

Do all Orgasms Feel Alike? Evaluating a Two-Dimensional Model of the Orgasm Experience Across Gender and Sexual Context

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The characteristics common to all human orgasm experiences and potential gender and contextual factors affecting these experiences were investigated in two studies. A two-dimensional descriptive model of the orgasm experience was evaluated by testing hypotheses concerning (a) fit of the model to adjective-ratings data describing male and female orgasm experiences, and (b) sexual context effects on the importance of model components. In the first model-evaluation study, 888 university students (523 women) provided adjective ratings to convey orgasm experiences attained through both solitary masturbation and sex with a partner. In a cross-validation study, 798 university students (503 women) provided similar ratings to convey orgasm experiences attained either through solitary masturbation or through sex with a partner. Overall, findings supported the utility of a two-dimensional model of the orgasm experience, an adjective-rating approach in comparing male and female orgasm, and the importance of examining sexual context effects on the orgasm experience.

Research efforts to systematize the variability in orgasm experiences, primarily female orgasm, have resulted in several anatomically based typologies of female orgasm. The distinction between clitoral and vaginal orgasm has drawn the most attention (e.g., Clifford, 1978; Fisher, 1973). However, there are several problems with these reductionistic typologies. First, the evidence for anatomically based typologies is based mainly on uncontrolled self-reports (see Mah & Binik, 2001). Second, the typologies suggest that the female orgasm experience is solely dependent upon genitopelvic stimulation and do not take into account other possible biopsychosocial influences (Levin, 1992; Mah & Binik, 2001), including variation at the psychological level (e.g., Fisher, 1973; Levin, 1981). Third, the typologies confound description with causal explanation by emphasizing how orgasm is triggered. Fourth, the typologies identify variations in orgasm but do not describe the core phenomenological characteristics that define orgasm and which all orgasm experiences share.

Two other problems are apparent in the relevant literature. First, that the bulk of the literature on the psychology

of orgasm focuses on female orgasm appears to reflect the assumption that female orgasm is psychologically more complex than male orgasm (Mah & Binik, 2001). In contrast, an enormous body of literature exists on the physiology of ejaculation in which "male orgasm" and "ejaculation" are typically interchangeable. However, the limited empirical evidence available suggests that male and female orgasm may bear more similarities than differences (see Mah & Binik, 2001, for review). In one controlled study by Vance and Wagner (1976), independent raters could not differentiate written descriptions of male versus female orgasm experiences.

The second problem concerns the fact that measures of the orgasm experience have typically been limited either to a dichotomous approach (occurrence or nonoccurrence) or to basic assessments of frequency, consistency, or satisfaction (e.g., Darling, Davidson, Sr., & Cox, 1991; Davidson, Sr. & Moore, 1994; Singh, Meyer, Zamborano, & Hurlbert, 1998). There is currently no universally accepted measure of the potentially wide range of subjective qualities making up the orgasm experience. As far as we know, the only empirical attempt to develop, validate, and publish such a measure has been Warner's (1998) Peak of Sexual Response Questionnaire, which evaluates the physical and affective dimensions of female orgasm experiences. However, Warner asked participants to rate their peak physical arousal, not their orgasm experiences. Consequently, the measure's subscales for the physical (Release, Throbbing, Continued Arousal, Vaginal Sensation, Sudden Cessation, Non-Genital) and affective dimensions (Evaluative, Depressed, Unresponsive, Almost) may reflect confounding of orgasm with sexual arousal and reactions to an inability to achieve orgasm.

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A multidimensional approach to describing and evaluating the subjective qualities of orgasm may help to address many of these issues. Biopsychosocial models by Davidson (1980) and Warner (1981) indicate that orgasm phenomenology comprises both physical sensations and psychological and emotional experiences. In an empirical study, Newcomb and Bentler (1983; see Bentler & Peeler, Jr., 1979) reported a typology of female orgasmic responsiveness with three dimensions: masturbatory, partner-present/noncoital, and coital. This typology thus implicates the psychological impact of interpersonal sexual context on orgasm experiences. Unfortunately, these studies have not stimulated further significant research or theoretical developments.

The purpose of the present studies was to develop and evaluate a biopsychosocial model of orgasm, using an adjective-ratings methodology. The first study included a questionnaire-development phase and a model-evaluation phase. The second study provided cross-validation with an independent sample. Three hypotheses were tested. First, the pattern of adjective ratings of the orgasm experience can be characterized by a two-dimensional model comprising physical and cognitive-affective dimensions. Second, the two-dimensional model will adequately characterize both male and female orgasm experiences. Third, sexual context differences will be apparent in the following ways: (a) Orgasm attained through sex with a partner will be associated with higher ratings on the cognitive-affective components than orgasm attained through solitary masturbation; and (b) for orgasm attained during sex with a partner, higher ratings on the cognitive-affective components will be observed with coital than noncoital activity.

PILOT PHASE: INSTRUMENT DEVELOPMENT

A list of adjectives was first compiled from the available self-report literature in which subjects were asked to describe their subjective experience of orgasm (e.g., Hite, 1976, 1981; Newcomb & Bentler, 1983; Vance & Wagner, 1976). Adjectives from the McGill-Melzack Pain Questionnaire (Melzack, 1975) were added to examine whether orgasm involves negative or painful experiences. A pool of 141 adjectives was thereby obtained. A total of 48 male and 41 female undergraduate and graduate students rated each adjective on a 0 to 9 scale (0 = *does not describe it at all*, 9 = *describes it perfectly*) to reflect how well it described their most recent orgasm. They completed the ratings twice to describe orgasm across two sexual contexts: solitary masturbation and sex with a partner. The 50 adjectives with the highest mean ratings across gender and sexual context conditions were retained. None of the negative adjectives from the Pain Questionnaire were retained. The resulting pool of 60 adjectives was reformatted into an adjective-ratings questionnaire with the following changes: (a) A 0 to 5 rating scale was used because many subjects indicated difficulty with the 0 to 9 scale; and (b) for the sex with part-

ner version, subjects indicated the sexual behavior by which they had achieved orgasm.

STUDY 1: MODEL EVALUATION

Participants

Participants were undergraduate and graduate students recruited using several strategies: in-class solicitation, a psychology subject pool, and ads posted on Internet listservs likely to have student members. The in-class solicitation method targeted university classes spanning a diverse range of disciplines. Those recruited from classes participated in a cash lottery; those recruited through the subject pool received partial course credit. Inclusion criteria included having experienced orgasm at least once during both solitary masturbation and sex with a partner. A sample of 523 women and 365 men met this criterion. Table 1 lists the sample's characteristics. The majority were young, unmarried, heterosexual undergraduate students.

Materials

Both the solitary masturbation and sex with partner versions of the 60-adjective ratings questionnaire were employed. For both, subjects rated each adjective on a 0 to 5 rating scale according to how well each adjective described their most recent orgasm experience (0 = *does not describe it at all*, 5 = *describes it perfectly*) attained within the respective contexts. In the sex with partner version, subjects indicated in a checklist how orgasm was achieved (intercourse, oral stimulation from partner, manual stimulation from partner, manual stimulation from self, other).

Procedure

For both in-class and individual recruitment, the study was described by the primary investigator or a research assistant and in an information sheet given to all prospective participants. To ensure anonymity of responses, no consent forms requiring identifying information were used; informed consent was assumed if an individual filled out a questionnaire. Participants completed the questionnaires on their own. Respondents to listserv ads received the information sheet, the questionnaires, and a self-addressed stamped envelope for returning the questionnaires. They were asked not to include identifying information when mailing back the questionnaires. All participants completed the solitary masturbation version first.

Statistical Analyses

Individuals who had 25% or more missing data were eliminated from the analyses. In the remaining sample, missing ratings for any adjective were replaced using the mean rating for that adjective for the corresponding gender x sexual context condition. In the sample, 94% of men and women had only two or fewer missing ratings in both sexual contexts.

Principal components analysis (PCA) of adjective ratings with varimax rotation was conducted separately for

Table 1. Demographic Characteristics of Model-evaluation and Cross-validation Samples

Demographics	Participants (Model-evaluation study)		Participants (Cross-validation study)			
	Women (<i>n</i> = 523)	Men (<i>n</i> = 365)	Solitary masturbation		Sex with partner	
			Women (<i>n</i> = 227)	Men (<i>n</i> = 129)	Women (<i>n</i> = 276)	Men (<i>n</i> = 166)
Age, years [<i>M</i> (<i>SD</i>)]	23.0 (5.1)	24.9 (7.0)	23.0 (7.3)	23.0 (6.5)	22.2 (5.6)	24.5 (8.1)
Student status (%)						
Undergraduate	73.4	65.2	77.5	72.1	76.1	71.1
Graduate	26.4	33.4	9.3	15.5	10.5	15.1
Religion (%)						
Catholicism	36.1	32.3	32.2	28.7	32.6	31.3
Protestantism	22.4	18.1	16.7	10.1	13.8	12.1
Judaism	11.7	16.4	13.7	17.1	15.2	17.5
Other	29.6	32.6	26.4	34.1	30.1	33.1
Primary sexual orientation (%)						
Heterosexual	86.4	81.6	79.7	81.4	83.0	86.1
Homosexual	6.5	14.2	3.1	5.4	2.5	4.8
Bisexual	6.5	3.8	4.9	3.1	6.2	3.0
Relationship status (%)						
Single	34.0	37.8	30.4	46.5	29.4	44.0
With partner, not living together	44.9	37.3	36.6	31.0	47.1	33.7
Living together/ married	19.1	22.2	14.5	9.3	12.7	13.9
Other	1.9	2.5	7.5	3.1	2.9	2.4

Note. Cases where the percentages of participants do not add up to 100% are due to missing data.

each gender, using SPSS for Windows, (a) to derive components for hypothesis testing, and (b) to reduce the number of adjectives due to reported difficulty with rating 60 adjectives. Because sexual context was a within-subjects variable, the correlation matrix analyzed included all adjectives from both sexual contexts. Components were retained if they contained at least two different adjectives or two pairs of matching adjectives from both sexual contexts. Only up to three adjectives with loadings greater than .40 were then selected from each retained component; from components with pairs of matching adjectives from both sexual contexts, up to three pairs were selected.

Reliability analyses involved two strategies. First, internal consistency of the retained adjectives was assessed with Cronbach's alpha. Second, a second set of PCAs of the retained adjectives with varimax rotation was conducted, extracting the same number of components for each gender as retained in the first set of PCAs.

Components were then collapsed across gender by grouping (a) components with the same adjectives, and (b) components judged to reflect similar concepts. Each component was then allocated to represent one of the two dimensions whose definition they best matched. To assess fit of the resulting two-dimensional model, confirmatory factor analysis (CFA) was conducted separately for each gender using EQS for Windows (Bentler & Wu, 1995). Indices of model fit examined were the ratio of χ^2 (corrected for nonnormal data; Bentler, 1995) to degrees of freedom, the goodness of fit index, the nonnormed fit index, the incremental fit index, and the comparative fit index (cor-

rected for nonnormal data; Bentler, 1995). The closer fit index values are to 1.00 and the lower the χ^2/df ratio, the better the model fit is considered to be. While fit index values greater than .90 and a χ^2/df ratio less than 2.00 have been recommended to indicate good model fit, (e.g., Bentler, 1995), researchers have used critical χ^2/df ratios from 2 to 5 and fit index values below .85 (e.g., Marsh & Hocevar, 1985; see Hoyle & Panter, 1995). In light of the exploratory nature of the study, more liberal criteria for good model fit were set: At least three of the four fit index values greater than .80 and χ^2/df ratio less than 2.50.

Component scale scores were created by summing ratings of the adjectives for each component. Analyses for the following are detailed with their corresponding results: (a) gender and sexual context differences between components with adjectives from one sexual context; (b) gender differences for components with matching adjectives from both contexts; and, in the sex with partner condition, (c) the effect of mode of orgasm induction on components.

Results

To distinguish items associated with each sexual context, adjectives are indicated with lower-case letters (e.g., swelling1, pleasurable2), whereas components are labeled with upper-case letters (e.g., Emotional Intimacy2, Relaxation). Adjectives and components with a suffix of "1" relate to the solitary masturbation context (e.g., shooting1, Emotional Intimacy1), whereas those with "2" are relate to the sex with partner context (e.g., shooting2, Emotional Intimacy2). Components without any suffix

have matching adjectives from both sexual contexts (e.g., Relaxation includes both peaceful1 and peaceful2).

Extracted Components and Reliability

In the initial PCAs, the first 11 components extracted from the female participants' data and the first 8 from male participants' data were retained. The components and their respective item loadings are listed in Table 2, with adjectives retained for further analyses marked a. In the first component for both genders, adjectives conveying pleasurable satisfaction were kept, whereas those conveying intensity (e.g., exciting, intense) were dropped to create a more homogeneous component. This strategy was possible because both types of adjectives loaded to similar degrees onto the component. Moreover, in the second PCAs of the retained adjectives from Table 2, extracting 11 components for women and 8 for men as with the first PCAs, the pleasurable/satisfaction items reloaded onto the same component. This indicates that excluding the intensity items did not change the nature of the component. Internal consistency of the retained adjectives was high: for women, Cronbach's $\alpha = .92$; for men, Cronbach's $\alpha = .90$.

Model Evaluation

Collapsing components across gender resulted in 12 components. Figure 1 indicates the dimension to which each component was allocated to form the two-dimensional model (Sensory and Cognitive-Affective dimensions). Analogous Pleasurable Satisfaction and Emotional Intimacy components appeared for both contexts (Pleasurable Satisfaction1, Emotional Intimacy1; Pleasurable Satisfaction2, Emotional Intimacy2), whereas Ecstasy appeared only for the sex with partner context (Ecstasy2). Table 3 summarizes the fit indices for the two-dimensional model. All fit indices were within criteria for good fit for both men and women.

Alternative Models

Competing models were also evaluated, and fit indices for these models are included in Table 3: (a) a one-dimensional model, in which all components loaded onto one dimension; and (b) a three-dimensional model, in which the cognitive-affective dimension was separated into a cognitive dimension (Pleasurable Satisfaction1, Pleasurable Satisfaction2, Relaxation) and affective dimension (Emotional Intimacy1, Emotional Intimacy2, Ecstasy2). The one-dimensional model did not quite meet fit criteria. The three-dimensional model met fit criteria but showed little improvement over the two-dimensional model.

Gender and Sexual Context Effects

Table 4 lists the mean component scores and scores adjusted for covariates for each gender. None of the demographic (age, religion, education, sexual orientation, relationship status) or orgasm (days since orgasm, duration of orgasm) characteristics were associated with scale scores systematically or to any great effect and so was not included as covariates.

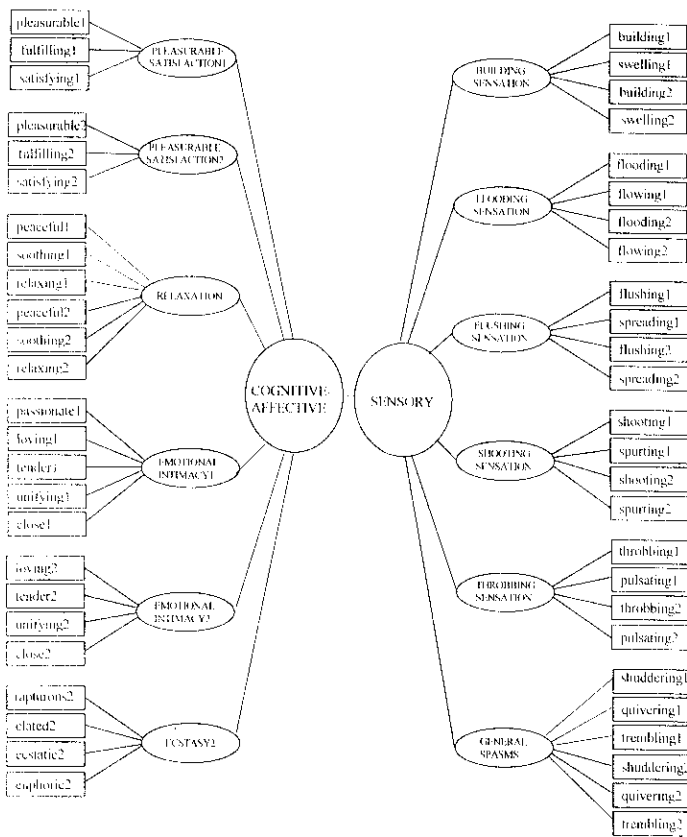
Table 2. Components from Principal Components Analyses, Model-evaluation Study

Component	Gender				
	Women		Men		
	Adjective	Loading	Adjective	Loading	
1	incredible1	.75	satisfying1 ^a	.79	
	powerful1	.73	pleasurable1 ^a	.74	
	fulfilling1 ^a	.69	exciting1	.71	
	satisfying1 ^a	.65	fulfilling1 ^a	.71	
	intense1	.65			
	exciting1	.63			
	wild1	.62			
	euphoric1		.60		
	pleasurable1 ^a	.57			
	2	pleasurable2 ^a	.79	loving2 ^a	.82
		satisfying2 ^a	.75	unifying2 ^a	.79
fulfilling2 ^a		.79	close2 ^a	.73	
3	euphoric2 ^a	.67	shuddering2 ^a	.74	
	elated2 ^a	.66	quivering2 ^a	.73	
	rapturous2 ^a	.66	trembling2 ^a	.64	
			shuddering1 ^a	.60	
4			quivering1 ^a	.57	
			trembling1 ^a	.49	
	loving2 ^a	.75	shooting2 ^a	.81	
	tender2 ^a	.68	spurting2 ^a	.68	
	close2 ^a	.64	erupting2	.65	
			exploding2	.60	
			shooting1 ^a	.59	
			hot2	.51	
			spurting1 ^a	.46	
	5	shuddering2 ^a	.73	satisfying2 ^a	.84
		shuddering1 ^a	.71	pleasurable2 ^a	.78
trembling2 ^a		.67	fulfilling2 ^a	.72	
quivering2 ^a		.64			
quivering1 ^a		.62			
6	trembling1 ^a	.61			
	close1 ^a	.72	tender1 ^a	.71	
	passionate1 ^a	.72	close1 ^a	.68	
	unifying1 ^a	.66	loving1 ^a	.65	
7	flowing1 ^a	.72	flushing2	.68	
	flooding1 ^a	.63	spreading2 ^a	.65	
	flowing2 ^a	.61	flushing1 ^a	.65	
	flooding2 ^a	.58	spreading1 ^a	.53	
8	relaxing1 ^a	.70	ecstatic2 ^a	.71	
	soothing1 ^a	.70	elated2 ^a	.61	
	peaceful1 ^a	.65	rapturous2 ^a	.45	
	relaxing2 ^a	.53			
	soothing2 ^a	.53			
	peaceful2 ^a	.51			
9	ecstatic2 ^a				
	spurting2 ^a	.76			
	spurting1 ^a	.72			
	shooting2 ^a	.58			
10	shooting1 ^a	.54			
	throbbing2 ^a	.73			
	throbbing1 ^a	.72			
	pulsating1 ^a	.71			
	pulsating2 ^a	.61			
11	building2 ^a	.76			
	building1 ^a	.72			
	swelling1 ^a	.56			
	swelling2 ^a	.44			

Note. Adjectives ending in "1" describe orgasm attained through solitary masturbation; those ending in "2" describe orgasm attained through sex with a partner.

^aAdjectives retained for further hypothesis-testing. Adjectives with loadings smaller than the last retained adjective for each component were excluded from the table.

Figure 1. The Two-Dimensional Model of the Psychological Experience of Orgasm, Model-Evaluation Study



Note. The adjectives are presented by the rectangular boxes, the components are represented by the small ovals, and the two dimensions are represented by the large ovals. Lines between the dimensions indicate correlational relationships. Lines between adjectives and components and between components and dimensions indicate regression of the former element on the latter element.

Pleasurable Satisfaction and Emotional Intimacy. A 2 x 2 (Gender x Sexual Context) mixed MANCOVA was performed with Pleasurable Satisfaction1, Pleasurable Satisfaction2, Emotional Intimacy1, and Emotional Intimacy2 as the repeated-measures dependent variables. All remaining components were entered as covariates. To investigate the impact of each effect on individual dependent variables, univariate ANCOVAs were conducted for each dependent variable. Strength of association, η^2 , was used to indicate effect size by dividing Sum of Squares (Effect) by Sum of Squares (Total).

A significant Gender x Sexual Context interaction was observed, $F(2, 885) = 3.80, p = .02$. Main effects tests revealed a significant Gender difference only within the solitary masturbation context, $F(2, 877) = 4.01, p = .02$. Univariate ANCOVA showed a significant Gender difference for Emotional Intimacy1, $F(1, 878) = 6.14, p = .01, \eta^2 = .007$; as seen in Table 4, women had significantly higher scores on Emotional Intimacy1.

Main effects tests also revealed a significant Sexual Context difference for both men, $F(2, 885) = 296.50, p <$

Table 3. Fit Indices for Two-dimensional Model and Alternative Models, Model-evaluation and Cross-validation Studies

Model	Fit indices				
	χ^2 / df	NNFI	CFI	IFI	GFI
Model-evaluation study					
Two-dimensional					
Men	2.11	.80	.83	.81	.73
Women	2.43	.81	.84	.82	.76
Alternative models					
One-dimensional					
Men	2.15	.79	.82	.80	.73
Women	2.55	.79	.82	.80	.75
Three-dimensional					
Men 2:10	.80	.83	.81	.73	
Women	2.40	.81	.84	.82	.76
Cross-validation study					
Two-dimensional					
Men/solitary masturbation	1.22	.92	.95	.93	.84
Men/sex with partner	1.65	.83	.86	.85	.79
Women/solitary masturbation	1.66	.88	.91	.90	.87
Women/sex with partner	1.99	.82	.86	.84	.83
Alternative model					
Three-dimensional					
Men/solitary masturbation	1.21	.92	.95	.93	.84
Men/sex with partner	1.63	.83	.87	.86	.79
Women/solitary masturbation	1.64	.89	.92	.90	.87
Women/sex with partner	1.97	.82	.87	.84	.83

Note. χ^2 / df = ratio between χ^2 and degrees of freedom; NNFI = non-normed fit index; CFI = comparative fit index; IFI = incremental fit index; GFI = goodness of fit index.

.001, and women, $F(2, 885) = 446.88, p < .001$. As apparent in Table 4, mean scores for Pleasurable Satisfaction2 were higher than for Pleasurable Satisfaction1, with a mean difference between the two components of 1.5 for men, $t(886) = 10.01, p < .001$, and 1.1 for women, $t(886) = 11.35, p < .001$. Mean scores for Emotional Intimacy2 were also higher than for Emotional Intimacy1, with a mean difference of 5.6 for men, $t(886) = 29.77, p < .001$, and 5.7 for women, $t(886) = 24.34, p < .001$.

Remaining factors. A one-way MANCOVA was conducted with the following: Gender as the independent variable; Relaxation, Ecstasy2, and all sensory components as the dependent variables; and Pleasurable Satisfaction1, Pleasurable Satisfaction2, Emotional Intimacy1, and Emotional Intimacy2 as covariates. A significant main effect of Gender was observed, $F(8, 875) = 89.70, p < .001$. Univariate ANCOVAs yielded significant Gender differences for the following components (see Table 4: ps ranging from $< .01$ to $< .001$): Relaxation, Flushing Sensations, Shooting Sensations, Throbbing Sensations, and General Spasms. For most of these, the corresponding effect sizes were small, $\eta^2s = .01-.04$; only Shooting Sensations showed any notable effect size, $\eta^2 = .32$.

Effect of mode of orgasm induction during sex with partner. One-way ANOVAs were conducted on the sex

Table 4. Mean Component Scale Scores and Scale Scores Adjusted for Covariates for Each Gender, Model-evaluation Study

Components	Gender	
	Women	Men
	<i>M (SD) / M^a</i>	<i>M (SD) / M^a</i>
Pleasurable Satisfaction1	11.4 (2.9) / 11.2	10.5 (3.2) / 10.7
Pleasurable Satisfaction2	12.9 (2.5) / 12.8	12.5 (2.7) / 12.6
Emotional Intimacy1	5.1 (5.1) / 5.3	4.4 (4.9) / 4.3
Emotional Intimacy2	13.2 (5.0) / 12.9	12.3 (5.4) / 12.6
Relaxation	16.6 (7.0) / 16.1	17.0 (6.6) / 17.5
Ecstasy2	10.9 (5.5) / 10.6	10.8 (5.1) / 11.1
Building Sensations	11.3 (5.5) / 11.0	9.7 (5.1) / 10.0
Flooding Sensations	9.2 (5.2) / 8.9	8.6 (4.9) / 8.8
Flushing Sensations	9.7 (5.4) / 9.4	7.2 (5.0) / 7.5
Shooting Sensations	5.5 (5.0) / 5.3	11.7 (5.2) / 11.9
Throbbing Sensations	13.1 (4.8) / 12.8	11.7 (4.6) / 12.0
General Spasms	17.4 (7.5) / 17.0	14.7 (7.2) / 15.1

^aAdjusted for covariates.

with partner data for each Gender. Mode of Orgasm Induction was the independent variable, and Pleasurable Satisfaction2, Relaxation, Emotional Intimacy2, Ecstasy2, and all sensory components were the dependent variables.

For women, significant main effects were observed for Flushing Sensations, $F(4,619) = 2.98$, $p = .02$, $\eta^2 = .02$, and Shooting Sensations, $F(4,619) = 2.50$, $p = .04$, $\eta^2 = .02$. Post-hoc Scheffé tests indicated just-significant differences in Flushing Sensations between manual stimulation by self [$M(SD) = 14.27(3.80)$; $n = 11$] and the following two induction modes: intercourse [$M(SD) = 9.26(5.55)$; $n = 223$], $p = .05$; and manual stimulation by partner [$M(SD) = 9.25(5.11)$; $n = 137$], $p = .06$. Post-hoc tests yielded no significant differences for Shooting Sensations. For men, a significant main effect was observed for Shooting Sensations, $F(4,364) = 3.54$, $p = .01$, $\eta^2 = .04$, and a just-significant main effect for Emotional Intimacy2, $F(4,364) = 2.42$, $p = .05$, $\eta^2 = .03$. However, post-hoc Scheffé tests revealed no significant differences for either component.

STUDY 2: CROSS VALIDATION

While findings supported the utility of the two-dimensional model, the exploratory nature of the model-evaluation study necessitated cross-validation in an independent sample. Sexual context was changed to a between-subjects variable in this study to ameliorate any order effects of having rated orgasm attained through solitary masturbation on subsequent ratings of orgasm attained through sex with a partner.

Participants

Participants in the study were undergraduate and graduate students recruited using the same strategies as in the first study. The inclusion criterion required participants to have experienced orgasm at least once within the sexual context assigned. A total of 227 women and 129 men receiving the solitary masturbation questionnaire and 276 women and 166 men receiving the sex with partner questionnaire met

the criterion. Table 1 summarizes the sample characteristics. The majority were young, unmarried, heterosexual undergraduate students.

Materials

The questionnaires were similar to the versions used in the first study but with fewer adjectives: the 28 adjectives retained in the first study for hypothesis-testing, and 12 other randomly selected adjectives from the original 60-item questionnaire.

Procedure

Recruitment and data-collection methods were similar to those in the first study. Participants randomly received one of the two sexual-context versions of the questionnaire.

Statistical Analyses

Individuals who had 25% or more missing data were eliminated from the analyses. In the remaining sample, missing ratings for adjectives were replaced using the adjective's mean rating for the corresponding Gender x Sexual Context condition. A total of 93 to 95% of participants had no missing ratings.

Ratings for the 28 adjectives forming the two-dimensional model were used in the analyses. To assess model fit, confirmatory factor analysis (CFA) was conducted using EQS for Windows (Bentler & Wu, 1995). Model fit was evaluated separately for each of the four Gender/Sexual Context groups. The same indices of model fit and criteria for good model fit as in the first study were examined. The remaining analyses, conducted using SPSS for Windows, will be described with their corresponding results.

RESULTS

Reliability

Internal consistency of the 28 adjectives, using Cronbach's α , was high across all groups (women/solitary masturbation: $\alpha = .89$; women/sex with partner: $\alpha = .88$; men/solitary masturbation: $\alpha = .92$; men/sex with partner: $\alpha = .90$).

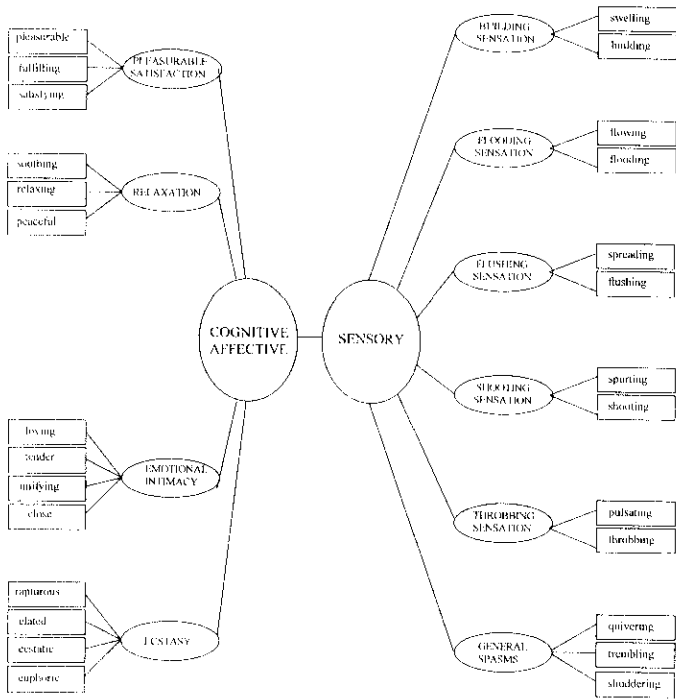
Model Evaluation

Fit indices for the two-dimensional model, shown in Figure 2, are summarized in Table 3 for all four Gender/Sexual Context groups. In all cases, fit indices for the two-dimensional model met criteria for adequate model fit. As shown in Table 3 and consistent with findings from the first study, the competing three-dimensional model also met fit criteria but showed little improvement over the two-dimensional model.

Gender and Sexual Context Effects

To test sexual context effects on the components, a 2 x 2 (Gender x Sexual Context) between-subjects MANCOVA was initially performed. Scale scores for all components were the dependent variables. As in the first study, none of the sociodemographic variables or orgasm variables had

Figure 2. The Two-Dimensional Model of the Psychological Experience of Orgasm, Cross-Validation Study



Note. The adjectives are represented by the rectangular boxes, the components are represented by the small ovals, and the two dimensions are represented by the large ovals. Lines between the dimensions indicate correlational relationships. Lines between adjectives and components and between components and dimensions indicate regressions of the former element on the latter element.

strong covariate effects. Hence, the results for a 2 x 2 (Gender x Sexual Context) between-subjects MANOVA and subsequent univariate ANOVAS for each dependent variable are presented here. Table 5 summarizes the mean component scale scores. Strength of association, η^2 , was again used to indicate effect size.

A significant main effect of Gender was observed, $F(10, 785) = 42.78, p < .001, \eta^2 = .35$. As seen in Table 5, univariate ANOVAS revealed that scores for all Sensory

components significantly differed between gender, ps ranging from .04 to $< .001$: Building Sensations, Flooding Sensations, Flushing Sensations, Shooting Sensations, Throbbing Sensations, and General Spasms. In all cases except for Shooting Sensations, women had higher scores. Only Shooting Sensations demonstrated a relatively large effect size, $\eta^2 = .18$; effect sizes for the remaining components were no higher than .03.

A significant main effect of Sexual Context was also noted, $F(10, 785) = 29.25, p < .001, \eta^2 = .27$. Univariate ANOVAS revealed that scores for the following significantly differed between Sexual Contexts, ps ranging from .02 to $< .001$: Pleasurable Satisfaction, Relaxation, Emotional Intimacy, Ecstasy, Shooting Sensations, and General Spasms. As apparent in Table 5, mean scores for all components except Relaxation were higher in the sex with partner context. Emotional Intimacy showed a relatively large effect size, $\eta^2 = .20$; effect sizes for the remaining components were no higher than .04.

Effect of Mode of Orgasm Induction During Sex with Partner

One-way ANOVAS were conducted on the sex with partner data for each Gender. Mode of Orgasm Induction was the independent variable, and Pleasurable Satisfaction2, Relaxation, Emotional Intimacy2, Ecstasy2, and all sensory components were the dependent variables. Significant main effects were observed for Emotional Intimacy2 for both women, $F(4,258) = 3.00, p = .02, \eta^2 = .05$, and men, $F(4,156) = 3.60, p = .01, \eta^2 = .05$. Post-hoc Scheffé tests indicated a significant difference for women only between intercourse [$M(SD) = 16.81(5.95); n = 90$] and manual stimulation by the partner [$M(SD) = 13.29(6.63); n = 56$], $p = .04$. Post-hoc Scheffé tests did not reveal any significant differences for men.

DISCUSSION

The Two-Dimensional Model

Overall, findings from both studies supported the hypothesis that orgasm can be characterized by distinct sensory

Table 5. Mean Component Scale Scores for Each Gender x Sexual Context Group, Cross-validation Study

Components	Gender x Sexual Context groups			
	Women/solitary masturbation (n = 227)	Women/sex with partner (n = 276)	Men/solitary masturbation (n = 129)	Men/sex with partner (n = 166)
	<i>M (SD)</i>			
Pleasurable satisfaction	11.8 (2.9)	12.6 (2.4)	11.3 (2.5)	12.4 (2.6)
Relaxation	8.3 (4.3)	7.0 (4.6)	8.7 (3.6)	7.5 (4.4)
Emotional intimacy	7.9 (6.4)	15.0 (6.7)	7.7 (6.3)	14.1 (6.6)
Ecstasy	9.6 (5.1)	11.9 (4.7)	9.7 (4.6)	11.4 (4.8)
Building sensations	4.9 (2.8)	4.9 (2.8)	4.1 (2.8)	4.7 (2.8)
Flooding sensations	4.8 (2.8)	5.0 (3.0)	4.2 (2.8)	4.7 (2.6)
Flushing sensations	4.9 (2.7)	5.3 (2.5)	4.1 (2.7)	4.1 (2.7)
Shooting sensations	2.8 (2.6)	3.2 (2.7)	5.4 (2.8)	6.1 (2.9)
Throbbing sensations	6.7 (2.6)	6.6 (2.8)	5.7 (2.8)	6.2 (2.6)
General spasms	8.5 (4.5)	9.3 (4.1)	6.6 (4.1)	8.1 (4.1)

and cognitive-affective experiences. This two-dimensional model remained reliable across two independent samples and across both within- and between-subjects approaches to measuring sexual context. The two-dimensional model also demonstrated improvement over a model with a single dimension encompassing all components, supporting the conceptual distinction made by existing psychological models of human orgasm (Davidson, 1980; Warner, 1981) between physical sensations and nonphysical experiences of orgasm.

Separating the cognitive-affective dimension into distinct cognitive and affective dimensions would presumably provide a more powerful theoretical three-dimensional model by permitting investigations of (a) the impact of one dimension on the other, or (b) changes in one dimension independent of changes in the other as a function of other biopsychosocial variables. For example, orgasmic pleasure (cognitive dimension) may be determined more by the physical sensations of orgasm (sensory dimension) during masturbation or a casual sexual encounter but by the emotional aspects (affective dimension) during sex with an emotionally intimate partner. Other psychophysiological phenomena, such as pain (Melzack & Torgerson, 1971) and female sexual desire (Heiman, 1998) and arousal (Laan & Everaerd, 1995), have been ascribed distinct physical, cognitive, and affective qualities.

However, the three-dimensional model showed little improvement over the two-dimensional model for both sexual contexts. Appraised pleasure and satisfaction derived from orgasm may be so strongly intertwined with the emotions aspects of orgasm that they would be difficult to differentiate. It is also possible that the young age and limited relationship and sexual experience of the student sample may have inflated the interdependence of the cognitive and affective experiences. A fundamental issue as well may not be whether one model is superior to the other, but which is more useful under different circumstances. Future studies with larger nonstudent samples may further permit more components to be developed to measure the cognitive and affective dimensions independently and thereby enhance their reliability and divergent validity.

The components also remained consistent across studies and are similar to many constructs investigated in studies of female orgasm (see Mah & Binik, 2001, for review). Some differences in specific components were noted between the present findings and other existing models. For example, components similar to some of Warner's (1981) physical (e.g., Throbbing) and affective (e.g., Evaluative) subscales for female orgasm were observed, but others (e.g., Sudden Cessation, Depressed, Unresponsive, Almost) were not. Methodological differences may account for these differences. In addition to confounding orgasm experiences with sexual arousal and/or reactions to the inability to achieve orgasm, Warner assigned descriptive items to the physical or affective dimension prior to conducting separate factor analyses on each item group. In the present study, all adjectives were included in the same factor analyses without a pri-

ori categorization. Future validity studies might examine how different biopsychosocial variables may influence specific components of the orgasm experience. For example, the perceived location of orgasmic sensation may relate more to the physical components, whereas relationship satisfaction may relate more to the cognitive-affective components.

Sexual Context Effects

Findings concerning the sensory components were consistent with the lack of evidence for physiological differences in masturbatory versus coital orgasm (e.g., Masters & Johnson, 1966). In the model-evaluation study, all sensory components had matching adjectives representing both sexual contexts. In the cross-validation study, there was also a lack of strong sexual context differences in most of the sensory components. Because both studies only investigated single orgasm experiences for each sexual context, future studies of test-retest reliability would be useful. Evaluations of the stability of adjective ratings might be anticipated to yield lower reliability with increasing time not only because of decline in memory effects, but also because orgasm experiences may vary over time (e.g., Butler, 1976; Hite, 1981).

In contrast, the finding in the model-evaluation study that pleasure/satisfaction, emotional intimacy, and ecstasy components were unique to each sexual context suggests that the cognitive-affective experience of orgasm attained through solitary masturbation may be qualitatively different from that of orgasm attained with a partner (cf. Levin, 1981). As hypothesized, the pleasure/satisfaction and, in particular, the emotional aspects of male and female orgasm were greater when orgasm was attained with a partner than with masturbatory orgasm. In the model-evaluation study, though, ratings in the sex with partner version may have been inflated because they may reflect comparisons to the initial ratings of masturbatory orgasm. In changing sexual context to a between-subjects variable in the cross-validation study, the result was a reduction in the strength of the sexual context effect on orgasm pleasure/satisfaction but not on the emotional intimacy aspects of the orgasm experience. The substantial increase in salience of emotional intimacy in the sex with partner context likely reflects the greater contribution of that context's inherent psychosexual and emotional qualities to the orgasm experience.

The sexual context effect for emotional intimacy seemed to be independent of how orgasm was attained in the sex with partner context. In both studies, few strong, consistent differences were noted across components as a function of mode of orgasm induction. Highly uneven cell sizes may have contributed to the lack of reliable findings. On the other hand, the findings are consistent with the theory that different orgasm triggers may not greatly determine the subjective qualities of orgasm (e.g., Fisher, 1973; Levin, 1981). Instead, the presence of and emotional closeness with the partner may underlie the differences in orgasm experiences achieved within sexual contexts where a partner is present versus not present (cf. Davidson, 1980).

Male and Female Orgasm

The same two-dimensional model could consistently describe the data from both men and women. This would suggest that male orgasm encompasses experiences beyond the sensations of ejaculation and bears more similarities than differences with female orgasm (e.g., Vance & Wagner, 1976). The only meaningfully large gender difference involved the higher ratings of shooting sensations by men, which presumably reflects the male capacity for ejaculation. Further studies should examine the relationship between this component and different aspects of the ejaculatory process, to rule out the possibility that men employed this component to describe the visual experience of seminal ejaculation rather than the internal ejaculatory sensations. Gender differences in other components, while reliable, were not substantive and could be attributable to gender differences in response style or semantic interpretation of particular adjectives. Data on gender differences in self-reported emotional intensity and expressivity are conflicting (e.g., Deffenbacher et al., 1996; Searle & Meara, 1999; Seidnitz & Diener, 1998). Controlling for endorsement of gender stereotypes of emotional responsiveness (e.g., Grossman & Wood, 1993), sex guilt, erotophilia-erotophobia, and social-desirability responding (Plaud, Gaither, & Weller 1998), though, typically eliminated gender differences. Having participants rate additional items on a relatively neutral topic like food tastes, for example, might also aid in evaluating the effects of the emotional valence of the adjectives on the gender differences observed.

Methodological Issues

The samples in both studies were limited to young university students, and hence generalizability of findings is limited. The relatively small sample sizes, especially with respect to the male participants, may affect reliability of the findings. The studies relied on retrospective self-report which, while critical for understanding psychological phenomena, may be compounded by response biases and/or individual verbal capacity and meanings ascribed to particular stimuli. This is particularly the case with sensitive issues like sexuality. Most individuals had experienced their orgasm 10 days or fewer prior to completing the questionnaire, and time since orgasm was experienced was not related to component scores in either study. It would be desirable, though, to control for retrospective-memory effects and time since orgasm more systematically. Future research should also control for amount of sexual experience, which was likely heterogeneous in our samples (i.e., samples included participants who had experienced either only one orgasm within one sexual context or many orgasms within both contexts).

Changing sexual context from a within-subjects to a between-subjects variable gave rise to another issue that could affect reliability of the components. As apparent when comparing Figures 1 and 2, the components in the

model-evaluation study, where most components had matching adjectives from both contexts, contained more adjectives than their counterparts in the cross-validation study. Similarly, the cognitive-affective dimension in the model-evaluation study included matching components from both sexual contexts (e.g., Pleasurable Satisfaction1, Pleasurable Satisfaction2); the same dimension in the cross-validation study did not have this advantage. Future studies should recruit larger samples to permit evaluations of an elaborated model in which components are more reliably measured by at least four to six adjectives (e.g., Bornstedt, 1983).

CONCLUSION

The adjective-ratings approach appears to be a flexible methodology appropriate to the study of human orgasm. It lends itself to both correlational and experimental paradigms, and its application to nonstudent populations will help further knowledge about the psychology of human orgasm. Future validity studies of the two-dimensional model and its components should apply a biopsychosocial approach involving concurrent objective and subjective measures during sexual stimulation. The model will hopefully stimulate further comparative studies of male and female orgasm and more empirical attention to male orgasm.

The adjective-ratings strategy along with the model would have potential clinical utility in terms of diagnostic and treatment assessment. For example, comparing adjective-rating profiles from clinical populations to normative or premorbid profiles may help differentiate the underlying causes of presenting orgasm difficulties. Individuals with physiological conditions or taking medications that cause orgasm dysfunctions might be expected to show more profile differences on the sensory components. In contrast, those with underlying psychosocial issues might exhibit more differences on the cognitive-affective components. The role of psychological, psychosocial, and psychosexual correlates of the orgasm experience would be useful in determining the course of sex therapy for those presenting with orgasmic difficulties. Certainly a standardized multi-dimensional questionnaire of orgasmic sensation would serve as a much-needed clinical assessment tool with populations reporting problems with orgasm and in evaluating the effectiveness of interventions for these problems.

REFERENCES

- Bancroft, J. (1989). *Human sexuality and its problems*. New York: Churchill Livingstone.
- Bentler, P. M. (1995). *EQS structural equations program manual*. Encino, CA: Multivariate Software.
- Bentler, P. M., & Peeler, Jr., W. H. (1979). Models of female orgasm. *Archives of Sexual Behavior*, 8, 405-423.
- Bentler, P. M., & Wu, E. J. (1995). *EQS for Windows user's guide*. Encino, CA: Multivariate Software.
- Bornstedt, G. W. (1983). Measurement. In P. H. Rossi, J. D. Wright, & A. B. Anderson (Eds.), *Handbook of survey research* (pp.69-121). New York: Academic Press.
- Butler, C. A. (1976). New data about female sexual response. *Journal of Sex & Marital Therapy*, 2, 40-46.
- Clifford, R. E. (1978). Subjective sexual experience in college women.

- Archives of Sexual Behavior*, 7, 183–197.
- Darling, C. A., Davidson, Sr., J. K., & Cox, R. P. (1991). Female sexual response and timing of partner orgasm. *Journal of Sex & Marital Therapy*, 17, 3–21.
- Davidson, J. M. (1980). The psychobiology of sexual experience. In J. M. Davidson & R. J. Davidson (Eds.), *The psychobiology of consciousness* (pp. 271–332). New York: Plenum Press.
- Davidson, Sr., J. K., & Moore, N. B. (1994). Guilt and lack of orgasm during sexual intercourse: Myth versus reality among college women. *Journal of Sex Education and Therapy*, 20, 153–174.
- Deffenbacher, J. L., Oetting, E. R., Thwaites, G. A., Lynch, R., Saker, D. A., Stark, R. S., Thacker, S., & Eiswerth-Cox, L. (1996). State-trait anger theory and the utility of the Trait Anger Scale. *Journal of Counseling Psychology*, 43, 131–148.
- Fisher, S. (1973). *The female orgasm*. New York: Basic Books.
- Grossman, M., & Wood, W. (1993). Sex differences in intensity of emotional experience: A social role interpretation. *Journal of Personality and Social Psychology*, 65, 1010–1022.
- Heiman, J. R. (1998). Psychophysiological models of female sexual response. *International Journal of Impotence Research*, 10 (Suppl. 2), S94–S97.
- Heiman, J. R. (2000). Orgasmic disorders in women. In S. R. Leiblum & R. C. Rosen (Eds.), *Principles and practice of sex therapy* (3rd ed., pp. 118–153). New York: Guilford Press.
- Hite, S. (1976). *The Hite report: A nationwide study of female sexuality*. New York: Dell.
- Hite, S. (1981). *The Hite report on male sexuality*. New York: Ballantine Books.
- Hoyle, R. H., & Panter, A. T. (1995). Writing about structural equation models. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 158–176). Thousand Oaks, CA: Sage.
- Laan, E., & Everaerd, W. (1995). Determinants of female sexual arousal: Psychophysiological theory and data. *Annual Review of Sex Research*, 6, 52–76.
- Levin, R. J. (1981). The female orgasm: A current appraisal. *Journal of Psychosomatic Research*, 25, 119–133.
- Levin, R. J. (1992). The mechanisms of human female sexual arousal. *Annual Review of Sex Research*, 3, 1–48.
- Mah, K., & Binik, Y. M. (2001). The nature of human orgasm: A critical review of major trends. *Clinical Psychology Review*, 21, 823–856.
- Marsh, H. W., & Hocevar, D. (1985). Application of confirmatory factor analysis to the study of self-concept: First- and higher order factor models and their invariance across groups. *Psychological Bulletin*, 97, 562–582.
- Masters, W. H., & Johnson, V. E. (1966). *Human sexual response*. Boston: Little, Brown.
- Melzack, R. (1975). The McGill Pain Questionnaire: Major properties and scoring methods. *Pain*, 1, 277–299.
- Melzack, R., & Torgerson, W. S. (1971). On the language of pain. *Anesthesiology*, 34, 50–59.
- Newcomb, M. D., & Bentler, P. M. (1983). Dimensions of subjective female orgasmic responsiveness. *Journal of Personality and Social Psychology*, 44, 862–873.
- Plaud, J. J., Gaither, G. A., & Weller, L. A. (1998). Gender differences in the sexual rating of words. *Journal of Sex & Marital Therapy*, 24, 13–19.
- Rosen, R. C., & Beck, J. G. (1988). *Patterns of sexual arousal: Psychophysiological processes and clinical applications*. New York: Guilford.
- Searle, B., & Meara, N. M. (1999). Affective dimensions of attachment styles: Exploring self-reported attachment style, gender, and emotional experience among college students. *Journal of Counseling Psychology*, 46, 147–158.
- Seidnitz, L., & Diener, E. (1998). Sex differences in the recall of affective experiences. *Journal of Personality and Social Psychology*, 74, 262–271.
- Singh, D., Meyer, W., Zamborano, R. J., & Hurlbert, D. F. (1998). Frequency and timing of coital orgasm in women desirous of becoming pregnant. *Archives of Sexual Behavior*, 27, 15–29.
- Vance, E. B., & Wagner, N. N. (1976). Written descriptions of orgasm: A study of sex differences. *Archives of Sexual Behavior*, 5, 87–98.
- Warner, J. E. (1981). *A factor analytic study of the physical and affective dimensions of peak of female sexual response in partner-related sexual activity*. Unpublished doctoral thesis, Teachers College, Columbia University.
- Warner, J. E. (1998). Peak of sexual response questionnaire (PSRQ). In C. M. Davis, W. L. Yarber, R. Bauserman, G. Schreer, & S. L. Davis (Eds.), *Handbook of sexuality-related measures* (pp. 256–257). Thousand Oaks, CA: Sage Publications.

