THE ROLE OF PREPOTENT SEXUAL FEATURES IN FEMALE NONSPECIFIC SEXUAL RESPONSE

By

Jessica Spape, BAH

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Canada
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ABSTRACT

Research has found that men’s sexual response demonstrates specificity; men’s genital sexual arousal patterns to sexual stimuli match their stated sexual orientation. Heterosexual women’s genital responses are nonspecific in that they show sexual responses to both their preferred and non-preferred gender (Chivers, 2010). It is unclear why women show this pattern; however, examining the specific stimulus features associated with sexual arousal in women may provide clarification. Prepotent sexual features, that is, stimuli that involuntarily elicit nervous system activity (cf. Lang, Rice & Sternbach, 1972), may be associated with an automatic sexual response (Blader & Marshall, 1989; Chivers, 2005; Ponseti et al., 2006; Van Lunsen & Laan, 2004). It is possible that heterosexual women show genital responses to both preferred and non-preferred stimuli because prepotent sexual features are present in both male and female sexual stimuli.

In order to better understand women’s nonspecific genital response, we examined whether stimulus prepotency was associated with nonspecific sexual response in heterosexual women. We assessed 36 heterosexual women’s genital and subjective arousal to slideshows of male and female prepotent stimuli (erect penises and aroused vulvas), non-prepotent stimuli (flaccid penises and female pubic triangles), and neutral stimuli (images of clothed men and women engaged in nonsexual activities). Counter to prediction, women demonstrated category-specific genital and subjective sexual responses, such that sexual arousal was significantly higher to prepotent male stimuli (images of erect penises) versus prepotent female stimuli; genital responses were nonspecific to non-prepotent and neutral stimuli. Results are discussed in terms of the sexual competency of stimuli and the Information Processing Model of Sexual Response.
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CHAPTER 1

Introduction

A great deal of research has been dedicated to the study of gender differences in various aspects of sexuality (Baumeister, 2000; Baumeister, Catanese, & Vohs, 2001; Murnen & Stockton, 1997; Petersen & Hyde, 2011). Differences have been found in the relationship between sexual orientation and sexual response patterns between men and women. Men have a category-specific sexual response pattern (Chivers, Rieger, Latty, & Bailey, 2004; Chivers & Bailey, 2005; Chivers, 2005; Sakheim, Barlow, Beck, & Abrahamson, 1985). This means that men’s pattern of sexual response is congruent with their stated sexual orientation; heterosexual men show significantly more genital and subjective sexual arousal to depictions of women than to depictions of men while homosexual men demonstrate the opposite pattern. The female genital sexual response pattern is nonspecific, as women demonstrate genital sexual arousal to the representation of both their preferred and non-preferred gender (Chivers et al., 2004; Chivers & Bailey, 2005; Chivers, Seto & Blanchard, 2007; Chivers, 2010; Laan, Everaerd, & Evers, 1995). On the other hand, women’s subjective sexual arousal has been found to be somewhat category-specific because they report greater sexual arousal to their preferred gender. Nonetheless, women still report subjective sexual arousal to non-preferred stimuli as well (Chivers et al., 2004; Chivers, & Bailey, 2005; Chivers et al., 2007). It remains unclear why women demonstrate this nonspecific pattern of sexual arousal.

Given the counterintuitive nature of nonspecificity of women’s genital arousal, several researchers have tried to find possible alternative explanations for the phenomenon to ensure that it is not attributable to another underlying mechanism or to
methodological problems (Laan et al., 1995; Laan & Everaerd, 1995; Chivers et al., 2004; Chivers & Bailey, 2005; Suschinsky, Lalumière, & Chivers, 2009). Because male sexual arousal is recorded using a different instrument, it was important to ensure that the vaginal photoplethysmograph, a tampon-shaped device that is used as a measure of vaginal vasocongestion by recording vaginal pulse amplitude (VPA) (Laan & Everaerd, 1995), is capable of recording a category-specific pattern of sexual arousal at all. To do so, male-to-female transsexuals were recruited to watch sexual stimuli and were found to demonstrate specificity of genital arousal using the photoplethysmograph (Chivers et al., 2004). This finding confirms that the vaginal photoplethysmograph is able to identify specificity. Another hypothesis was that women demonstrate nonspecificity because the vaginal photoplethysmograph is recording general emotional arousal instead of sexual arousal specifically. To test this, researchers showed women a range of sexual and non-sexual stimuli as well as emotion provoking stimuli, e.g., a simulated roller coaster ride. The vaginal photoplethysmograph only detected sexual arousal because it did not record a response to the emotion provoking stimuli and only recorded responding to the sexual stimuli (Laan & Everaerd, 1995; Laan et al., 1995; Suschinsky et al., 2009). Finally, it was suggested that perhaps women did not demonstrate category-specificity because women’s genital responses do not vary as significantly as men’s; however, this is not the case as women have been found to experience significant increases in vaginal vasocongestion to sexual depictions of both their preferred and non-preferred genders, when compared to neutral stimuli (Chivers et al., 2004; Chivers & Bailey, 2005).

A sexually competent stimulus is one that yields a sexual response (Both, Everaerd, & Laan; 2007; Janssen, Everaerd, Spiering, & Janssen, 2000; Spiering,
Everaerd, Karsdorp, Both, & Brauer, 2006; Spiering, Everaerd, & Laan, 2004). Male specificity and female nonspecificity suggest that what makes a sexual stimulus competent is different for men and women. Chivers, Seto, and Blanchard (2007) proposed that women might not show specificity of genital arousal because gender cues alone do not make a stimulus competent for them. Rather, Chivers et al. (2007) suggested that other cues, such as the level of sexual activity presented within a stimulus, might be more important to the competency of sexual stimuli for women. To separate sexual activity level cues from gender cues, Chivers et al. (2007) showed a series of stimuli to heterosexual and homosexual men and women that varied by the level of sexual activity (none, masturbation, coupled sex) and the gender (male, female) of the persons depicted. For women, sexual activity was a stronger predictor of sexual arousal than gender. A clear pattern of genital responding emerged: vasocongestion increased from nonsexual stimuli, to masturbation, and was highest for the intercourse stimuli, independent of actor gender. Nevertheless, an unexpected finding emerged: heterosexual women showed increased genital arousal to the nonsexual stimulus depicting a nude woman exercising. In fact, sexual arousal to the nude female exercise stimulus was significantly higher than sexual arousal to the control film, whereas arousal to the nude male stimulus was not. Moreover, the heterosexual women’s self reports indicated higher subjective arousal to the nude female aerobics than to the nude male walking on the beach or doing yoga. This finding is counterintuitive, as there was no sexual activity depicted and one would expect heterosexual women to show increased arousal to nude men and not nude women. The present study aimed to understand this counterintuitive finding and further our understanding of women’s nonspecific sexual response.
In their paper, Chivers et al. (2007) proposed that the female exercise video may contain an unforeseen sexual confound: during their aerobic routine, the nude women would occasionally spread their legs and expose their vulvas. Chivers et al. (2007) explain that a vulva is a rare sight outside of sexual contexts, whereas a flaccid penis is not. Perhaps the presence of an exposed vulva led to the significant increase in sexual arousal observed in heterosexual women to the nude female aerobics. This would suggest that a vulva might be a more sexually arousing feature than a flaccid penis to heterosexual women.

The idea that certain features within our environment are more salient is not new. Research on the development of fears and phobias has introduced the idea of a prepotent stimulus (Öhman, 1986, 1993). A prepotent stimulus is one that automatically elicits nervous system activity (Lang, Rice, & Sternbach, 1972). Stimulus prepotency implies that there is a biological preparedness that contributes to the emotional salience of some stimuli (Öhman, 1993). For example, research has shown that there is greater resistance to extinction for conditioned responses to fear-relevant stimuli (images of snakes and spiders) than fear-irrelevant stimuli (images of flowers and mushrooms) (Öhman, Eriksson, & Olofsson, 1975) and that it is possible to develop a conditioned fear response to fear-relevant stimuli after only one exposure (Öhman et al., 1975).

Given the importance of sexual arousal for successful reproduction, Geer, Lapour, and Jackson (1993) argue that genital responding must occur in the presence of competent stimuli for species survival and that this link is likely highly prepared. Borrowing from the fear literature, we hypothesized that an exposed vulva may function as prepotent sexual feature. Though no research has looked into the prepotency of sexual
stimuli, some research has found evidence of an automatic sexual response in women (Van Lunsen & Laan, 2004; Chivers, 2005). Psychophysiological assessment of arousal in women has identified an increase in vasocongestion within seconds from the onset of a visual sexual stimulus (Chivers, 2005). The short time lapse between stimulus initiation and the physical response would suggest that visual cues are unconsciously processed and lead to an automatic genital response (Van Lunsen & Laan, 2004; Chivers, 2005). Van Lunsen and Laan (2004) have suggested that visual sexual cues are biologically prepared and lead to automatic genital vasocongestion in women; however, research has also found that seeing a member of your preferred gender nude is not enough to elicit a sexual response (Chivers et al., 2007). Therefore, not all visual sexual cues lead to an automatic genital response. We hypothesize that an exposed vulva acts as a prepotent sexual stimulus that elicits an automatic sexual response in women.

The idea of stimulus prepotency would suggest that the male and female nonsexual stimuli presented in the Chivers et al. (2007) study were not equivalent because the exercising men were presented with flaccid penises but the exercising women exposed their vulvas. An exposed vulva is a rare sight outside of sexual contexts (Chivers et al., 2007) but one may encounter a flaccid penis outside of sexual situations (e.g., in a change room, at a nudist beach). An exposed and aroused vulva and an erect penis may be important cues of sexual preparedness because they are so strongly associated with sexual contexts. It is possible that the heterosexual female participants showed higher genital sexual arousal to the films of women exercising than to those of men exercising due to the presence of a prepotent sexual cue within the stimulus. If prepotent sexual features elicit an automatic sexual response in women, it is possible that women show
nonspecificity because prepotent sexual features are found in almost all the sexual stimuli that have been used in studies examining specificity of women’s sexual arousal.

**Current Study**

To examine whether the presence of prepotent sexual features makes a sexual stimulus competent for heterosexual women, we examined both physiological and subjective sexual arousal to prepotent sexual stimuli (erect penises and exposed vulvas), non-prepotent male and female sexual stimuli (flaccid penises and pubic triangles), and images featuring men and women engaged in nonsexual activities. It was hypothesized that heterosexual women would show higher levels of genital responding to prepotent sexual stimuli than to non-prepotent sexual stimuli. Given that no previous study has examined arousal to images of genitals, our predictions were based solely on the findings of Chivers et al. (2007). In Chivers et al. (2007), heterosexual women showed a very slight increase in VPA to the male nude stimuli; therefore, we predicted that women may show genital arousal to non-prepotent stimuli but this arousal would not be significantly greater than arousal to neutral stimuli. In line with past psychophysiological research findings (Chivers et al., 2004; Chivers & Bailey, 2005; Chivers, 2005; Chivers et al., 2007), we specifically predicted that women would respond similarly to both male and female prepotent stimuli. We hypothesized that subjective sexual arousal would be highest for prepotent sexual features versus non-prepotent sexual features. Unlike genital sexual arousal, heterosexual women’s subjective sexual arousal is somewhat category-specific (Chivers & Bailey, 2004; Chivers, 2005; Chivers et al., 2007); therefore, we predicted that heterosexual women would rate images of their preferred gender’s genitals as more arousing than images of their non-preferred gender’s genitals.
CHAPTER 2

Method

Participants

Participants were recruited from Queen’s University, St. Lawrence College, and the surrounding Kingston area via posters and Internet advertisements. The inclusion criteria were as follows: no history or current problems with sexual functioning; no history of mental illness or substance abuse; participants must not currently be using any forms of medication known to affect sexual functioning such as anti-depressants; could not have an active sexually transmitted infection or be pregnant at the time of testing. We recruited heterosexual females between the ages of 18 and 40 years old; participants had to speak, read, and write English fluently; had to have normal or corrected vision and had to have experienced vaginal penetration. Hormonal contraceptive (oral, patch, injection, etc.) use was permitted. Participants provided their stated sexual orientation, but it was confirmed using the Kinsey Sexual Attraction Scale (Kinsey et al., 1948; Kinsey et al., 1953). Participants had to have a regular menstrual cycle (approximately 28 days long with monthly menstruation) but could not be menstruating at the time of testing, because vaginal bleeding would interfere with vaginal photoplethysmography readings.

According to a power analysis where predicted power was set at .8, alpha level at .05, and the predicted effect was moderate (with Cohen’s F set at .1), 36 participants were needed for this experiment. A total of 66 women responded to our advertisements: 24 women declined participation or did not respond after receiving further information about the study, 6 women were not eligible to participate, and 36 eligible women attended the testing session and completed the procedure.
Due to technical difficulties, both the genital and subjective sexual arousal data for one participant was lost. One woman’s genital sexual arousal data were excluded due to poor quality VPA signal. Four women were excluded because they reported bisexual attractions. Consequently, our total sample size for genital data was 30 and 31 for subjective sexual arousal. Two women forgot to report their continuous self-reported arousal, making the total sample size for continuous self-reported arousal 29.

**Apparatus and Materials**

*Data acquisition.* Psychophysiological sexual responses were continuously sampled and recorded using Limestone Technologies Data-Pac_USB system (Limestone Technologies, Kingston, Ontario, Canada). The Limestone software and hardware was installed on a Pentium Dell desktop computer (Dell Canada Inc., North York, Ontario, Canada).

*Female genital response.* Women’s genital responses were continuously assessed using vaginal photoplethysmography (VPP). A vaginal photoplethysmograph is a tampon-shaped device that is inserted by the participant into the vagina to monitor vaginal vasocongestion. A silicone placement device, situated 5 cm away from the photoplethysmograph, ensured women placed the device in the correct orientation. The photoplethysmograph is equipped with a red-orange spectrum light (technische Handelsonderneming Coos, The Netherlands) that illuminates the tissues of the vagina, and a phototransistor that picks up the amount of light backscattered from within the vagina. Vaginal pulse amplitude (VPA) is a measure of change in vaginal blood flow associated with each heartbeat. VPA was measured as peak-to-trough amplitude for each vaginal pulse. The photoplethysmograph signal was sampled at a rate of 10 samples per
second, band-pass filtered (0.5 to 10 Hz), and digitized (40 Hz). VPA has been shown to exhibit both convergent and discriminant validity because it can differentiate between sexual arousal due to a sex stimulus and arousal due to a sexually threatening film, and VPA demonstrates no response to nonsexual stimuli (Laan & Everaerd, 1995). For each participant, a baseline was established before the presentation of each stimulus. Before data analysis, VPA waveforms were visually inspected for movement artifacts and these were removed before data analysis.

*Self-reported sexual response.* Women rated their sexual and emotional responses before and after viewing each stimulus using a number keypad attached with Velcro to the reclining chair. Signals from this keypad went to the same Pentium Dell desktop that received the vaginal photoplethysmograph signal. Questions were presented on the same screen as the test stimuli and answers were provided using a Likert-type scale ranging from 0 to 9, where 0 represented no sexual arousal and 9 represented the highest levels of sexual arousal or arousal associated with orgasm. Questions assessing self-reported sexual response were presented before and after each experimental trial. For a list of pre- and post-trial questions, see Appendix 1.

*Continuous self-reported sexual arousal.* While watching the experimental stimuli, women manipulated a virtual gauge (i.e., an electronic representation of a bar) to continuously report their subjective sexual arousal. It was explained to participants that the scale ranged from 0% (no sexual arousal represented by the absolute bottom of the scale) to 100% (most sexual arousal ever felt, sexual arousal associated with orgasm represented by the absolute top of the scale). Participants raised and lowered the virtual
gauge, presented on a computer monitor adjacent to the sexual stimulus, using the “+” or “-” key on the keypad attached to the armrest of a reclining chair.

*Experimental Stimuli.* Images depicting prepotent sexual features, that is, erect penises and exposed vulvas, were provided by Jorge Ponseti and are the same stimuli used in his 2006 and 2009 studies. Supplemental prepotent stimuli came from the Internet as well as images depicting non-prepotent sexual features (flaccid penises and pubic triangles). Participants were shown two slideshows for each stimulus category (male prepotent, female prepotent, male non-prepotent, female non-prepotent, male neutral, and female neutral) for a total of 12 photographic slideshows. For both prepotent and non-prepotent sexual stimuli it was important to ensure that no secondary sexual characteristics were present within the stimuli to ensure sexual arousal could only be attributed to the genitals presented. Our stimuli did not show female breasts or hips and we limited display of pectoral muscle in male stimuli. A total of 4 neutral slideshows were presented: two representing fully clothed women engaging in everyday activities and the other two featured fully clothed men.

Each slideshow was 90 seconds long and consisted of 15 images; therefore, each picture was shown for six seconds. The slideshows were presented in a predetermined random order for each participant. To randomize stimulus presentation, each slideshow was randomly numbered and ordered based on a sequence of numbers generated by an online random number generator. Before the experiment began, the experimenter showed participants a slideshow of landscape images to establish a baseline vaginal photoplethysmograph reading. These landscape images were also taken from the Internet. No audio accompanied any of the presented slideshows and all presented images were
controlled for size, brightness, contrast, and colour. All image slideshows underwent pilot testing to ensure that they elicited a physical sexual response in women. In total, five pilot tests were run and all women demonstrated an increase in vasocongestion greater than half a standard deviation to at least one stimulus category.

Viewing time and/or our participants’ attention to the experimental stimuli was not assessed; however, no problems were noted during testing. All participants answered pre- and post- trial questions promptly after stimulus offset indicating that they were paying attention to the screen and the given instructions.

**Measures**

**Personal information.** Participants completed a questionnaire assessing age, romantic and sexual relationship status, education level, income, number of children, stated sexual identity, ethnicity, and employment status. The mean age was 21.86 years of age (SD = 4.38) with a range of 18 to 35 years. The majority was currently in a relationship (53.70%, n = 22) and the mean relationship length was 20 months (SD = 24.69). These relationships were reported to be both romantic and sexual in nature. Only 27.80% (n= 10) reported being single. The majority was of European descent (69.40%, n = 25) and had a university degree or was completing a university degree (75%, n = 27) at the time of participation. More than half (55.60%, n = 20) reported using hormonal contraceptives. Thirty women reported a heterosexual identity, two bisexual, two women reported that they do not use labels for sexual identity, and two more labeled their sexual identity as “other.”

**Sexual orientation.** We only recruited heterosexual women for this study. To ensure a heterosexual orientation, participants were asked to report their stated sexual
identity and sexual orientation was also measured using the Kinsey Sexual Attraction Scale (KSAS) (Kinsey et al., 1948; Kinsey et al., 1953). The KSAS (see Appendix 2) is a seven-point scale that allows participants to rate their relative attractions to and desires for men and/or women. The scale ranges from zero (exclusively attracted to opposite-gender) to six (exclusively homosexual, no heterosexual attraction). For the purposes of this study, only participants who identified as exclusively or predominantly heterosexual on the KSAS were included. From the 36 women who were recruited into this study, 34.10% (n = 14) of our sample classified themselves as exclusively heterosexual and 43.90% (n = 18) as predominantly heterosexual Two women self-identified as bisexual and their identifications were confirmed using the KSAS. Two more women were identified as bisexual using the KSAS; therefore, the genital and subjective data for these four bisexual participants were excluded from our analyses.

Procedure

The same female experimenter processed all participants and a script was followed to ensure each participant received the exact same instructions. All study materials and procedures were reviewed for ethical compliance by the Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board and received ethics approval.

Potential participants were oriented to the laboratory and the equipment. After a brief explanation of the procedure, methods, and apparatus, the woman was left alone to read the letter of information and sign the consent form (see Appendix 3). If the participant chose to take part in the study, she received a more detailed walkthrough of the experiment to better familiarize her to the testing room, equipment, and full
experimental procedure. The experimenter answered any questions participants had and addressed any outlying concerns. Once the participant was fully informed, the experimenter left her in the testing room to disrobe and insert the vaginal photoplethysmograph.

The testing room was dimly lit and featured a door that locked from the inside to ensure maximum privacy. The computer screen used to display the experimental stimuli was placed approximately four feet away from a comfortable reclining chair. Participants had a keypad to respond to the pre- and post-stimulus questions. The experimenter communicated with the participant via text messages displayed on the computer screen and the participant spoke to the experimenter through an intercom placed in the testing room.

Once the vaginal photoplethysmograph was in place, the experimenter established a baseline by presenting a neutral stimulus (images of natural landscapes). After the baseline was established, the participant was presented with the experimental stimuli consisting of 12 slideshows. Each participant saw two versions of each stimulus type (male prepotent, female prepotent etc). Before and after each slideshow, participants were presented with questions and answered these using a keypad. Participants continuously reported their subjective sexual arousal using the keypad while watching each experimental stimulus. Each slideshow was separated by a short period to allow the participant to return to their pre-trial baseline level. This short break was typically 120 seconds long; however, it varied depending on whether or not the participant’s genital responses returned to her pre-trial baseline. If the participant did not return to baseline, she was asked to complete a distraction task such as counting backwards or reading aloud
from a neutral-content magazine. After the sexual arousal assessment, participants completed the questionnaire (see Appendix 2 for full questionnaire), were debriefed (see Appendix 4 for debriefing form), and received $25 as monetary compensation for their time.

Data Reduction and Analysis

Given that each participant saw two different slideshows for each stimulus category, paired samples t-tests confirmed there were no significant differences in sexual arousal between the two slideshows in that category for all dependent variables (standardized genital arousal, percent increase genital arousal, subjective sexual arousal, and continuous self-reported arousal). There were no significant differences for any of the variables; therefore, the data was collapsed across exemplars to create one score for each stimulus category for each dependent variable.

Mean change in genital response for each stimulus was calculated by subtracting the pre-trial baseline genital response from the mean genital response for that trial. All resulting scores were standardized within subjects to control for individual differences in responding and maximize the discriminative validity of genital arousal assessment (see Harris, Rice, Quinsey, Chaplin, & Earls, 1992). Standardized z-scores are informative in that they indicate the pattern of genital arousal and the magnitude of sexual arousal relative to all other stimuli, but they do not inform us about the magnitude of genital arousal relative to baseline. Therefore, we also ran our analysis on physical sexual arousal expressed as a percent change from baseline. Both statistical techniques are widely used in sexual psychophysiology (Chivers et al., 2010). To calculate these
percent-increase scores, we subtracted the mean baseline for each trial from the mean genital response for each trial and divided this by the baseline for each trial.

For subjective sexual arousal, we calculated a difference score for each slideshow by subtracting the pre-trial arousal scores from the post-trial arousal scores. For continuous self-reported arousal, we first calculated a mean change score for each slideshow by subtracting the pre-trial baseline self-reported arousal from the trial mean self-reported arousal.

To test whether heterosexual women showed greater physiological sexual arousal and/or reported greater subjective sexual arousal to prepotent stimuli versus non-prepotent and neutral stimuli, we used a 2 [Gender (male, female)] X 3 [Potency (prepotent, non-prepotent, and neutral)] repeated-measures analysis of variance (ANOVA) on genital and subjective arousal data separately. For genital arousal, we predicted a significant main effect of potency such that sexual arousal would be highest for depictions of prepotent sexual stimuli, followed by non-prepotent sexual stimuli and that neutral images would lead to the least sexual arousal. For our subjective data, we predicted a significant main effect of stimulus category and we predicted the same pattern of results for our subjective data as our genital data for stimulus category. In line with past research, we further predicted a significant main effect of gender for the subjective arousal ratings. We also predicted a significant main effect of both gender and potency for continuous self-reported sexual arousal.
CHAPTER 3
Results

*Genital Responses*

Women’s vaginal responses were predicted to vary with the level of potency of the stimuli, such that sexual arousal would be highest for depictions of prepotent sexual stimuli, followed by non-prepotent sexual stimuli and that neutral images would lead to the least sexual arousal. To test this hypothesis, mean arousal difference to all types of stimuli were submitted to a 2 [Gender (male, female)] X 3 [Potency (prepotent, non-prepotent, neutral)] repeated-measures ANOVA. We ran the same repeated-measures ANOVA on percent increase over baseline data. The pattern of results was similar using both techniques and both sets of results are presented below. All descriptive statistics for genital arousal are presented in Table 1 and Figure 1.

Table 1

*Descriptive statistics for genital arousal data.*

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<tr>
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<th>Standardized genital data</th>
<th>Percent increase</th>
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<tr>
<td></td>
<td>Female stimuli</td>
<td>Male stimuli</td>
</tr>
<tr>
<td></td>
<td>Mean  SD</td>
<td>Mean  SD</td>
</tr>
<tr>
<td>Prepotent</td>
<td>0.09  0.54</td>
<td>1.06  0.77</td>
</tr>
<tr>
<td>Non-prepotent</td>
<td>-0.16  0.58</td>
<td>-0.08  0.49</td>
</tr>
<tr>
<td>Neutral</td>
<td>-0.51  0.71</td>
<td>-0.4  0.56</td>
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</table>

*Note:* Standardized genital arousal was calculated by, first, subtracting the pre-trial baseline genital response from the mean genital response for that trial and then standardizing these scores within subjects. Table shows z-scores for mean genital arousal difference scores. To calculate percent-increase from baseline, we subtracted the mean baseline for each trial from the mean genital response for each trial and divided this by the baseline for each trial. Data are shown in percent-increase from baseline. Table represents means for n = 30.
Standardized genital arousal was calculated by, first, subtracting the pre-trial baseline genital response from the mean genital response for that trial and then standardizing these scores within subjects. Figure shows z-scores for mean genital arousal difference scores. Error bars represent 95% confidence intervals. Figure represents means for n = 30.

For our standardized genital arousal data, a significant main effect of gender was identified, $F(1, 29) = 15.18, p = .001, \eta^2_p = .34$, as well as a significant main effect of stimulus potency, $F(2, 58) = 31.79, p < .001, \eta^2_p = .52$. A significant interaction between stimulus potency and gender was also found, $F(2, 58) = 10.05, p < .001, \eta^2_p = .26$. Pairwise comparisons revealed that heterosexual women experienced significantly greater genital arousal to male prepotent stimuli than female prepotent stimuli ($p < .001$), but there were no significant differences between male and female stimuli for any other level of potency (sexual non-prepotent or neutral). These results indicate that women demonstrated specificity of genital sexual arousal to prepotent sexual features but not to non-prepotent or neutral stimuli.
The same pattern of results emerged for percent increase data. We identified a significant main effect of gender, $F(1, 29) = 10.80, p < .05, \eta_p^2 = .27$, and a significant main effect of potency, $F(2, 58) = 30.79, p < .001, \eta_p^2 = .52$. We further identified a significant interaction between gender and potency, $F(2, 58) = 7.95, p = .001, \eta_p^2 = .22$. Pairwise comparisons revealed that heterosexual women showed specificity for our prepotent sexual stimuli exhibiting higher physical sexual arousal to male stimuli than female stimuli ($p = .001$), with women experiencing a 97% increase in genital arousal to the male prepotent stimuli and only a 42% increase to the female prepotent stimuli. There were no significant differences between male and female stimuli at any other levels of potency. Descriptive statistics for continuous self-reported sexual arousal are presented in Table 1 and Figure 2.

![Figure 2. Percent increase genital arousal for all stimulus categories. To calculate percent-increase from baseline, we subtracted the mean baseline for each trial from the mean genital response for each trial and divided this by the baseline for each trial. Data is shown in percent-increase and multiplying y-axis values by one hundred will inform the reader about the exact percent increase. Error bars represent 95% confidence intervals. Figure represents means for n = 30.](image-url)
Given our unexpected findings, we ran theoretically informed post-hoc comparisons to better understand our data. To control for familywise error but avoid being too conservative, we chose to run a multistage Bonferroni procedure (Howell, 2001) on six paired samples t-tests for genital arousal. Though we only tested three hypotheses with these t-tests, we ran the tests on both the standardized genital data and the percent increase data; therefore, a total of six t-tests were used. The first tests compared whether non-prepotent sexual stimuli led to significantly more sexual arousal than neutral stimuli. This comparison would inform us about whether non-prepotent sexual features lead to a significant increase in genital arousal. We compared whether genital arousal to female prepotent stimuli was significantly greater than genital arousal to the female non-prepotent sexual stimuli. This comparison would address whether depictions of vulvas led to more genital arousal in heterosexual women than pubic triangles. The third t-test compared genital arousal between the female prepotent sexual stimuli and male non-prepotent sexual stimuli. It was hypothesized that the vulva, being prepotent, leads to more genital arousal than the flaccid penis, explaining Chivers et al.’s (2007) counterintuitive finding where heterosexual women showed higher physical sexual arousal to nude females than nude males.

We used the Holm and Larzelere and Mulaik test (Howell, 2001) as our multistage Bonferroni procedure. For this procedure, we calculated $t'$ values for all comparisons and organized these scores in descending order (without regard for the sign). The significance of the test with the largest $t'$ was examined first and the $p$-value for that comparison had to be less than alpha divided the total number of t-tests conducted for that data set. We set our alpha at .05; therefore, our largest $t'$ needed a $p$-value that is less
than .008 (for the six post-hoc t-tests). The next largest $t'$ needed a $p$-value that is less than .05 divided by five (the remaining number of t-tests conducted), and we continued the procedure until all $p$-values have been systematically examined.

Our pairwise comparison found no significant difference across gender between the non-prepotent stimuli and the neutral stimuli for both standardized genital and percent increase data, allowing us to collapse genital arousal data to non-prepotent sexual stimuli and neutral stimuli across gender. Out of our total six t-tests for genital arousal, the test comparing percent increase genital arousal between non-prepotent sexual stimuli and neutral stimuli yielded the largest $t'$ and was significant at $t(29) = 3.32, p < .008$. Women showed significantly more genital sexual arousal to the non-prepotent stimuli than the neutral stimuli. Our next largest $t'$ compared standardized genital data between non-prepotent sexual stimuli and our neutral stimuli and this comparison was not significant, $t(29) = 2.53, p = .017$, (had to be at less than $p < .010$ to attain significance). None of the four remaining t-tests were significant, indicating that there was no significant difference in genital arousal between the female prepotent stimuli and the female non-prepotent sexual stimuli for either standardized genital data, $t(29) = 1.89, p = .069$, or percent increase data, $t(29) = .98, p = .331$, or between female prepotent stimuli and the male non-prepotent stimuli for percent increase data, $t(29) = 1.34, p = .191$, or standardized data, $t(29) = 1.16, p = .254$.

**Subjective sexual arousal.**

Subjective sexual arousal to male and female prepotent, non-prepotent and neutral stimuli was submitted to a 2 [Gender (male and female)] X 3 [Potency (prepotent, non-prepotent and neutral)] repeated-measures ANOVA. Results for subjective sexual arousal
followed a similar pattern as our genital responding data. Descriptive statistics for subjective sexual arousal are shown in Table 2 and Figure 3.

Table 2

*Descriptive statistics for subjective sexual arousal.*

<table>
<thead>
<tr>
<th></th>
<th>Mean difference</th>
<th>Continuous self-reported</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female stimuli</td>
<td>Male stimuli</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Prepotent</td>
<td>0.42</td>
<td>1.48</td>
</tr>
<tr>
<td>Non-prepotent</td>
<td>0.19</td>
<td>1.17</td>
</tr>
<tr>
<td>Neutral</td>
<td>-0.55</td>
<td>1.11</td>
</tr>
</tbody>
</table>

*Note:* Subjective sexual arousal was calculated by subtracting the pre-trial arousal scores from the post-trial arousal scores. Pre- and post-arousal scores could range from 0 (no sexual arousal) to 9 (most sexual arousal ever experienced). Mean difference scores are presented. Continuous self-reported sexual arousal could range from 0% (no sexual arousal) to 100% (most sexual arousal ever experienced). To obtain these scores, a mean change score for each slideshow was calculated by subtracting the pre-trial baseline continuous self-reported arousal from the mean continuous self-reported arousal. Mean difference scores are presented. For subjective sexual arousal n = 31 and for continuous self-reported arousal n = 29.
Figure 3. Subjective sexual arousal (calculated as the difference between reported pre and post trial arousal) for all stimulus categories. Subjective sexual arousal was calculated by subtracting the pre-trial arousal scores from the post-trial arousal scores. Pre- and post-arousal scores could range from 0 (no sexual arousal) to 9 (most sexual arousal ever experienced). Mean difference scores are presented. Error bars represent 95% confidence intervals. Figure presents means for n = 31.

As predicted for subjective sexual arousal, a significant main effect of gender was identified, $F(1, 30) = 50.51, p < .001, \eta_p^2 = .63$, with women reporting higher arousal to male stimuli. We further identified a significant main effect of potency, $F(2, 60) = 40.07, p < .001, \eta_p^2 = .57$, and a significant interaction between gender and potency, $F(2, 60) = 17.91, p < .001, \eta_p^2 = .33$. Pairwise comparisons revealed that, unlike with genital sexual arousal, subjective sexual arousal to male stimuli at all levels of potency was significantly higher than subjective sexual arousal to female stimuli (all $ps < .05$).

The same Bonferroni technique outlined above was used on our subjective sexual arousal data. Unlike with genital arousal, we could not collapse male and female data to
compare whether non-prepotent sexual stimuli led to significantly more subjective arousal than neutral stimuli because we found that subjective arousal to male stimuli was significantly higher than to female stimuli for all levels of potency. Because of this significant gender difference, we ran a total of three post-hoc paired-samples t-tests on subjective sexual arousal: two (one for male and one for female stimuli) to test whether subjective sexual arousal was higher to non-prepotent sexual stimuli than neutral stimuli and one to test whether subjective arousal to the female prepotent stimuli was greater than subjective arousal to the female non-prepotent sexual stimuli.

The t-test comparing subjective arousal to male non-prepotent sexual stimuli and male neutral stimuli yielded the largest $t'$ and was significant at, $t(31) = 4.02, p < .016$, with subjective arousal to the non-prepotent sexual stimuli being higher. The next largest $t'$ compared subjective arousal to the female non-prepotent and female neutral stimuli and this test was also significant at, $t(31) = 2.57, p < .025$, with subjective arousal being highest to female non-prepotent sexual stimuli. Finally, the t-test comparing subjective sexual arousal between the female prepotent sexual stimuli and the female non-prepotent sexual stimuli yielded the smallest $t'$ and was not significant, $t(31) = .68, p = .50$.

Mean continuous self-reported arousal change data for male and female prepotent, non-prepotent, and neutral stimuli were submitted to a 2 [Gender (male and female)] X 3 [Potency (prepotent, non-prepotent and neutral)]. Full descriptive statistics for continuous self-reported sexual arousal are presented in Table 2 and Figure 4.
Both a main effect of gender, $F(2, 31) = 37.57, p < .001, \eta^2_p = .55$, and potency, $F(2, 62) = 37.42, p < .001, \eta^2_p = .55$, were identified for continuous self-reported arousal. A significant interaction between gender and potency was once again identified, $F(2, 62) = 14.82, p < .001, \eta^2_p = .32$. As with pre-post trial subjective sexual arousal, pairwise comparisons revealed that, as with genital sexual arousal, only male prepotent stimuli yielded significantly more continuous self-reported sexual arousal than female prepotent stimuli ($p < .001$). There was no difference between male and female stimuli at any other level of potency.
Continuous self-reported arousal data were submitted to the same post hoc paired-samples t-tests and multistage Bonferroni as subjective sexual arousal data. As with subjective sexual arousal, we could not collapse continuous self-reported arousal data across genders because heterosexual women reported significantly higher subjective sexual arousal to male stimuli at all levels of potency. Our comparison with the highest $t'$ value was the comparison between female non-prepotent sexual stimuli and female neutral stimuli and it was significant, $t(28) = 2.91, p < .016$. The next largest $t'$ value was for the comparison between male non-prepotent sexual stimuli and male neutral stimuli and this comparison was also significant, $t(25) = 2.67, p < .025$. In other words, heterosexual women reported more arousal to the male and female non-prepotent sexual stimuli than the male and female neutral stimuli, respectively. The comparison between continuous self-reported sexual arousal to female prepotent sexual stimuli and non-prepotent sexual stimuli was not significant, $t(27) = .34, p = .73$.

CHAPTER 4

Discussion

The aim of this study was to understand the role of prepotent sexual features in heterosexual women’s nonspecific genital response. It was originally hypothesized that heterosexual women would show nonspecificity of genital arousal because they are responding to prepotent sexual features (erect penises and exposed vulvas) found in almost all sexual stimuli. Prepotent sexual features do not help explain female nonspecificity because we found specificity of genital arousal in heterosexual women in response to prepotent sexual features. Women in our sample showed higher genital arousal to depictions of male prepotent sexual stimuli than female prepotent stimuli. We
hypothesized that prepotent sexual features would lead to an automatic sexual response in heterosexual women because heterosexual women had been found to show higher genital arousal to nonsexual stimuli in which a woman occasionally exposed her vulva (a prepotent sexual feature) than to a stimulus where a man walked nude on a beach displaying his flaccid penis (a non-prepotent sexual feature) (Chivers et al., 2007). We directly tested this hypothesis and found that, for both standardized and percent increase genital data, an exposed vulva did not lead to more genital arousal than a flaccid penis. This finding further supports the idea that the presence of prepotent sexual features within sexual stimuli does not explain nonspecific genital responding in heterosexual women. Genital responding to non-prepotent sexual features (flaccid penises and pubic triangles) was found to be nonspecific in heterosexual women; however, when we collapsed data across genders, arousal to non-prepotent sexual features was significantly greater than genital arousal to neutral stimuli for percent increase data and very close to significance for standardized genital data.

Because past research has found heterosexual women’s subjective sexual arousal pattern to be somewhat category-specific (Chivers et al., 2004; Chivers & Bailey, 2005; Chivers et al., 2007), we predicted that heterosexual women would report higher subjective sexual arousal to the male stimuli than female stimuli. This hypothesis was confirmed, with heterosexual women reporting higher subjective sexual arousal to male stimuli than female stimuli at all levels of potency. On the other hand, continuous self-reported arousal was only higher for male stimuli for prepotent features but there was no difference in arousal between male and female stimuli at any other level of potency. It remains unclear why these two techniques lead to different results. For both subjective
sexual arousal and continuous self-reported arousal, women reported significantly more sexual arousal to the male and female non-prepotent stimuli than the male and female neutral stimuli. We found no difference in subjective sexual arousal or continuous self-reported arousal between female prepotent features and female non-prepotent features.

We originally hypothesized that exposed and aroused genitals were prepotent, and defined a prepotent stimulus as one that yields an automatic sexual response in women. By being the first study to examine genital and subjective sexual arousal to images that only depicted genitals, we were able to directly test the potency of sexual features. Surprisingly, women in our sample showed significantly greater genital sexual arousal to our non-prepotent stimuli than our neutral stimuli, indicating that these features are, in fact, prepotent\(^1\). In other words, images of nude non-prepotent genitals are enough to make a stimulus sexually competent for heterosexual women and trigger an automatic genital response. For both subjective and continuous self-reported sexual arousal, women reported higher arousal to the male and female non-prepotent stimuli than to the neutral stimuli. These results indicate that depictions of non-prepotent genitals are enough to make a stimulus sexually competent at the subjective level as well. Our original hypothesis that aroused genitals are prepotent sexual features has not been supported because unaroused and concealed genitals were also found to lead to a significant increase in genital arousal in heterosexual women.

This finding is in contrast to that of Chivers et al. (2007) who found that heterosexual women did not show greater genital or subjective sexual arousal to a film segment depicting a nude male than to neutral film clips. If genitals are sufficient to make

\(^1\) Note that, for clarity, we will continue to refer to non-prepotent sexual features as non-prepotent despite this finding.
a stimulus sexually competent for heterosexual women, but Chivers et al. (2007) found no increased sexual arousal in heterosexual women to a stimulus depicting a nude male, one must conclude that other information presented within the Chivers et al. (2007) stimulus was more relevant to sexual response for heterosexual women than depictions of male genitals in establishing how sexually arousing the stimulus was. Chivers et al. (2007) presented women with a film clip of a nude male walking on the beach, whereas the present study simply showed images of genitals. The video stimuli used in Chivers et al. (2007) provided more context than our images and it is possible that the extra information (the beach, the model’s body language, etc.) informed women that the situation was not sexual, leading women to experience less sexual arousal. Given that the stimuli used in the current study lacked context it is possible that women ascribed more sexual meaning to the images than if the genitals had been placed in a broader nonsexual context as they were in Chivers et al. (2007).

This study found that genital arousal to exposed vulvas was not significantly higher than genital arousal to flaccid penises; therefore, the increased arousal identified by Chivers et al. (2007) could not be solely accounted for by the presence of a prepotent sexual feature. Furthermore, if the nonsexual context of the nude male film presented by Chivers et al. (2007) inhibited sexual response in heterosexual women one must examine whether the information present in the female nude stimuli could have informed women of a sexual context leading to increased sexual arousal. In fact, the female nude stimuli presented by Chivers et al. (2007) establishes a more sexual context than the film clip depicting the nude male stimuli because the actress performing the aerobics moved sensually and stared lustfully into the camera. It is likely that these secondary cues
sexualized the stimuli, whereas the stimuli depicting a nude male walking on the beach lacked overtly sexual cues, setting up a relatively neutral context despite the presence of nudity. It is likely that women’s increased genital response to the female nude stimuli is related more to the sexualized context than the presence of prepotent sexual features.

There is evidence that contextual cues are more important than gender cues for sexual arousal in heterosexual women. Chivers et al. (2007) showed that sexual activity cues presented within sexual stimuli are more important than gender cues for heterosexual women’s genital sexual arousal. For heterosexual women, genital responding significantly increased as the sexual activity became more explicit. Chivers and Timmers (in press) recently examined genital and subjective sexual arousal in women who listened to erotic audio narratives varying by sexual activity described (no sexual interaction described and sexual interaction described), gender (interaction described with a male or a female), and relationship status (interaction was described with a long-term partner, friend or stranger). Surprisingly, women showed significantly less genital responding to sexual stories describing sex with a friend than sexual stories with long-term partners or strangers. This effect was identified for stories that described activities with men and women, meaning that women also demonstrated nonspecificity of genital sexual arousal to audio stories. Relationship cues had no significant effect on male genital responding. These findings suggest that relationship status cues are more important than gender cues for heterosexual women’s genital responding. The current study’s findings suggest that when stimulus intensity is low and stimuli lack contextual cues, heterosexual women increasingly rely on gender cues for genital and subjective arousal.
Although we identified a main effect of potency for genital, subjective, and continuous self-reported sexual arousal in heterosexual women, such that prepotent sexual features led to more arousal than non-prepotent sexual stimuli and neutral stimuli, an exposed vulva was not equivalent to an erect penis for heterosexual women. For all dependent variables, arousal to the erect penis was significantly greater than arousal to the exposed vulva but images of exposed vulvas were not more arousing than images of flaccid penises or pubic triangles. This suggests that an erect penis is somehow different from the other sexual features to heterosexual women.

Findings from the field of neuroscience may help elucidate the present findings. Ponseti et al. (2006) showed men and women images of male and female aroused genitals and examined brain activation. Congruent with our pattern of genital and subjective sexual arousal, women demonstrated greater brain activity when viewing their preferred gender’s genitals; similarly, only viewing images of their preferred gender led to activation of the ventral premotor cortex, an area is involved in imitative and tool-related tasks. This suggests that viewing the genitals of one’s preferred gender, “triggers action representations of sexual behaviour” (Ponseti et al., 2006, p. 825) within an individual. This line of research suggests that an erect penis is a powerful sexual cue to heterosexual women because of the action it embodies and sexual potential it represents. The images Ponseti et al. (2006) showed their participants were all of prepotent genitals; therefore, it is possible that we did not identify specificity of arousal to the non-prepotent sexual stimuli because they do not represent the potential of sex as powerfully as prepotent sexual features. Non-prepotent sexual features may lead to an automatic genital

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2 Note that these exact images were all included in our prepotent stimulus set.
response in women but the potential for sex present in images of erect penises is far less ambiguous, perhaps leading to increased genital responding in heterosexual women.

According to the Information Processing Model of Sexual Arousal (Geer et al., 1993; Janssen et al., 2000), sexual arousal is the result of a complex interplay between physiological, psychological and behavioural variables (Rosen & Beck, 1988). This model divides information processing into two stages: appraisal and response generation (Geer et al., 1993; Janssen et al., 2000). Appraisal gives meaning to stimuli and begins the process of encoding the stimuli and matching it to past memories. Response generation is described as an “integrative stage” (Janssen et al., 2000, p. 9) where meaning is connected to motor plans. Past research has found that genital responding occurs quickly following stimulus initiation (Van Lunsen & Laan, 2004; Chivers, 2005) and that genital responding is easily elicited despite unfavourable conditions such as anxiety and distraction (Heiman & Rowland, 1983; Sakheim et al., 1987; Cranston-Cuebas & Barlow, 1990; Laan & Everaerd, 1995). This suggests that, as with fear, the connection between stimulus and response for sexual arousal is likely to be biologically prepared and much of appraisal and response generation must occur at a preattentive level or automatically, without cognitive elaborations (Geer et al., 1993; Janssen et al., 2000).

Using the Information Processing Model of Sexual Arousal (Geer et al., 1993; Janssen et al., 2000) as a framework, it is possible that when an individual is exposed to sexual stimuli, certain cues are automatically processed and lead to genital arousal. Geer et al. (1993) explain that because humans are constantly bombarded with stimuli in their environment, there must exist cognitive biases that ensure that we do not process and
respond to all stimuli. With sexual stimuli, one must first determine whether a stimulus is sexual or not (Geer et al., 1993, Jansen et al., 2000). This appraisal must be preattentive and automatic. Further, the cues that inform whether a stimulus is sexual must be highly prepared. Depictions of nude genitals are most likely automatically processed when women are exposed to sexual stimuli and inform the viewer that the stimuli may be sexual in nature, leading to automatic genital response and the allocation of attentional resources to the stimulus. It is possible that for heterosexual women, nonspecificity originates at this higher level of processing when one can elaborate on other cues such as relationship status cues or level of sexual activity (Chivers et al., 2007; Chivers & Timmers, in press). If this is the case, it would explain why past research using clips from pornographic films, typically laden with sexual context, has consistently identified nonspecificity of genital arousal in heterosexual women (Laan et al., 1995; Chivers et al., 2004; Chivers & Bailey, 2005; Chivers et al., 2007; Chivers, 2010). Further elaboration may also lead to the dissipation or inhibition of sexual arousal if contextual cues inform the viewer that the situation is nonsexual despite the presence of genitals. This would explain why heterosexual women did not show increased genital arousal to the male nude stimuli in Chivers et al. (2007).

Limitations.

The most important limitation of this study is the lack of a comparison group in our experimental design. Because we did not show our stimuli to another group of individuals, it is impossible to assess whether we have truly identified specificity of arousal in heterosexual women or whether our stimuli would yield a similar pattern of arousal in a comparison group such as lesbian women, gay men or straight men. It is
possible that an erect penis is an important sexual feature that would yield genital arousal in most individuals.

Given the lack of context shown in our stimuli, it is possible that participants read a sexual context into the images due to the nature of our laboratory and research program. Women were invited to partake in sexuality research and may have entered the scenario heavily primed for sex. Perhaps women experienced more or reported more arousal due to this priming. It is also possible that women projected sexual meaning to the genitals presented because they were taking part in a sexuality study, whereas viewing the same images may be less sexualized in a more neutral environment. Nonetheless, it is unlikely that this priming would affect the pattern of results observed in this study.

There is an inherent volunteer bias in sexuality research; participants in sexuality studies have been found to hold more liberal attitudes and had more experience with erotica (Wolchik, Spencer, & Lisi, 1983; Wolchik, Braver, & Jensen, 1985). Specifically, women who participate in sexual psychophysiology studies report more frequent masturbation and oral sex, and less sexual inhibition (Wolchik et al., 1983; Morokoff, 1985). It is possible, for example, that higher pornography consumption or more sexual experience affects one’s responses to images of genitals such that genitals may be less arousing. On the other hand, research has shown that women who are high in sex guilt and low in sexual experience show higher genital responsiveness than women with high sexual experience (Morokoff, 1985). Chivers et al. (2004) found that the pattern of nonspecificity was unaffected by variables which distinguish sexual psychophysiology research participants from non-participants. It is possible that these variables could affect
the magnitude of responding but it is unlikely that they influence the pattern of results captured within our sample.

Generalizability is also a problem due to the laboratory setting. Bloemers et al. (2010) found that genital and subjective arousal response is higher at home than in an institutional setting for healthy women. It remains unclear whether this finding suggests that women experience enhanced sexual response at home or whether being in a laboratory setting reduces sexual arousal. It is possible that response to genitals would be even higher if women were exposed to the stimuli at home. This is a limitation for most sexual psychophysiological research that is unlikely to affect the pattern of results identified.

Future directions.

The most important future direction would be to record genital and subjective arousal to this set of stimuli in other groups of individuals. It is important to know if lesbian women or gay men show the same pattern of arousal as heterosexual women. Further, it would be interesting to see if heterosexual men maintain their category-specificity when looking at genitals without context. Perhaps the erect penis is a powerful sexual cue regardless of orientation or gender.

It would be important to understand whether an erect penis is more important for sexual arousal in heterosexual women or whether context is more powerful. A future study could present heterosexual women with images of erect penises in sexual and nonsexual contexts to examine whether women would show increased genital arousal. If contextual cues are more important to heterosexual women, one would predict increased genital arousal to depictions of erect penises in nonsexual contexts. A comparison group
such as lesbians or gay and straight men would also be useful in such a study to ensure results could be attributed to heterosexual women alone or whether a similar pattern could be observed in other groups.

This is the first study to demonstrate specificity of genital responding with respect to gender in heterosexual women. Because this finding is novel it would benefit from replication. Beyond replication, the next step would be to gradually introduce more information in the stimulus presented to heterosexual women to identify when genital responding becomes nonspecific. A future study could examine genital and subjective sexual arousal to full nudes that depict prepotent sexual features and non-prepotent sexual features. It would be interesting to know whether heterosexual women’s genital responding remains category-specific once secondary sex characteristics (such as breasts, pectorals, or hips) are depicted at the same time as prepotent and non-prepotent stimuli and whether differences in responding still exist between prepotent and non-prepotent sexual features once new information is added to the stimuli.

CHAPTER 5

Conclusions

Research has found that heterosexual women sexually respond to both preferred and non-preferred sexual stimuli. This study hypothesized that perhaps heterosexual women show this pattern of genital arousal due to the presence of prepotent sexual features within almost all sexual stimuli. This hypothesis was not supported as we found specificity of genital arousal in heterosexual women to images of prepotent sexual features, with women showing higher genital arousal to the male prepotent stimuli than to the female prepotent stimuli. Heterosexual women in our sample showed increased
genital arousal to non-prepotent sexual features indicating that the presence of nude unaroused genitals is enough to make a sexual stimulus competent for women. In line with past research, heterosexual women in our sample reported specificity of subjective sexual arousal, reporting higher arousal to the male stimuli than the female stimuli for all levels of potency.

This is the first study to identify specificity of genital arousal in heterosexual women and the first to establish that the sight of human genitals is enough to elicit a genital response in heterosexual women. Taken together with findings from past research (Chivers et al., 2007; Chivers & Timmers, in press), the results of the current study suggest the importance of context in heterosexual women’s sexual arousal response. The findings of this study have important implications for our understanding of the cognitive processes that underlie sexual arousal in heterosexual women.
References


Appendix 1: List of pre- and post-trial questions

Pre-trial questions.
1. How sexually aroused do you feel?
2. How strong are your genital sensations?
3. How strong is your desire for sex with a partner?
4. How strong is your desire to masturbate?
5. How interested do you feel?
6. How happy do you feel?
7. How relaxed do you feel?
8. How bored do you feel?
9. How anxious do you feel?
10. How disgusted do you feel?

Post-trial questions.
1. How high was your sexual arousal during the picture slideshow?
2. How strong are your genital sensations?
3. How strong is your desire for sex with a partner?
4. How strong is your desire to masturbate?
5. How much attention did you pay to the picture slideshow?
6. How happy did you feel while watching the picture slideshow?
7. How interested did you feel while watching the picture slideshow?
8. How relaxed did you feel while watching the picture slideshow?
9. How bored did you feel while watching the picture slideshow?
10. How anxious did you feel while watching the picture slideshow?
11. How disgusted did you feel while watching the picture slideshow?
12. How sexually arousing was the picture slideshow?
Appendix 2: Full research questionnaire

Turmeric Questionnaire

This questionnaire asks about your personal information, sexual orientation, sexual experiences, sexual attitudes, typical sexual responses to sexual stimuli, and personality characteristics as an adult (since age 18). Each section has directions, in bold type, on how to answer the questions. Please read the directions and questions carefully, and either place a checkmark in the circle of the answer that most applies to you, write your answer in the space provided, or circle the number that most applies to you.

If a question does not apply to you, please write NA (not applicable) in the space provided. If you do not feel comfortable answering a question, please draw a slash through it and go to the next question.

When you have finished answering the questionnaire, please put it in the envelope provided. Remember, all of your answers are completely confidential and identified by a participant number only. Your name cannot be linked to your responses. Please answer as honestly as possible.

PLEASE DO NOT WRITE IN THIS AREA

Participant ID #: _______________________
Date Completed: _______________________
Initials of Experimenter: ______________
Date Data Entered: ____________________
The following questions ask about your personal information. Please read each question carefully and either place a checkmark in the circle of the answer that best describes you, or write your answer in the space provided. Remember, all of your answers are completely confidential.

1. Age: ___________________
2. Date of birth (DD/MM/YY): ______________________
3. Relationship status:
   1. Single
   2. Married
   3. Dating
   4. Common Law
   5. Engaged
   6. Divorced
   7. Widowed
4. If you are currently in a relationship please state the length of that relationship: ________ years OR _______ months
5. How many children do you have? _____________
6. Ethnic origin: African Asian European First Nations Hispanic Other (please specify) _____________
7. Highest level of education completed:
   1. Completed Grade 8
   2. Some high school completed (grades 9-11)
   3. Graduated from high school, or equivalent
   4. Vocational, trade or business school completed
   5. Community college – currently attending or completed diploma
   6. University – currently attending or completed bachelor’s degree
   7. Graduate/professional school (MA, PhD, MBA, MD): attending or completed degree
8. Are you currently employed at a paid job?
   1. Yes, full-time
   2. Yes, part-time
   a. If yes, what is your current position/title? __________________________
   3. No, full-time homemaker
   4. No, retired
   5. No, full-time student
   6. No, currently unemployed
9. Did you use any of the following substances or beverages today? Please check all that apply.
   • Beverage containing caffeine (e.g., coffee, tea, Coke, Mountain Dew)
   • Alcohol
   • Marijuana
   • Tobacco
   • Other recreational drug
   • I used none of these substances
10. Do you engage in regular physical activity? Yes No
11. If Yes, how many times per week? __________________
12. Did you engage in physical exercise today? Yes No
13. If Yes, how many hours did you exercise before coming into the laboratory today? ________
14. Did you take any medications today? Yes No
15. If Yes please list: ______________________________________________________
16. Do you currently use hormonal contraceptives? Yes No
17. If yes, please list the name here ___________________________________________
18. How long (in days), on average, is your monthly cycle? (From the beginning of one period to the next?) ________ days
19. How many days do you typically menstruate/bleed for? ________ days
20. What was the date for the first day you started menstruating from your last menstrual period? (e.g., June 27). If you know the day of the week but are not sure about the correct date, please look at the calendar on the table.
   ______ (day) _______ (month)
21. Are you currently pregnant? Yes No

The following questions ask about your romantic and sexual attractions, sexual contacts, and sexual identity, in adulthood (since age 18). Please read each question carefully and read the options presented after each question. Please check the circle next to the response that best describes you.
Remember, all of your answers are completely confidential.

1. Please think about the people you have typically been romantically attracted to. By “romantically” attracted we mean a deep emotional connection that is more than friendship.
   Would you say that your romantic attractions are toward:
   1. Women only
   2. Women mostly, but men occasionally too
   3. Women mostly, but men frequently (but not more than toward women)
   4. Women and men about equally
   5. Men mostly, but women frequently (but not more than toward men)
   6. Men mostly, but women occasionally too
   7. Men only

2. Please think about the people you have typically been sexually attracted to. By “sexually” attracted we mean you experience sexual desire or interest in someone. Would you say that your sexual attractions are toward:
   1. Women only
   2. Women mostly, but men occasionally too
   3. Women mostly, but men frequently (but not more than toward women)
   4. Women and men about equally
   5. Men mostly, but women frequently (but not more than toward men)
   6. Men mostly, but women occasionally too
   7. Men only

3. Please think about the people you typically have sexual fantasies about. By a “sexual fantasy” we mean sexual scenarios or daydreams you think about, and may use when masturbating and/or having sex with a partner. Would you say your sexual fantasies are
about:
  1. Women only
  2. Women mostly, but men occasionally too
  3. Women mostly, but men frequently (but not more than about women)
  4. Women and men about equally
  5. Men mostly, but women frequently (but not more than about men)
  6. Men mostly, but women occasionally too
  7. Men only

4. Now, please think about having sexual contact with a man. How sexually interested or excited do you feel by the thought of having sex with a man?
   1. Extremely
   2. Definitely
   3. Somewhat
   4. A little bit
   5. Not at all

5. Keep thinking about having sexual contact with a man. How “turned-off” or disgusted do you feel by the idea of having sex with a man?
   1. Extremely
   2. Definitely
   3. Somewhat
   4. A little bit
   5. Not at all

6. Now, please think about having sexual contact with a woman. How sexually interested or excited do you feel by the thought of having sex with a woman?
   1. Extremely
   2. Definitely
   3. Somewhat
   4. A little bit
   5. Not at all

7. Keep thinking about having sexual contact with a woman. How “turned off” or disgusted do you feel by the idea of having sex with a woman?
   1. Extremely
   2. Definitely
   3. Somewhat
   4. A little bit
   5. Not at all

8. Please check any of the following labels that you currently use to think about yourself.
   • Heterosexual
   • Lesbian or gay
   • Bisexual
   • Queer
   • Other __________
   • I do not use a label

The following questions ask about your sexual experiences and sexual responses in adulthood. Please read each question carefully and either
check the circle that best describes you, or write your answer in the space provided. By “sexual contact” we mean consensual contact with you or your partner’s genitals, such as manual, oral, or penetration sex. Remember, all of your answers are completely confidential.

1. Have you ever had sexual contact with a man? Yes No
2. If yes, with how many men have you had sexual contact? __________
3. How old were you when you first had sexual contact with a man? __________
4. Have you ever had sexual contact with a woman? Yes No
5. If yes, with how many women have you had sexual contact? __________
6. How old were you when you first had sexual contact with a woman? __________
7. Are you romantically or sexually involved with anyone right now? Yes No
8. If “yes,” check ALL of the following that apply to your situation
   • I am romantically involved with one person.
   • I am sexually involved with one person.
   • I am romantically involved with more than one person.
   • I am sexually involved with more than one person.
   • I am married.
   • I consider myself to be in a committed, lasting relationship.
9. If you are involved with one person right now, is this person…
   1. Male
   2. Female
   3. Transgender (born female)
   4. Transgender (born male)
10. If you are involved with more than one person right now, are these individuals… (check all that apply)
    1. Male
    2. Female
    3. Transgender (born female)
    4. Transgender (born male)
11. How often do you look at sexual pictures or films? (please select only one)
    1. I have never seen sexual pictures or films
    2. I have seen sexual pictures or films once or twice but do not use them regularly
    3. Less than once per month Several times a week
    4. Once per month
    5. Once per week
    6. Once a day
    7. Several times a day
12. How often do you read sexual stories? (please select only one)
    1. I have never read sexual stories
    2. I have read sexual stories once or twice but do not use them regularly
    3. Less than once per month Several times a week
    4. Once per month
    5. Once per week
    6. Once a day
    7. Several times a day
For questions 16 through 29, please consider an average month from the past year.

16. How many times, per month, do you typically desire sexual contact with a partner? _____

17. How many times, per month, do you typically have sexual contact with a partner? _____

18. How often do you usually reach orgasm during penile-vaginal sexual intercourse with a man? If you haven’t had sexual intercourse with a man in the past year, consider your past sexual contacts with men when answering this question.
   1. Never
   2. Rarely (between 1% and 20% of sexual contacts)
   3. Fairly often (between 21% and 40% of sexual contacts)
   4. Often (between 41% and 60% of sexual contacts)
   5. Usually (between 61% and 80% of sexual contacts)
   6. Almost always (between 81% and 99% of sexual contacts)
   7. Always (100% of sexual contacts)
   8. Never had sexual intercourse with a man

19. How often do you usually reach orgasm when a man performs oral sex on you? If you haven’t had oral sex with a man in the past year, consider your past sexual contacts with men when answering this question.
   1. Never
   2. Rarely (between 1% and 20% of sexual contacts)
   3. Fairly often (between 21% and 40% of sexual contacts)
   4. Often (between 41% and 60% of sexual contacts)
   5. Usually (between 61% and 80% of sexual contacts)
   6. Almost always (between 81% and 99% of sexual contacts)
   7. Always (100% of sexual contacts)
   8. Never had a man perform oral sex on me

20. How often do you usually reach orgasm when your vagina is penetrated by a woman? Penetration could be with fingers or a dildo. If you haven’t had sexual intercourse with a woman in the past year, consider your past sexual contacts with women when answering this question.
   1. Never
   2. Rarely (between 1% and 20% of sexual contacts)
   3. Fairly often (between 21% and 40% of sexual contacts)
   4. Often (between 41% and 60% of sexual contacts)
   5. Usually (between 61% and 80% of sexual contacts)
   6. Almost always (between 81% and 99% of sexual contacts)
   7. Always (100% of sexual contacts)
   8. Never had my vagina penetrated by a woman

21. How many days or hours has it been since you last had sexual contact (manual, oral, or penetration sex) with a partner? _____ days OR _____ hours
22. How many days or hours has it been since you last masturbated? ____ days OR ____ hours
23. How many times, per month, do you typically masturbate? _______
24. How often do you usually reach orgasm when a woman performs oral sex on you? If you haven’t had oral sex with a woman in the past year, consider your past sexual contacts with women when answering this question.
   1. Never
   2. Rarely (between 1% and 20% of sexual contacts)
   3. Fairly often (between 21% and 40% of sexual contacts)
   4. Often (between 41% and 60% of sexual contacts)
   5. Usually (between 61% and 80% of sexual contacts)
   6. Almost always (between 81% and 99% of sexual contacts)
   7. Always (100% of sexual contacts)
   8. Never had a woman perform oral sex on me
25. How often do you reach orgasm when you masturbate?
   1. Never
   2. Rarely (between 1% and 20%)
   3. Fairly often (between 21% and 40%)
   4. Often (between 41% and 60%)
   5. Usually (between 61% and 80%)
   6. Almost always (between 81% and 99%)
   7. Always (100%)
   8. I do not masturbate
26. How often do you find yourself thinking about sex with interest or desire?
   1. Never
   2. Less than once per month
   3. Once per month
   4. Once per week
   5. Several times a week
   6. Once per day
   7. Several times per day
27. How often do you have trouble becoming or staying mentally sexually aroused?
   1. Never
   2. Less than half of the time
   3. About half of the time
   4. More than half of the time
   5. All the time
28. How often do you have trouble becoming or staying physically sexually aroused?
   Never
   1. Less than half of the time
   2. About half of the time
   3. More than half of the time
   4. All the time
29. How happy are you with the quality of your sex life? By “sex life” we mean all your sexual outlets, both with partners and without.
1. Very happy  
2. Somewhat happy  
3. Very unhappy  
4. Somewhat unhappy  
5. Neutral – neither happy nor unhappy  

These questions ask about your sexual feelings and responses during the past 4 weeks.  
Please answer the following questions as honestly and clearly as possible. Your responses will be kept completely confidential. In answering these questions the following definitions apply:  

Sexual activity can include caressing, foreplay, masturbation, oral sex and vaginal intercourse.  
Sexual intercourse is defined as penetration (entry) of the vagina.  
Sexual stimulation includes situations like foreplay with a partner, self-stimulation (masturbation), or sexual fantasy.  

CHECK ONLY ONE BOX PER QUESTION  

Sexual desire or interest is a feeling that includes wanting to have a sexual experience, feeling receptive to a partner’s sexual initiation, and thinking or fantasizing about having sex.  
1. Over the past 4 weeks, how often did you feel sexual desire or interest?  
   1. Almost always  
   2. Most times (more than half the time)  
   3. Sometimes (about half the time)  
   4. A few times (less than half the time)  
   5. Almost never or never  

2. Over the past 4 weeks, how would you rate your level (degree) of sexual desire or interest?  
   1. Very high  
   2. High  
   3. Moderate  
   4. Low  
   5. Very low or none at all  

Sexual arousal is a feeling that includes both physical and mental aspects of sexual excitement. It may include feelings of warmth or tingling in the genitals, lubrication (wetness), or muscle contractions.  

3. Over the past 4 weeks, how often did you feel sexually aroused (“turned on”) during sexual activity or intercourse?  
   1. No sexual activity  
   2. Almost always or always
3. Most times (more than half the time)
4. Sometimes (about half the time)
5. A few times (less than half the time)
6. Almost never or never

4. Over the past 4 weeks, how would you rate your level of sexual arousal (“turn on”) during sexual activity or intercourse?
   1. No sexual activity
   2. Very high
   3. High
   4. Moderate
   5. Low
   6. Very low or none at all

5. Over the past 4 weeks, how confident were you about becoming sexually aroused during sexual activity or intercourse?
   1. No sexual activity
   2. Very high confidence
   3. High confidence
   4. Moderate confidence
   5. Low confidence
   6. Very low or no confidence

6. Over the past 4 weeks, how often have you been satisfied with your arousal (excitement) during sexual activity or intercourse?
   1. No sexual activity
   2. Almost always or always
   3. Most times (more than half the time)
   4. Sometimes (about half the time)
   5. A few times (less than half the time)
   6. Almost never or never

7. Over the past 4 weeks, how often did you become lubricated (“wet”) during sexual activity or intercourse?
   1. No sexual activity
   2. Almost always or always
   3. Most times (more than half the time)
   4. Sometimes (about half the time)
   5. A few times (less than half the time)
   6. Almost never or never

8. Over the past 4 weeks, how difficult was it to become (“wet”) during sexual activity or intercourse?
   1. No sexual activity
   2. Extremely difficult or impossible
   3. Very difficult
   4. Difficult
   5. Slightly difficult
6. Not difficult
9. Over the past 4 weeks, how often did you **maintain** your lubrication (“wetness”) until completion of sexual activity or intercourse?
   1. No sexual activity
   2. Almost always or always
   3. Most times (more than half the time)
   4. Sometimes (about half the time)
   5. A few times (less than half the time)
   6. Almost never or never
10. Over the past 4 weeks, how **difficult** was it to maintain your lubrication (“wetness”) until completion of sexual activity or intercourse?
    1. No sexual activity
    2. Extremely difficult or impossible
    3. Very difficult
    4. Difficult
    5. Slightly difficult
    6. Not difficult
11. Over the past 4 weeks, when you had sexual stimulation or intercourse, how **often** did you reach orgasm (climax)?
    1. No sexual activity
    2. Almost always or always
    3. Most times (more than half the time)
    4. Sometimes (about half the time)
    5. A few times (less than half the time)
    6. Almost never or never
12. Over the past 4 weeks, when you had sexual stimulation or intercourse, how **difficult** was it for you to reach orgasm (climax)?
    1. No sexual activity
    2. Extremely difficult or impossible
    3. Very difficult
    4. Difficult
    5. Slightly difficult
    6. Not difficult
13. Over the past 4 weeks, how **satisfied** were you with your ability to reach orgasm (climax) during sexual activity or intercourse?
    1. No sexual activity
    2. Very satisfied
    3. Moderately satisfied
    4. About equally satisfied and dissatisfied
    5. Moderately dissatisfied
    6. Very dissatisfied
14. Over the past 4 weeks, how **satisfied** have you been with the amount of emotional closeness during sexual activity between you and your partner?
    1. No sexual activity
2. Very satisfied
3. Moderately satisfied
4. About equally satisfied and dissatisfied
5. Moderately dissatisfied
6. Very dissatisfied

15. Over the past 4 weeks, how **satisfied** have you been with your sexual relationship with your partner?
   1. Very satisfied
   2. Moderately satisfied
   3. About equally satisfied and dissatisfied
   4. Moderately dissatisfied
   5. Very dissatisfied

16. Over the past 4 weeks, how **satisfied** have you been with your overall sexual life?
   1. Very satisfied
   2. Moderately satisfied
   3. About equally satisfied and dissatisfied
   4. Moderately dissatisfied
   5. Very dissatisfied

17. Over the past 4 weeks, how **often** did you experience discomfort or pain during vaginal penetration?
   1. Did not attempt intercourse/vaginal penetration
   2. Almost always or always
   3. Most times (more than half the time)
   4. Sometimes (about half the time)
   5. A few times (less than half the time)
   6. Almost never or never

18. Over the past 4 weeks, how **often** did you experience discomfort or pain following vaginal penetration?
   1. Did not attempt intercourse/vaginal penetration
   2. Almost always or always
   3. Most times (more than half the time)
   4. Sometimes (about half the time)
   5. A few times (less than half the time)
   6. Almost never or never

19. Over the past 4 weeks, how would you rate your **level** (degree) of discomfort or pain during or following vaginal penetration?
   1. Did not attempt intercourse/vaginal penetration
   2. Very high
   3. High
   4. Moderate
   5. Low
   6. Very low or none at all
The questions below ask about things that might affect your sexual arousal. Other ways that we refer to sexual arousal are feeling “turned on”, “sexually excited”, and “being in a sexual mood”. Women describe their sexual arousal in many different ways. These can include genital changes (being “wet”, tingling sensations, feelings of warmth, etc.) as well as non-genital sensations (increased heart rate, temperature changes, skin sensitivity, etc.) or feelings (anticipation, heightened sense of awareness, feeling “sexy” or “sexual”, etc.).

We are interested in what would be the most typical reaction for you now. You may read a statement that you feel does not apply to you, or may have applied to you in the past but doesn’t now. In such cases please indicate how you think you would respond, if you were currently in that situation. Some of the questions sound very similar but are in fact different. Please read each statement carefully and then circle the letter to indicate your answer. Don’t think too long before answering. Please give your first reaction to each question.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If I think that a partner might hurt me emotionally, I put the brakes on sexually.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. It turns me on if my partner “talks dirty” to me during sex.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Having sex in a different setting than usual is a real turn on for me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. If it is possible someone might see or hear us having sex, it is more difficult for me to get aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Someone doing something that shows he/she is intelligent turns me on.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Feeling overpowered in a sexual situation by someone I trust increases my arousal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. I find it harder to get sexually aroused if other people are nearby.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. If I see a partner interacting well with others, I am more easily sexually aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. If I am concerned about being a good lover, I am less likely to become aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>Rating</td>
<td>1</td>
<td>2</td>
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<td>---</td>
<td>--------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>10</td>
<td>Seeing a partner doing something that shows his/her talent can make me very sexually aroused.</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>It would be hard for me to become sexually aroused with someone who is involved with another person.</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>Eye contact with someone I find sexually attractive really turns me on.</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>I get really turned on if I think I may get caught while having sex.</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>If I think that I am being used sexually it completely turns me off.</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>Seeing an attractive partner’s naked body really turns me on.</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>It is easier for me to become aroused with someone who has “relationship potential.”</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>17</td>
<td>Just being physically close with a partner is enough to turn me on.</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>If I think about whether I will have an orgasm, it is much harder for me to become aroused.</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>19</td>
<td>I get very turned on when someone really wants me sexually.</td>
<td></td>
<td>1</td>
<td>2</td>
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<tr>
<td>20.</td>
<td>Fantasizing about sex can quickly get me sexually excited.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>21.</td>
<td>If I am uncertain about how my partner feels about me, it is harder for me to get aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>22.</td>
<td>Particular scents are very arousing to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>23.</td>
<td>Often just how someone smells can be a turn on.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Certain hormonal changes definitely increase my sexual arousal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>25.</td>
<td>If I am worried about taking too long to become aroused, this can interfere with my arousal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>26.</td>
<td>Sometimes I am so attracted to someone, I cannot stop myself from becoming sexually aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>27.</td>
<td>I really need to trust a partner to become fully aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>28.</td>
<td>It is difficult for me to stay sexually aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>29.</td>
<td>When I am sexually aroused the slightest thing can turn me off.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>30.</td>
<td>When I think about someone I find sexually attractive, I easily become sexually aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>31.</td>
<td>With a new partner I am easily aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
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<td></td>
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</tr>
<tr>
<td>32.</td>
<td>If I see someone dressed in a sexy way, I easily become sexually aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>33.</td>
<td>If a partner is forceful during sex, it reduces my arousal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>34.</td>
<td>Dominating my partner sexually is arousing to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>35.</td>
<td>Sometimes I feel so “shy” or self-conscious during sex that I cannot become fully aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>36.</td>
<td>Unless things are “just right” it is difficult for me to become sexually aroused.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
For each statement identified below, circle the number to the right that best reflects your level of agreement with each statement. Please use the scale below as a reference.

1 ——— 2 ——— 3 ——— 4 ——— 5 ——— 6 ——— 7

Not True  Somewhat True  Very True
1. I sometimes tell lies if I have to
2. I never cover up my mistakes
3. There have been occasions when I have taken advantage of someone
4. I never swear
5. I sometimes try to get even rather than forgive and forget
6. I always obey laws, even if I’m unlikely to get caught
7. I have said something bad about a friend behind his/her back
8. When I hear people talking privately, I avoid listening
9. I have received too much change from a salesperson without telling him/her
10. I always declare everything at customs
11. When I was young I sometimes stole things
12. I have never dropped litter on the street
13. I sometimes drive faster than the speed limit
14. I never read sexy books or magazines
15. I have done things that I don’t tell other people about
16. I never take things that don’t belong to me
17. I have taken sick-leave from work or school even though I wasn’t really sick
18. I have never damaged a library book or store merchandise without reporting it
We would like to understand your experience of participating in this study. Please think about your experience today and check the circle that best describes your experience.

1. Did you find the vaginal gauge uncomfortable?

   Not at all  Definitely
   A little bit  Extremely
   Somewhat

2. Did you find the vaginal gauge distracting?

   Not at all  Definitely
   A little bit  Extremely
   Somewhat

3. How did you feel during the testing procedure?

   Very tense and uncomfortable
   Somewhat tense and uncomfortable
   Neutral
   Somewhat comfortable and relaxed
   Very comfortable and relaxed

What do you think the purpose of this study is?
_______________________________________________
_______________________________________________
_______________________________________________
Were your feelings of arousal similar to what you are accustomed to feeling (outside of the lab), or were they very different? If they were different, how?

Did anything about your experience surprise you?

We are interested in knowing what this experience was like for you. If you wish to make any comments about your experience participating in this study, please feel free to write as much or as little as you like in the space below (you may also use the backside of this paper if needed).
Thank you for completing this questionnaire. Please take a minute to make sure you answered all the questions. When you are finished, please put this questionnaire in the envelope provided and then tell the experimenter you have finished.

Before answering this question, please let the experimenter know that you are finished.

How sexually aroused do you feel right now? ( 0 = “No arousal”, 9 = “Most arousal I’ve ever felt”)
Letter of Information and Consent

TITLE OF PROJECT:

Psychophysiological assessment of sexual responses to sexually explicit images.

BACKGROUND INFORMATION:

You are being invited to participate in a research study sponsored by the Department of Psychology at Queen’s University, and directed by Dr. Meredith Chivers. The principal investigator for this study is Jessica Spape, a graduate student working with Dr. Chivers. The study involves measuring your physical and mental sexual arousal responses to nonsexual and sexual images. Participating in this study also involves completing a questionnaire about your sexuality.

Your participation will help scientists understand how features within sexual stimuli affect women’s sexual arousal.

A trained research assistant will read through this form with you, describe the study procedures in detail, show you the testing room and the genital gauges, and answer any questions you might have. This study has been reviewed for ethical compliance by the Queen’s University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board.

DETAILS OF THE STUDY:

The aims of this study are to examine the following among sexually healthy women: 1) genital and subjective sexual response to sexual and nonsexual images; 2) associations between sexual interests and patterns of sexual response to sexual images.

You will not be considered for this study if you: 1) are younger than 18 or older than 40; 2) do not read and write English fluently; 3) have current or past mental illness or substance abuse; 4) are using medications thought to influence sexual response; 5) have chronic genital or subjective sexual arousal problems; 6) experience pain during sexual activity. Pain, in this context, is defined as superficial pain during more than 50% of sexual activities or insertions; 7) are about equally sexually attracted to women and men; 8) are exclusively sexually attracted to women; 9) have a sexually transmitted infection; 10) are pregnant, or have been pregnant in the last six months; 11) have never
experienced vaginal penetration during sexual activity, used menstrual tampons, or undergone a pelvic examination; 12) have an irregular menstrual period.
Your participation in this study involves undergoing 1) a sexual arousal assessment, and 2) the completion of questionnaires. The arousal assessment and completion of questionnaires will take place at the Sexuality and Gender Laboratory, Department of Psychology, Queen’s University.

Sexual Arousal Assessment: The first part of this study involves measuring your physical and mental sexual arousal to sexual and nonsexual images. These images will feature male and female genitalia as well as images of men and women engaged in activities. This part of the study will take about one hour.

The experimenter will explain how to use the equipment to measure your arousal responses. Once you understand how to do this, you will undress from the waist down in a private testing room, sit in a comfortable reclining chair, and insert the genital gauge. You will insert the gauge into your vagina yourself.

The experimenter will guide you through the first part of the study from a separate room, using messages sent over a computer monitor. You will first watch a 3-minute long slideshow featuring landscapes. Then you will see twelve slideshows that are all approximately 90 seconds long. These slideshows will feature images of male and female genitals as well as images of fully clothed men and women engaging in nonsexual activities. Immediately before and after viewing each slideshow, you will be asked to answer questions about your sexual and emotional responses to the images, and you will be asked to rate image characteristics. After you have watched all the slideshows, you will remove the genital gauge, place it in a plastic bag, and dress.

Questionnaires: After the sexual arousal assessment, you will be asked to complete a questionnaire asking about your personal information (age, marital status, education, household income, ethnicity, employment status, medication, substance use, and current sexual health), sexual experiences, sexual orientation, sexual responses to sexual stimuli, sexual functioning, sexual attitudes, and personality characteristics. You will complete these questionnaires in a private room. This part of the study will take about a half hour.

After you have completed the questionnaire, you will watch a 10-minute long film and complete a question asking about your sexual feelings.

COMPENSATION:

Upon completion of the study, you will receive $25 as compensation for your time and study-related expenses such as travel. If the study has to be terminated for any reason, compensation will be adjusted according to the fraction of the study completed at a rate of $12.50 per hour.

BENEFITS OF PARTICIPATION:
The information obtained from this study will potentially improve understanding of the processes involved in sexual arousal. While you may not benefit directly from this study, results from this study may benefit women and men by increasing our understanding of the sexual psychophysiology of sexual interests.

RISKS OF PARTICIPATION:

There are no known risks from participating in this study. You may, however, feel awkward using the genital gauge if you are not comfortable touching your genitals. You may feel awkward watching the sexual videos if you find sexually explicit materials objectionable.

The genital gauges are reused and undergo thorough, high-level disinfection (cold sterilization) between uses. High-level disinfection is a common and safe way of disinfecting instruments made of plastics and is the same procedure used in hospitals. There is minimal risk from using a genital gauge after it has been disinfected.

CONFIDENTIALITY AND PARTICIPANT RIGHTS:

All information obtained during the course of this study is strictly confidential and your anonymity will be protected at all times. Coded (ID) numbers will replace all names and you will be identified only by this number. There will be one password-protected file linking your name and contact information with your ID number; that password will be available only to the members of the research team working on this study. Data will be stored in locked files and will only be available to the investigators and research assistants involved in this project. You will not be identified in any publication or reports of the study; data will be combined in all reports of this study.

Your participation in this study is completely voluntary. You may withdraw from this study at any time without any consequence.
SUBJECT STATEMENT AND SIGNATURE SECTION:

I, ________________________________ (please print name), have read and understood the information/consent form for this study. I have had the purposes and procedures of this study explained to me by a trained research assistant and I understand what is required for participation in this study. I understand that my participation is voluntary and that I can withdraw my participation at this time. I have been given sufficient time to consider the above information and have had the opportunity to ask questions which have been answered to my satisfaction. I understand the potential benefits and risks associated with participating in this study and understand that my confidentiality will be protected throughout the study. I am voluntarily signing this form. I will retain a copy of this consent form for my information.

Should I have further questions, I understand that I can contact any of the following individuals:

- Dr. Meredith Chivers, Principal Investigator (613-533-2889; Meredith.Chivers@queensu.ca), Assistant Professor in the Department of Psychology at Queen’s University
- Dr. Richard Beninger (613-533-2486; psychead@post.queensu.ca), Head of the Department of Psychology at Queen’s University
- Dr. Albert Clark (613-533-6081), Chair of the Queen’s University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board

By signing this consent form, I am indicating that I agree to participate in this study

______________________          ______________________           __________
Participant’s name                  Participant’s signature                   Date
______________________
Person obtaining consent

Please check ONE of the following boxes:

☐ I would like any identifying information destroyed once the study is completed, and I would like to remain anonymous.

☐ I agree to let the researchers keep my identifying information on file in the secure lab, and to contact me for participation in future research projects.

STATEMENT OF INVESTIGATOR:
I, or one of my colleagues, have carefully explained to the participant the nature of the above research study. I certify that, to the best of my knowledge, the participant
understands clearly the nature of the study and demands, benefits, and risks involved to participate in this study.

__________________________________________  __________
Signature of Principal Investigator            Date
Limits of Confidentiality

All information disclosed during your participation in this research study is confidential and **will not** be disclosed to anyone with your written and informed consent **except** where reporting is required by law, that is –

1. where there is suspicion that a child or children (that is, an individual who is PRESENTLY under the age of 16) has been or is being abused,

2. where the research participant is likely to harm her- or himself unless protective measures are taken,

3. where the research participant presents a serious danger of violence to others, and

4. if the research participant reveals that she has been sexually abused by a healthcare provider (for example, a psychologist or physician) covered by the Regulated Health Professionals Act, it is necessary by law to report the name of the perpetrator to his/her governing body.

IF YOU HAVE ANY CONCERNS ABOUT THESE MATTERS, OR ABOUT THIS FORM, PLEASE DISCUSS THESE WITH THE RESEARCH ASSISTANT.

*******************************************************************
PLEASE SIGN THE ACKNOWLEDGEMENTS BELOW TO INDICATE THAT YOU HAVE READ THIS INFORMATION ABOUT CONFIDENTIALITY
*******************************************************************

I acknowledge the circumstances that limit confidentiality and I accept them.

Participant’s name          Participant’s signature          Date

Person obtaining consent
Appendix 4: Debriefing letter

Debriefing Statement

Previous research suggests that women and men respond differently to sexual stimuli. Women respond to both preferred (relative to her sexual orientation) and non-preferred genders, whereas men respond much more to persons of their preferred gender.

Chivers et al. (2007) found that heterosexual women experienced genital and subjective sexual arousal when viewing films of nude women performing an aerobic routine. More surprising, these heterosexual women did not get sexually aroused by films of naked men exercising. We do not understand why women showed this counterintuitive pattern of sexual arousal. One possibility is that, in the female films, the female actors opened and closed their legs and exposed their vulvas while they exercised and women responded to this as a sexual cue; in the male films, men had exposed penises but these were flaccid. Ponseti et al. (2006) have proposed that an exposed vulva or erect penis may function as a prepotent sexual feature, that is, a visual sexual stimulus that evokes an automatic sexual response regardless of the sexual orientation of the viewer. Women may have responded to the films of women exercising and not to the films of men exercising because the films featured a prepotent sexual feature.

The presence of prepotent sexual features in sexual stimuli may help explain why women respond to a broader range of sexual stimuli than men. The current study will examine whether exposed vulvas and erect penises lead to an automatic genital sexual response in heterosexual women.

A reminder: All information is kept completely confidential in locked research cabinets and password-protected computer files. Only members of the research team will have access to this information. At no time will you be identified as an individual because the data will be numerically coded to ensure confidentiality and anonymity. Only the group data will be reported in the research.

If participating in this study leads you to feel distressed, you are encouraged to contact your family physician or a mental health professional. Attached is a list of mental health resources in the Kingston and surrounding area, as well as a list of websites related to sexuality.

Thank you for participating in this study. Your time and effort is greatly appreciated.

If you have any further comments or questions about this research project, or would like to receive a summary of research findings, please contact Jessica Spape by e-mail at 8js79@queensu.ca, or Dr. Meredith Chivers by e-mail at Meredith.Chivers@queensu.ca, or by telephone at (613) 533-2889.
Sexual and Mental Health Resources

Belleville General Hospital ...................................................(613) 969-5511
Brockville General Hospital ..................................................(613) 345-5645
Kingston General Hospital ....................................................(613) 548-2333
Frontenac Community Mental Health Services:
  Information ...........................................................................544-1356
  24 Hour Crisis Line .............................................................544-4229

Leeds and Grenville Rehabilitation and Counseling Services:
  Toll Free ...............................................................................1 800 267-4406
  Delta .......................................................................................(613) 928-3460
  Gananoque .................................................................(613) 382-4016 ext. 100
  Kemptville .................................................................(613) 258-7204
  Prescott .......................................................................(613) 925-5940

KFLA Health Unit (Sexually Transmitted Infection Clinic)
Confidential diagnosis and treatment
221 Portsmouth Ave.
Phone: 613-549-1232 or 1-800-267-7875
Website: http://www.healthunit.on.ca/programs/sexualhealth.html

Queen’s University Student Health Services
LaSalle Building, 146 Stuart St.
Phone: 613-533-2506
Website: http://www.queensu-hcds.org

Sexual Health Resource Centre (SHRC)
2nd Floor of the John Deutsch University Centre
Phone: 613-533-2959

Sexual Assault Crisis Centre Kingston (SACCK)
Phone: 613-544-6424

Lesbian/Gay/Bi Youth Phone Line
Phone: 1-800-268-YOUTH

Education Queer Issues Project (EQUIP)
Phone: 613-533-3154
Email: equip@ams.queensu.ca
Website: http://clubs.myams.org/equip/

http://www.sexualhealth.com/
http://www.sexualityandu.ca/
http://www.plannedparenthood.org/
http://www.hars.ca
## Appendix 5 – Experimental stimuli

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Female non-prepotent (pubic triangles) A
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Female prepotent (exposed vulvas)

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Appendix 6 – Ethics approval

QUEEN'S UNIVERSITY HEALTH SCIENCES & AFFILIATED TEACHING HOSPITALS RESEARCH ETHICS BOARD

June 3, 2009

Dr. M.L. Chivers
Department of Psychology
Room 354 - Humphrey Hall
Queen's University

Dear Dr. Chivers,

Study Title: Psychophysiological assessment of sexual preferences in women

The members of the Queen's University Health Sciences & Affiliated Teaching Hospitals Research Ethics Board have examined the protocol, questionnaires, advertisement and the revised consent form (for your project as stated above) and consider it to be ethically acceptable. This approval is valid for one year from the date of the Chair's signature below. Please attend carefully to the following list of ethics requirements you must fulfill over the course of your study:

- Reporting of Amendments: If there are any changes to your study (e.g. consent, protocol, study procedures, etc.), you must submit an amendment to the Research Ethics Board for approval. (see https://www.queensu.ca/vpr/eb.htm).

- Reporting of Serious Adverse Events: Any unexpected serious adverse event occurring locally must be reported within 2 working days or earlier if required by the study sponsor. All other serious adverse events must be reported within 15 days after becoming aware of the information.

- Reporting of Complaints: Any complaints made by participants or persons acting on behalf of participants must be reported to the Research Ethics Board within 7 days of becoming aware of the complaint. Note: All documents supplied to participants must have the contact information for the Research Ethics Board.

- Annual Renewal: Prior to the expiration of your approval (which is one year from the date of the Chair's signature below), you will be reminded to submit your renewal form along with any new changes or amendments you wish to make to your study. If there have been no major changes to your protocol, your approval may be renewed for another year.

Yours sincerely,

[Signature]
Chair, Research Ethics Board

[Signature] June 11, 2009

Study Code: PSYC-091-09

- Investigators please note that if your trial is registered by the sponsor, you must take responsibility to ensure that the registration information is accurate and complete
The membership of this Research Ethics Board complies with the membership requirements for Research Ethics Boards as defined by the Tri-Council Policy Statement; Part C Division 5 of the Food and Drug Regulations, DHPR, and U.S. DHHS Code of Federal Regulations Title 45, Part 46 and carries out its functions in a manner consistent with Good Clinical Practices.

Federalwide Assurance Number: #FWA00004184
#IRB0001173

Current 2009 membership of the Queen’s University Health Sciences & Affiliated Teaching Hospitals Research Ethics Board

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<tr>
<td>Dr. A.F. Clark</td>
<td>Emeritus Professor, Department of Biochemistry, Faculty of Health Sciences, Queen’s University (Chair)</td>
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<tr>
<td>Dr. H. Abdollah</td>
<td>Professor, Department of Medicine, Queen’s University</td>
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<tr>
<td>Dr. C. Cline</td>
<td>Assistant Professor, Department of Medicine, Director, Office of Biobehavior, Queen’s University Clinical Ethicist, Kingston General Hospital</td>
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<td>Rev. T. Deline</td>
<td>Community Member</td>
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<tr>
<td>Dr. M. Evans</td>
<td>Community Member</td>
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<tr>
<td>Dr. S. Irving</td>
<td>Psychologist, Providence Care, St. Mary’s of the Lake Hospital Site</td>
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<tr>
<td>Prof. L. Kepping-Burke</td>
<td>Assistant Professor, School of Nursing, Queen’s University</td>
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<tr>
<td>Mrs. J. Kotecha</td>
<td>Research &amp; Programs Manager, Centre for Studies in Primary Care, Department of Family Medicine, Queen’s University</td>
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<td>Dr. J. Low</td>
<td>Emeritus Professor, Department of Obstetrics and Gynaecology, Queen’s University and Kingston General Hospital</td>
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<td>Dr. W. Raczk</td>
<td>Emeritus Professor, Department of Pharmacology &amp; Toxicology, Queen’s University</td>
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<td>Dr. A.N. Singh</td>
<td>WHO Professor in Psychosomatic Medicine and Psychopharmacology Professor of Psychiatry and Pharmacology, Chair and Head, Division of Psychopharmacology, Queen’s University Director &amp; Chief of Psychiatry, Academic Unit, Quinte Health Care, Belleville General Hospital</td>
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<td>Community Member</td>
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<td>Ms. K. Weismaun</td>
<td>LL.B. and Adjunct Instructor, Department of Family Medicine (Biobehavior)</td>
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<td>Dr. S. Wood</td>
<td>Director, Office of Research Services (Ex-Officio)</td>
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