data were analyzed in a multiple regression analysis in which we simultaneously entered deactivation and hyperactivation scores as predictors of RTs for sex-related words. In this regression, we also simultaneously entered both RTs for nonwords and RTs for neutral words as covariates to statistically control for their contribution to RTs for sex-related words and to discover the unique contribution of SSFS scores. This regression yielded significant unique effects for both deactivation ($\beta = .37, p < .01$) and hyperactivation ($\beta = -.30, p < .05$). In line with our predictions, participants scoring higher on deactivation were slower to detect sex-related words (longer RTs), and participants scoring higher on hyperactivation were quicker to detect these words. The introduction of participant's sex into the regression models did not modify the above findings (βs of .38 and –.29, ps $< .05$) and the interactions between SSFS scores and participant's sex were not significant (βs of .02 and –.03, ps $> .10$).

Overall, SSFS scores predicted people's cognitive reactions (recognition times) to sex-related words. Importantly, regressions performed on RTs for nonwords or neutral words did not yield any significant effects of SSFS scores. Moreover, the contribution of SSFS scores to RTs for sex-related words remained the same after introducing attachment orientations (ECR scores) or sexual arousal (SAI) as covariates into the regression, thereby contributing to the incremental validity of SSFS scores.

Predicting physiological and affective reactions to sexual stimuli. Consistent with our hypotheses, individuals scoring relatively high on sexual deactivation expressed less positive attitudes toward sex (see Tables 3–5). These individuals tend to view sexual stimuli as a potential source of distress and therefore attempt to avoid sexual stimulation. Accordingly, we predicted that people scoring higher on sexual deactivation would report more negative affect and show physiological signs of distress (e.g., heightened salivary cortisol) in response to sexual stimuli. In contrast, we predicted that individuals scoring high on sexual hyperactivation would report more positive affect in response to sexual stimuli. People scoring high on sexual hyperactivation might experience sex-related distress primarily when the threat of sexual failure becomes more salient (e.g., when encountering a potential partner for sex). Mere exposure to sexual stimulation might not be sufficient for eliciting distress among them because they would be mainly overloaded with sexual arousal.

To test this prediction, we asked 17 Israeli undergraduate men (Sample 14; see Table 1) to complete the SSFS and the neuroticism subscale of the BFI during regular lecture time and to come to a laboratory 2–3 weeks later, where they were presented with erotic pictures while we assessed their affective and physiological reactions. The laboratory session included three stages. In the first stage, participants completed the PANAS (Watson et al., 1988) as a baseline measure of mood and provided salivary cortisol samples. In the second stage, participants looked at 15 neutral landscape pictures (one per minute) on a computer monitor and provided salivary cortisol samples again. These two cortisol measurements (before and after exposure to neutral pictures) were averaged to create a measure of baseline cortisol level. In the third stage, participants saw 15 erotic pictures (12 pictures of nude attractive women and three pictures depicting sexual activities between heterosexual partners) on a computer monitor at a rate of one per minute and provided salivary cortisol samples immediately afterward. They then completed the PANAS again and answered five questions about their current level of sexual arousal on a 7-point scale (e.g., How much do you feel sexually aroused by these pictures?"). The Cronbach α for these five items was .81. Strong correlations were found between cortisol levels at the various assessment times (rs from .63 to .72).

The data were analyzed in a series of multiple regression analyses. In regressions assessing the contribution of SSFS scores to predicting PANAS scores after sexual pictures and salivary cortisol levels immediately after sexual pictures, we entered baseline measures of affect and cortisol as covariates to control statistically for their contributions and then examined the effects of SSFS scores on pre-post changes in affect and cortisol levels. As expected, individuals scoring higher on sexual hyperactivation reported more sexual arousal following exposure to the erotic pictures ($\beta = .77, p < .01$). Sexual hyperactivation was also associated with higher reported positive affect following exposure to the erotic pictures relative to baseline ($\beta = .39, p < .05$). However, no significant association was found between sexual hyperactivation and negative affect or salivary cortisol (all ps $> .05$).

In contrast, sexual deactivation was associated with higher reported negative affect following exposure to the erotic pictures relative to baseline ($\beta = .70$, $p < .01$). Moreover, sexual deactivation was associated with increased cortisol levels (relative to baseline) immediately after exposure to the erotic pictures ($\beta = .67$, $p < .01$).

Overall, sexual deactivation was a significant predictor of physiological and affective responses to erotic stimuli. Moreover, standardized regression coefficients revealed that the contribution of sexual deactivation to changes in self-reported affect and salivary cortisol remained significant after statistically controlling for BFI neuroticism (β*s* of .68 and .64, *p*s $< .01$), thereby contributing to the incremental validity of SFSS scores. However, one should take into account that the small sample size (17 participants) weakens the generalizability of the findings. Future studies should attempt to replicate these findings in larger samples.

Predicting complex affective reactions to sexual stimuli among people scoring high on SSFS hyperactivation. The heightened sexual arousal and positive affect reported by people scoring high on sexual hyperactivation in response to erotic pictures fit well with the observed associations between hyperactivation and measures of sexual arousal, desire, and excitation (see Table 3). However, the finding that people scoring high on sexual hyperactivation did not show any sign of distress in response to the erotic pictures is inconsistent with the observed positive associations between SSFS hyperactivation and measures of sex-related distress (see Table 3). We believe that sexual hyperactivation leads people to approach erotic stimuli, thereby heightening positive affect in the presence of such stimuli (e.g., erotic picture). However, when the encounter with erotic stimuli also involves actually having sex with another person, sexual hyperactivation can include anxieties related to sexual performance failure and its consequences. This then introduces negative affect into what would otherwise be expected to produce pleasure. Therefore, we predicted that asking people to think about an erotic movie would increase negative affect (compared to neutral thoughts) only among people scoring high on sexual deactivation, but not among those who score high on sexual hyperactivation. However, asking people to think about having sex with a romantic partner would increase negative affect among people scoring high on sexual hyperactivation as well as deactivation.

To test these predictions, we asked 105 Israeli undergraduates (Sample 15; see Table 1) to complete the SSFS and other questionnaires (ECR, SOI, BFI neuroticism) during regular lecture time. Then, 2–3 weeks later they came to a laboratory and performed a memory task. In this task, participants were randomly divided into three conditions (35 participants in each). In the *erotic movie* condition, participants were asked to recall an erotic movie they had watched. In the *sexual intercourse* condition, participants were asked to recall having sexual intercourse with a partner. In the neutral condition, participants were asked to recall a TV program they usually watched. In all three conditions, participants were asked to briefly list the emotions and thoughts elicited by the recalled memory. Following this task, all participants completed the PANAS (Watson et al., 1988) and were asked to rate the extent to which each of the 20 items was descriptive of their mood during the task. We computed two scores by averaging relevant items: positive affect ($\alpha = .89$) and negative affect ($\alpha = .92$).

PANAS scores were analyzed in two-step hierarchical regression analyses. For these regressions, we created two dummy variables—one contrasting the erotic movie condition (+1) with the neutral condition (−1) and the other contrasting the sexual intercourse condition (+1) with the neutral condition (−1). In Step 1 of each regression, we entered the dummy variables and the SSFS scores (centered around their means) as predictors. In Step 2, we added the interactions between each of the dummy variables and each SSFS score.

The regression analysis performed on the positive affect scores yielded only a significant interaction between the erotic movie condition and sexual hyperactivation ($\beta = .29$, $p < .05$). Simple slope analyses revealed that sexual hyperactivation was significantly associated with heightened positive mood only in the erotic movie condition ($\beta = .45$, $p < .01$) but not in the neutral condition ($\beta = -.13$). Moreover, thinking about an erotic movie significantly heightened positive affect only when sexual hyperactivation was high (+1 *SD*, $\beta = .40$, $p < .01$), but not when it was low (−1 *SD*, $\beta = -.18$). No other effects were significant. This effect mirrors the higher positive affect reported by participants scoring high on sexual hyperactivation in reaction to exposure to erotic pictures.

The regression analysis performed on the negative affect scores yielded a significant unique effect of sexual deactivation ($\beta = .35$, $p < .01$), as well as significant interactions between deactivation and the erotic movie condition ($\beta = .28$, $p < .05$), deactivation and recalled sexual intercourse ($\beta = .24$, $p < .05$) and hyperactivation and recalled sexual intercourse ($\beta = .22$, $p < .05$). Simple slope analyses revealed the following pattern of associations: Sexual deactivation was significantly associated with heightened negative mood in the erotic movie condition ($\beta = .63$, $p < .01$) and in the recalled sexual intercourse condition ($\beta = .59$, $p < .01$), but not in the neutral condition ($\beta = .09$). In addition, sexual hyperactivation was significantly associated with heightened negative mood only in the recalled sexual intercourse condition ($\beta = .45$, $p < .01$), but not in the erotic movie condition ($\beta = .01$) or the neutral condition ($\beta = -.13$).

Overall, people scoring higher on sexual deactivation reacted to recalled memories of either erotic movies or sexual intercourse with heightened negative affect. People scoring higher on sexual hyperactivation reacted to memories of erotic movies with heightened positive affect, but they showed heightened negative affect in response to memories of sexual intercourse. The introduction of participant's sex into the regression models did not modify the above findings and the interactions between SSFS scores and participant's sex were not significant. Moreover, standardized regression coefficients (not reported here for the sake of parsimony) revealed that the reported effects of SSFS scores on self-reported affect remained significant after introducing attachment orientations (ECR scores), sociosexuality (SOI), or neuroticism (BFI) as covariates into the regression, thereby contributing to the incremental validity of SFSS scores.

Predicting mating preferences. Numerous studies have shown that people typically prefer physically beautiful partners for engaging in short-term sexual relations (see D. M. Buss, 2008, for a review), because this is a sign of a partner's "good genes," which increase the chances of reproductive success—the assumed function of the sexual system. Therefore, sexual hyperactivation, which involves heightened sexual desire (see Table 3), should lead people

to rely more heavily on physical attractiveness as a criterion for choosing dating partners. That is, we expected people scoring high on sexual hyperactivation to perceive other people mainly in terms of the sexual system's goal—reproductive success. In contrast, individuals scoring high on sexual deactivation seem less interested in sex and in short-term sexual relations (see Table 3). Accordingly, we expected them to rely less heavily on physical attractiveness while making mating choices and to choose dating partners based on other criteria, which are less inherent to reproductive success (e.g., expressing warm feelings, providing support).

In a test of these predictions, 87 Israeli undergraduates (Sample 16; see Table 1) completed the SSFS and other questionnaires (ECR, SOI), and then viewed, in randomized order, 37 pictures of opposite-sex individuals. For each picture, they rated the extent to which they would be interested in a dating relationship with the portrayed person. Ratings were made on a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*). Each slide included a photograph of the face of the potential dating partner, her or his age, and her or his occupation.

To quantify the physical attractiveness of each of the 37 female and 37 male potential partners, we asked a different sample of Israeli undergraduates ($N = 46$, 28 women and 18 men) to rate the physical attractiveness of each portrayed person on a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*). Men rated the physical attractiveness of each of the 37 portrayed women, and women rated the physical attractiveness of each of the 37 portrayed men. We averaged the ratings made by all of the participants for each picture, and this score served as a measure of each potential partner's physical attractiveness. The mean physical attractiveness across all of the pictures was 4.65 ($SD = 1.16$). Participants in this sample also rated the future economic status of each portrayed person (using information about her or his profession), on a 7-point scale ranging from 1 (*very low status*) to 7 (*very high status*). We then averaged the ratings made by all of the participants for each picture, and this score served as the estimated future economic status of each of the 37 female and 37 male potential partners. The mean economic status across all of the pictures was 4.08 ($SD = 0.82$).

A multilevel regression (MLM) was conducted, with physical attractiveness of the portrayed person at Level I. The Level I model also included the order of slide presentation, the age of potential partners, and their estimated future economic status (as controls). Level II variables included participant's sex and scores on sexual hyperactivation and deactivation. In addition, interactions of each SSFS score with participant's sex were examined.

Sexual hyperactivation significantly interacted with physical attractiveness ($\gamma = 0.10$, $p < .05$). Simple slope analyses showed that hyperactivation was associated with greater attraction to more physically attractive partners (+1 *SD*, $\gamma = 0.23$, $p = .08$) but not to physically unattractive partners (−1 *SD*, $\gamma = 0.02$). Sexual deactivation interacted with physical attractiveness in the opposite direction ($\gamma = -0.13$, $p < .05$). Simple slope analyses showed that sexual deactivation was associated with weaker attraction to more physically attractive partners (+1 *SD*, $\gamma = -0.20$, $p < .05$) but not to physically unattractive partners (−1 *SD*, $\gamma = 0.06$). However, this deactivation effect was moderated by participant's sex ($\gamma = -0.11$, $p < .05$); simple slopes analyses indicated that the effect occurred mainly among men. That is, men, but not women, scoring higher on SSFS deactivation were less likely to feel attracted to a physically attractive partner. One post hoc explanation of this sex difference is that SSFS deactivation can lead men to attach less value to the sexual and physical aspects of attraction in making mating choices, whereas women already attach less value to such aspects regardless their scores on sexual deactivation.

Overall, SSFS hyperactivation and deactivation scores predicted participants' mating preferences in the expected directions. Moreover, multilevel regression coefficients (not reported here for the sake of parsimony) revealed that the reported effects of SSFS scores on mating preferences remained significant after introducing attachment orientations (ECR scores) or sociosexuality (SOI) as covariates into the regression, thereby contributing to the incremental validity of SFSS scores. Conceptually similar findings were found in a study that examined the relationship between SSFS scores and mating preferences using videotapes of potential romantic partners (Szepsenwol, Mikulincer, & Birnbaum, 2013).

Predicting attraction to a partner following a relationship conflict. A recent study has shown that the desire to have sex with a romantic partner increases after relational conflicts with this partner, perhaps as a means of repairing the damage that a conflict can have on a relationship (Birnbaum, Mikulincer, & Austerlitz, 2013). We would expect secondary sexual strategies to affect the use of sex as a relationship repairing strategy, with sexual hyperactivation increasing the use of this strategy and sexual deactivation reducing it. That is, the SSFS scores should predict changes in sexual attraction to a romantic partner following a relationship conflict.

To test this prediction, we had 125 Israelis who were in a romantic relationship at the time of the study (Sample 17; see Table 1) complete the SSFS and the ECR scales. About half of the participants ($N = 64$) were asked to visualize a situation in which they had experienced a mild conflict with their romantic partner (e.g., arguing over which movie to see). The rest of the participants ($N = 61$) were asked to visualize a neutral situation with their romantic partner (e.g., sitting down for dinner). In both conditions, participants were asked to recall the situation as vividly as possible and to write about their thoughts and feelings during the situation. Following this task, all participants completed five items assessing sexual attraction to their partner (e.g., "How sexually arousing is your partner?" "How sensual is your partner?" Cronbach $\alpha = .92$).

To examine the effect of SSFS scores and the conflict manipulation on attraction to a partner, we conducted a multiple regression analysis. The predictors were the conflict manipulation—a dummy variable comparing conflict (1) with control (−1), sexual hyperactivation and deactivation (centered around their means), participant's sex, and all two-way and three-way interactions. The analysis revealed a significant main effect of sexual deactivation ($\beta = -.56$, $p < .01$) and a significant interaction between conflict and deactivation ($\beta = -.30$, $p < .01$). Simple slope analyses revealed that visualizing a relational conflict increased sexual attraction to a romantic partner (compared to the neutral condition) only when sexual deactivation scores were low (−1 *SD*, $\beta = .39$, $p < .01$). This effect was not significant when sexual deactivation scores were high (+1 *SD*, $\beta = -.15$). Moreover, the negative association between deactivation and sexual attraction was higher in the conflict condition ($\beta = -.85$, $p < .01$) than in the neutral condition ($\beta = -.29$, $p < .05$). That is, as expected, sexual

deactivation inhibited the use of sex as a relationship-repair strategy following relational conflict. These findings held for both men and women (no significant interactions were found between SSFS scores and participants' sex; all *p*s $> .05$). At odds with our predictions, sexual hyperactivation was not associated with sexual attraction to a partner. It is possible that the sexual worries associated with sexual hyperactivation inhibited sexual desire in the romantic context made salient in this experiment. However, this is a post hoc explanation that requires further research.

Overall, sexual deactivation predicted less sexual attraction to a partner following relationship conflict. Moreover, standardized regression coefficients (not reported here for the sake of parsimony) revealed that the reported effects of SSFS deactivation on sexual attraction remained significant after introducing attachment orientations (ECR scores) as covariates into the regression, thereby contributing to the incremental validity of SFSS scores.

Predicting expressions of sexual desire in a conversation between dating partners. Beyond examining reactions to actual sexual stimuli, we also wanted to examine whether SSFS scores would be manifested in expressions of sexual desire during an interaction with a dating partner. We predicted that participants scoring higher on sexual hyperactivation would express more desire toward their partners, whereas participants scoring higher on sexual deactivation would express less desire toward their partners. Because tests of these predictions require the participation of both members of a couple, we measured SSFS scores and expressions of sexual desire in both couple members and also explored whether one member's SSFS scores would affect the other member's expressions of sexual desire during a couple interaction.

Two members of 58 Israeli couples who had been dating between 2 and 4 months ($M = 3.17$, $SD = 0.89$) completed the SSFS, the ECR, the SOI, and the BFI online and, 1 week later, participated in a video-recorded laboratory session (Sample 18; see Table 1). No significant correlation was found between couple members' hyperactivation (.20) or deactivation (–.15) scores. During the laboratory session, couple members were seated in two chairs facing each other, close enough together so that they could touch each other, and discussed satisfying and unsatisfying aspects of their sexual relationship for 10 min.

The video-recorded interactions were coded by two trained independent judges, graduate students in psychology who were blind to participants' SSFS scores. Each judge watched the video-recorded interactions and rated each dyad member's verbal and nonverbal expressions of sexual desire (e.g., verbal expressions of desire to have sex, seductive smiles or eye contact) in a single overall behavioral coding of sexual desire. Ratings were made on a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*). Interrater reliability was adequate (intraclass correlation [ICC] for women's expressions = .78, ICC for men's expressions = .77). Hence, judges' ratings were averaged for each participant. The average expression of sexual desire was 4.39 ($SD = 1.15$) for men and 4.31 ($SD = 1.06$) for women. A moderate association was found between men's and women's expressions of desire within a couple ($r = .33$, $p < .05$).

Actor and partner effects of sexual hyperactivation and deactivation on men's and women's behavioral expressions of desire were assessed simultaneously using a multilevel regression (MLM) in accordance with the actor-partner interdependence framework (APIM; Cook & Kenny, 2005). In this analysis, the dependent variable was judges' rating of a participant's behavioral expression of desire during the conversation. The predictor variables were participant's sex, participants' SSFS scores, their partner's SSFS scores, and the interactions between sex and the actor and partner SSFS scores. Findings indicated that sexual deactivation was associated with lower expressions of desire by both actor ($\beta = -.24$, $p < .05$) and partner ($\beta = -.32$, $p < .001$). This effect was not significantly moderated by participant's sex. None of the sexual hyperactivation effects were significant.

Overall, participants scoring higher on the SSFS deactivation scale were less likely to express sexual desire toward a dating partner while interacting with her or him. Moreover, partners of these participants also expressed less sexual desire toward the sexually deactivated participant, thereby creating a dyadic self-exacerbating cycle of sexual inhibition. The lack of significant effects of sexual hyperactivation may reflect the complex attitudes and feelings associated with this strategy in romantic relationships, which in turn may inhibit the expression of heightened sexual desire for one's romantic partner. Importantly, standardized regression coefficients (not reported here for the sake of parsimony) revealed that the reported effects of SSFS scores on sexual desire remained significant after introducing attachment orientations (ECR scores), sociosexuality (SOI), or higher order personality traits (BFI scores) as covariates into the regression, thereby contributing to the incremental validity of SFSS scores.

General Discussion

Sexual activity offers one of the greatest physical and emotional pleasures in human life (Shaver et al., 1988). However, just as the sexual system may increase positive affect and sexual motivation, it may also produce strong negative affect that can impair its functioning (e.g., Birnbaum & Gillath, 2006; Birnbaum & Reis, 2006). In the present research, we used Bowlby's (1982) conceptualization of behavioral systems as a theoretical framework capable of explaining the dual potential of the sexual system in generating both joy and distress. Specifically, we theorized that individual differences in the functioning of the sexual system can be conceptualized in terms of anxious hyperactivation or avoidant deactivation (see also Mikulincer & Shaver, 2012) and that variations in these two strategies underlie a person's sexual attitudes, motives, feelings, and behaviors and influence the extent to which sex can be a source of pleasure or distress.

Based on this conceptualization of individual differences in sexual-system functioning, we developed the Sexual System Functioning Scale (SSFS), a self-report instrument assessing variations in sexual-system hyperactivation and deactivation. We then used 18 samples and multiple methodologies to examine the two-factor structure of the SSFS, its psychometric properties, its convergent validity with existing sex-related measures, its nomological network of associations with personality, relational orientations, affect, well-being, and psychological resources, and the extent to which its scores can predict responses to sexual stimuli. Our findings clearly indicate that the SSFS is reliable and valid, and they support our theoretical analysis of the cognitive–affective meanings and psychological implications of sexual-system hyperactivation and deactivation.

Exploratory and confirmatory factor analyses conducted in Israel and the U.S., in English and Hebrew, yielded the anticipated

two factors of sexual-system hyperactivation and deactivation. In addition, similar to the ECR scales measuring attachment orientations (Brennan et al., 1998), the sexual-system hyperactivation and deactivation dimensions were consistently found to be essentially orthogonal. Thus, variations in the functioning of the sexual system can be conceptualized as regions in a two-dimensional space. Sexual comfort, which reflects the optimal functioning of the sexual system, is located in the region in which both anxious hyperactivation and avoidant deactivation are low and is defined by confidence in one's sexual desirability and skill. Higher scores on sexual hyperactivation and/or deactivation reflect deviations from this region of sexual comfort and make sex a source of distress rather than pleasure. Whereas people scoring high on sexual-system hyperactivation experience this distress, but continue to experience sexual excitation as well and seek sexual satisfaction, people scoring high on sexual-system deactivation withdraw from sexual stimuli and activities, perhaps as a means of defending against the pain and discouragement that sexual activities can produce.

The SSFS scores were shown to be temporally stable and to concur with both partner reports of participants' sexual strategies and judges' ratings of these sexual strategies as manifested in participants' narratives of sexual activities. This correspondence implies that the SSFS identifies distinct behavioral tendencies that can be observed by partners and are evident in people's accounts of their own sexual experiences. Additionally, the SSFS scores have convergent validity with respect to preexisting self-report measures of sexual attitudes, motives, feelings, and behavior. They also exhibited discriminant validity with respect to measures of socially desirable responding and sociodemographic variables. Moreover, the SSFS scores displayed incremental validity in predicting sex-related beliefs and feelings beyond variance explained by other personality and relational measures.

SSFS hyperactivation and deactivation scores were systematically associated with other sex-related constructs. For example, sexual-system hyperactivation was associated with sexual excitation as well as sexual arousal and positive affect following exposure to erotic stimuli. At the same time, however, it was associated with experiencing sex-related worries and aversive feelings during sexual intercourse. The ambivalent nature of sexual-system hyperactivation was also demonstrated by its association with both approach and avoidance sexual motives (e.g., having sex to promote intimacy, having sex out of insecurity, respectively). This ambivalence toward sexuality possibly reflects the distress caused by sexual frustration and the insistent (but not necessarily successful) attempts to resolve it by gratifying sexual needs. Indeed, sexual-system hyperactivation was related to a higher frequency of sexual fantasies that involve unrestricted sex and dominance themes and to corresponding behavioral tendencies, such as making intense efforts to initiate sexual activities, even including sexual coercion.

Sexual-system deactivation, like sexual-system hyperactivation, was accompanied by heightened sex-related anxieties, as well as by negative sexual self-representations. This similarity implies that both strategies are motivated by sexual frustration and serious doubts about sexual attractiveness and performance. And yet, hyperactivation and deactivation strategies entail opposite responses to coping with doubts and distress (i.e., fight vs. flight). In particular, the flight responses characterizing sexual-system deactivation involve aversive reactions toward sexual cues and inhibition of sexual expressions. This distinctly negative stance toward sexuality takes many forms, such as holding erotophobic attitudes, withdrawal from sexual activities, and reluctance to engage in casual sex and other short-term sexual relations. It also takes the form of slower cognitive processing of sexual stimuli, elevated cortisol reactions, and heightened negative affect following exposure to erotic stimuli as well as lower levels of pleasure and higher levels of aversive feelings during sexual intercourse and a weakened tendency to use sex as a means of repairing relational tensions.

The findings also indicate that both sexual-system hyperactivation and deactivation may lead a person further away from the desired state of sexual comfort and satisfaction and put her or him at risk for sexual dysfunctions. Still, the two sexual-system strategies may have different consequences for sexual well-being. The intrusive and aggressive responses characterizing hyperactivation strategies, albeit potentially unappealing to partners, can at least facilitate sexual encounters. Sexual-system deactivation, by comparison, may deprive sex of intimacy and deny the option of corrective sexual experiences, thereby possibly impairing sexual functioning more severely.

Suboptimal functioning of the sexual system may not only erode sexual well-being but also have negative implications for general well-being. This is largely because sexual experiences, whether positive or negative, are likely to be encoded in internal working models of self (Mikulincer & Shaver, 2012) and thus to become central to one's self-view (e.g., Andersen et al., 1999; Rehbein-Narvaez, Garcia-Vazquez, & Madson, 2006). Consequently, individual differences in sexual functioning may be manifested in the ways people think about themselves (Mikulincer & Shaver, 2012). Specifically, sexual-system hyperactivation and deactivation may heighten doubts about one's sexual attractiveness and performance (see Table 3), which can lead to negative self-perceptions. Indeed, both sexual-system hyperactivation and deactivation were found to be associated with negative representations of self. These negative self-perceptions, in turn, may undermine emotional well-being (e.g., Kwan, Bond, & Singelis, 1997) and underlie the observed links between SSFS scores and heightened negative affectivity and lowered psychological well-being.

In addition to potentially affecting well-being through self-representations, sexual-system activation may be directly associated with mood. Hyperactivation and deactivation strategies may reduce the occurrence of positive emotions associated with smooth sexual functioning, and instead generate negative emotions. In fact, both sexual-system hyperactivation and deactivation were inversely correlated with measures of positive psychological states and positively correlated with greater psychological distress and negative affectivity. These findings corroborate the notion that hyperactivation and deactivation of the sexual can be viewed as risk factors for developing emotional and interpersonal problems (Mikulincer & Shaver, 2012).

Dynamic, Structural, and Developmental Aspects of Sexual-System Functioning

The negative psychological states associated with sexual-system hyperactivation and deactivation may go along with dysfunctions of other behavioral systems, primarily those involved in romantic

love (attachment and caregiving; Shaver et al., 1988). For example, to the extent that a person feels chronically insecure about being loved, whether this is manifested in relational worries or in being uncomfortable with intimacy, it is unlikely that the person's sexual system will function optimally. Consistent with this contention, we found that both forms of attachment insecurity, anxiety and avoidance, were associated with the two SSFS scores. Similarly, a growing body of research has indicated that even though anxious and avoidant attachment are associated with different approaches to sex (ambivalent vs. detached), they both bias the functioning of the sexual system (e.g., Birnbaum, 2007a, 2010; Birnbaum, Reis, Mikulincer, Gillath, & Orpaz, 2006).

Of course, influences in the reverse direction, from sexual-system activation to attachment processes, are also possible. Because sexual desire encourages physical proximity and intimate contact, it is likely to contribute to the formation and maintenance of attachment bonds (e.g., Birnbaum, 2014; Hazan & Zeifman, 1994). This line of theorizing implies that just as optimal sexual functioning can promote the development of attachment relationships, so can disruptions in sexual-system functioning lead to corresponding disruptions of attachment processes. For example, sexual-system deactivation may be particularly maladaptive in the context of emerging romantic relationships, wherein disinterest in sex can be interpreted as disinterest in the relationship. Suppression of sexual urges and systematic rejection of a partner's sexual advances are potentially detrimental to relationship well-being in later stages as well, as they are likely to leave a partner sexually frustrated and feeling unwanted. By comparison, sexual-system hyperactivation may be especially disruptive to relationship harmony when it undermines commitment. Still, even if infidelity is not involved, sex-related worries may impair sexual functioning (e.g., Birnbaum & Reis, 2006) and eventually lead to relationship dissatisfaction (Birnbaum, 2007a).

The interrelations among hyperactivated and deactivated forms of sexual and attachment responses raise the possibility that they reflect basic personality differences that are expressed in the domain of intimate relationships. However, although sexual deactivation and hyperactivation correlate with broader personality traits (see Table 6), the associations are moderate. In addition, SSFS scores capture aspects of sexual-system functioning that are not fully explained by broad personality traits. Thus, the two strategies cannot be considered as mere expressions of personality constructs. Instead, the personality profile associated with each sexual strategy may be viewed as one that facilitates the pursuit of this specific strategy more effectively. In particular, the cluster of personal characteristics possessed by people who anxiously hyperactivate their sexual desire is marked by impulsive features. Hence, it is likely to help these individuals pursue sexual activity (but not necessarily sexual satisfaction) more successfully. Equally, the constellation of characteristics possessed by people who deactivate their sexual desire is marked by behavioral inhibitions and lower levels of openness to new experiences. It is therefore likely to help these individuals limit their exposure to sexual stimuli and suppress sexual urges. Whether chronic dysfunctions of the sexual system enhance the expression of certain traits or vice versa, or whether both are affected by early and ongoing experiences, is a question for future research.

These possibilities raise questions about how and why the sexual system develops either optimally or nonoptimally. Bowlby (1982, 1973) claimed that individual differences in the functioning of any behavioral system are almost exclusively created by the history of positive and negative outcomes of system activation in various contexts across the lifespan. Behavioral genetic studies challenged Bowlby's view by showing that, at least in the case of the attachment system, heritable factors may explain some of these individual differences (e.g., Crawford et al., 2007). Evolutionary life history models emphasize that certain familial environments may also shape variability in sexual strategies. These models posit that unpredictable childhood environments predispose individuals to develop unrestrained sexual behavior that leads to more offspring. In such environments, a fast strategy, which involves seizing opportunities to reproduce quickly and often, would have better chances of being successful in terms of ultimate gene dissemination than a slower strategy, which involves long-term planning and investment that might fail to materialize (e.g., Belsky, Schlomer, & Ellis, 2012; Chisholm, 1993).

It is thus possible that genetic factors, coupled with certain life experiences (e.g., parental attitudes toward sex, early sexual experiences, the type of early environment a person grew up in), increase the likelihood of adopting one sexual strategy over another. Regardless of the source or nature of the adopted strategy, its related emotions and cognitions are likely to be integrated into the sexual-system's cognitive-behavioral "programming" and reflected in its working models. These sexual working models, in turn, should remain malleable in response to potential changes in the social context (e.g., partners' responses, social norms of sexuality) over the life span and therefore function as a vehicle for additional changes in sexual-system functioning.

Conclusions and Future Directions

Sex has the potential to motivate intensely meaningful experiences whose nature and quality may vary across individuals and contexts. Sex may promote enduring bonds between adult romantic partners. Yet, sex may be what causes partners to grow apart. Sex may generate both positive and negative affect, and it has the potential to verify one's desirability and talent or skill as much as to threaten one's self-esteem. Various theories, models, and constructs have been designed to account for individual differences in human sexuality. Although some of these models have been supported by a wide variety of studies, they have failed to integrate the various dimensions of individual differences in sexuality and related findings into one overarching theory. For example, some of these approaches describe prior developmental processes that may affect sexual strategies but do not specify the proximate mechanisms through which developmental trends may be calibrated in response to ongoing transactions with the social world (e.g., life history models; Belsky et al., 2012). Other models describe proximate regulatory mechanisms (e.g., affect regulation) but fail to delineate developmental and relational processes that may underlie sexual response (e.g., the dual control model; Bancroft & Janssen, 2000).

Here, we have introduced a behavioral systems approach to human sexuality and used the concept of sexual behavioral system as an organizing framework to better understand variability in human sexual response. In doing so, we have elaborated on the sexual-system construct and provided empirical support for the view that individuals differ in the degree to which they hyperac-

tivate or deactivate their sexual responses. We have also provided evidence that these sexual strategies are relevant to personal and interpersonal well-being. Our research suggests important questions about how these sexual strategies interact with changes in social situations (e.g., fluctuations in the quality of couple interactions) to shape sexual and relational experiences. For example, it is unclear whether and how individual differences in sexual functioning fluctuate across different stages of relationship development and how they affect relationship quality and longevity. It is also unclear whether sexual-system hyperactivation and deactivation would manifest differently in men and women at different relationship phases. Although we did not find any significant gender differences in sexual-system hyperactivation and deactivation, a recent study did indicate that these strategies have different implications for men's and women's mating patterns, at least in the stage where they are seeking a partner (Szepsenwol et al., 2013).

Relatedly, it is unclear how the balance between the systems that are theorized to be involved in romantic love (attachment, caregiving, and sexual mating; Shaver et al., 1988) changes throughout the course of relationships. How do these systems influence one another and how do they operate jointly to affect relationship quality during relationship development? Would expressions of sexual-system activation be particularly important in early stages of emerging relationships, before attachment between partners has become well consolidated? Would these sexual expressions become relatively less important to relationship quality as the relationship progresses? We hope our new measure will encourage future studies that will address these questions and explore the sources and consequences of individual differences in sexual-system functioning.

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Appendix

The Sexual System Functioning Scale

The following statements concern how you feel during sexual activity. We are interested in how you generally experience sexual activity, not just in what is happening in your current sex life. Please read each statement and indicate the extent you agree with it, using the following scale:

Not at all 1	2	3	4	5	6	Very Much 7

1	I feel comfortable responding to my partner's sexual needs.	1	2	3	4	5	6	7
2	I worry about not being "good enough" in bed.	1	2	3	4	5	6	7
3	I often find it hard to experience pleasure during sexual activity.	1	2	3	4	5	6	7
4	During sexual activity, I worry about my sexual "performance."	1	2	3	4	5	6	7
5	I feel comfortable discussing sex or talking about sex.	1	2	3	4	5	6	7
6	I worry that other people won't be attracted to me and won't want to have sex with me.	1	2	3	4	5	6	7

(*Appendix continues*)

Appendix (*continued*)

7	I feel comfortable exploring my sexuality and being open to new sexual experiences.	1	2	3	4	5	6	7
8	I need a lot of reassurance regarding my sexual performance.	1	2	3	4	5	6	7
9	I find it hard to feel comfortable during sexual intercourse.	1	2	3	4	5	6	7
10	If I can't get other people to desire me and want to have sex with me, I get frustrated and angry.	1	2	3	4	5	6	7
11	During sexual activity, I sometimes feel uninvolved and uninterested.	1	2	3	4	5	6	7
12	When I haven't had sex for a while, I begin to feel anxious and insecure.	1	2	3	4	5	6	7
13	I usually have sex only when my partner pressures me or really wants me to.	1	2	3	4	5	6	7
14	When I don't perform well sexually, I feel really bad about myself.	1	2	3	4	5	6	7
15	Having sex isn't high on my priority list.	1	2	3	4	5	6	7
16	During sexual intercourse, I worry a lot about what my partner is thinking and feeling.	1	2	3	4	5	6	7
17	Thoughts about sex don't especially excite or interest me.	1	2	3	4	5	6	7
18	Being sexually desirable is extremely important to me.	1	2	3	4	5	6	7
19	Sometimes, sexual activities strike me as an unnecessary nuisance.	1	2	3	4	5	6	7
20	I often need a lot of reassurance that someone desires me and wants to have sex with me.	1	2	3	4	5	6	7
21	I enjoy sex.	1	2	3	4	5	6	7
22	During sex, I worry about disappointing my partner.	1	2	3	4	5	6	7
23	Thinking about sex leaves me indifferent.	1	2	3	4	5	6	7
24	My desire for sex is often stronger than my partner's.	1	2	3	4	5	6	7

Note. Evenly numbered items are hyperactivation items, and odd items are deactivation items. Items 1, 5, 7, and 21 are reverse coded.

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