

Interoceptive Awareness Moderates the Relationship Between Perceived and Physiological Genital Arousal in Women

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ABSTRACT

Introduction: In general, laboratory studies have shown low correlations between subjective (ie, self-report) and physiologic (ie, vaginal pulse amplitude) measurements of sexual arousal in women. One explanation for this presumed low concordance is that women might not be attending to their genital responses and/or might be unable to accurately perceive their genital responses.

Aim: To examine the extent to which women can perceive their genital arousal sensations, the role that interoceptive awareness plays in this ability, and whether interoceptive awareness influences sexual concordance in women.

Methods: Twenty-six sexually functional women viewed an erotic film while their physiologic and perceived genital sexual arousal levels were measured continuously. Self-report measurements of sexual function and bodily awareness also were administered.

Main Outcome Measures: Physiologic sexual arousal was measured with a vaginal photoplethysmograph, and perception of genital arousal was measured with an arousometer. Degree of bodily awareness was measured with the Multidimensional Assessment of Interoceptive Awareness questionnaire.

Results: Women exhibited a significant degree of agreement between physiologic and perceived genital arousal ($P < .05$). Interoceptive awareness was found to significantly moderate this relation ($P < 0.05$), such that a greater degree of interoceptive awareness facilitated greater agreement between physiologic and perceived genital arousal. Interoceptive awareness also was found to facilitate greater concordance between subjective and physiologic sexual arousal ($P < .05$).

Conclusion: Women can perceive their genital response, and interoceptive awareness influences this ability and the relation between subjective and physiologic sexual arousal. Increasing bodily awareness could be a plausible route for treatment development.

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Key Words: Sexual Function; Sexual Arousal; Awareness; Concordance

INTRODUCTION

During the past four decades, laboratory studies have shown varying degrees of concordance between subjective (ie, self-report) and physiologic (ie, vaginal pulse amplitude [VPA]) measurements of sexual arousal in women. For example, an early study by Heiman¹ reported significant, positive correlations ($r = 0.44$ – 0.68) in women, whereas in the same year Osborn and Pollack² reported a non-significant, but nevertheless substantial, negative relation ($r = -0.40$) between subjective and physiologic arousal. In 2010, a meta-analysis of 132 relevant articles showed that, overall, there seems to be a small, positive relation ($r = 0.26$) between women's subjective and

physiologic sexual arousal.³ When examining this relation by factors such as stimulus content or method of measurement, this relation varies from an average of 0.25 to 0.55. Understanding this variation among women has important implications. Treatments focused on increasing genital cues might not be beneficial if women cannot perceive these cues. Recent research has suggested that treatments that aim to increase awareness of bodily sensations and genital cues might increase sexual arousal in women with sexual difficulties.⁴ If women can perceive their genital sensations, and the degree to which they can do so is dependent on their level of bodily awareness, then treatments designed to increase bodily awareness might be warranted. Identifying individuals with low bodily awareness might be a worthwhile strategy for determining which patients would most benefit from awareness-based treatments such as biofeedback or mindfulness.

Researchers have attempted to explain low concordance rates in women by examining continuous and discrete measurements

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of self-reported sexual arousal. Subjective sexual arousal is most commonly assessed retrospectively as an average of several Likert-scale responses to statements such as “During the film, I felt sexually aroused.”⁵ A weakness of retrospective discrete measurements of sexual arousal is that they cannot be compared contemporaneously with genital arousal and might be measuring one’s current post-stimulus state rather than one’s arousal during stimulus exposure. Alternatively, continuous measurements allow for the measurement of subjective arousal throughout the stimulus presentation. Also, unlike retrospective self-report questionnaires, continuous measurements of sexual arousal have been found useful in differentiating women with from those without sexual arousal disorders.⁶ However, it should be noted that continuous measurements of subjective sexual arousal require women to assess their arousal state in real time on a moment-to-moment basis. As such, this methodology might have the added effect of leading women to attend more closely to genital cues than would a discrete questionnaire assessment and, in doing so, positively affect the concordance between genital and subjective measurements of arousal.

Although continuous measurements of subjective arousal could feasibly affect concordance rates, when continuous measurements of subjective sexual arousal are analyzed with traditional correlational analyses, low correlations of subjective and physiologic arousal are generally still found. This suggests that choice of analytic technique could help explain low concordance.³ Concordance is typically measured as a change score, which condenses genital arousal data collected continuously throughout the assessment into a single data point. This compromises the richness of continuous data collection. Hierarchical linear modeling (HLM), a statistical technique designed to analyze repeated measures data nested within subjects, has been shown effective at detecting varying degrees of genital-subjective concordance in women.⁷ HLM fits models to multilevel data while accounting for variability across each level by estimating coefficients based on subjects’ unique slopes and intercepts. This allows for the analysis of group data while accounting for individual differences. Similarly, smoothing regression splines, which balance the fit between data points with the number of bends in the modeled trajectory, has been suggested as an analytic tool sensitive enough for the detection of sexual arousal patterns.⁸

It also has been hypothesized that women’s attitudes toward sex and sexual stimuli might influence the concordance between subjective and physiologic sexual arousal. For example, negative affect from “man-made” erotica has been suggested to decrease concordance. However, when women are shown “woman-made” erotica, reports of subjective arousal increase but concordance does not meaningfully change.⁹ Cultural messages women receive to inhibit sexuality also can play a role in these changing levels of concordance. Social desirability could negatively influence self-report measurements of sexual arousal by causing women to under- or over-report certain responses to the sexual films but is unlikely to affect physiologic arousal. Indeed, one study found

that measurements of impression management significantly negatively affected discrete measurements of subjective sexual arousal. When examining the effect of impression management on continuous measurements of subjective sexual arousal, a small, negative effect was found, although this did not reach statistical significance.¹⁰

Women who show low concordance between their subjective and genital arousal responses might be unable to accurately perceive their genital responses. Despite the growing body of research examining interoceptive awareness in relation to sexuality, little research has examined women’s awareness of their genital arousal.^{11,12} One study found that nearly half the women in the sample reported minimal or no change in genital arousal during periods of greatest engorgement (as measured by vaginal blood volume and VPA), which suggests that women might not notice genital arousal despite being physiologically aroused.¹ Perceptions of genital arousal were assessed retrospectively and this finding did not reach statistical significance. Researchers also have found that women’s accuracy of their perception of their genital arousal might be independent of the strength of their genital response.¹³ Women with higher mean VPA were no more likely to perceive their genital arousal than were women with lower mean VPA. This is an important finding, because it suggests that it might not be necessary to have a robust genital arousal response to be aware of it. However, it also could be that women were not attending to their genital cues. That is, it was not so much that they were unable to perceive their level of arousal, but rather they were not focused on attending to their arousal. Indeed, results from a more recent study suggested that bringing attention to one’s body could increase subjective arousal.¹⁴ Unfortunately, the study did not examine the impact of this relation on VPA. The degree to which there might be individual variability among women in their ability to perceive genital sensations has, to our knowledge, not directly been assessed.

To better understand the degree to which women can perceive their genital sensations during sexual arousal and to explore whether identifiable individual variability exists in this ability, the present study had three aims:

1. To examine whether women can perceive their level of genital arousal when specifically told to attend to genital sensations.
2. To examine whether a self-report measurement of interoceptive (bodily) awareness can identify women who can accurately perceive their genital responses.
3. To examine whether interoceptive awareness can, in part, explain the relation between subjective and physiologic sexual arousal in women.

METHODS

Participants

Twenty-six women were recruited through advertisements in undergraduate psychology courses. Women were eligible to

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