



## Review

## Sexual arousal in men: A review and conceptual analysis

Erick Janssen\*

The Kinsey Institute for Research in Sex, Gender, and Reproduction, Indiana University, Bloomington, IN, USA

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## ABSTRACT

Sexual arousal is an emotional/motivational state that can be triggered by internal and external stimuli and that can be inferred from central (including verbal), peripheral (including genital), and behavioral (including action tendencies and motor preparation) responses. This article, while focusing on sexual arousal in men, provides a conceptual analysis of this construct, reviews models of sexual arousal, and discusses the usefulness of perspectives derived from motivation and emotion research in improving our understanding of its determinants and behavioral correlates. In this, it considers the role of genital feedback in men's subjective sexual arousal and the connections between sexual arousal and sexual desire. Future research and definitions may increasingly focus on its central integrative functions (as opposed to its input and output characteristics). Yet, the study of sexual arousal can be expected to continue to benefit from the measurement of its genital, verbal, and behavioral components. Instances of discordance between response components suggest that they are, at least in part, under the control of different mechanisms, and it is proposed that a better understanding of sexual arousal will prove contingent on a better understanding of such mechanisms and the conditions under which they converge and diverge.

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## Introduction

*"Coitus is impossible for man without erection of the penis, and that requires his sexual arousal."*  
(Squier, 1938, p. 119)

## Defining sexual arousal

The use of the term *sexual arousal* in the English-language medical and scientific literature can be traced back to the 1930s (e.g., Murchison and Harden, 1933; Squier, 1938).<sup>1</sup> Phrases and expressions that refer to *arousing the sexual impulse* (e.g., Ellis, 1903), *arousing erotic sensations* (Kelly, 1930), *arousing passion* (e.g., Gurley, 1909;

\* The Kinsey Institute for Research in Sex, Gender, and Reproduction, Indiana University, Morrison Hall 313, 1165 East Third Street, Bloomington, IN 47405-2501, USA. Fax: +1 812 855 8277.

E-mail address: [ejanssen@indiana.edu](mailto:ejanssen@indiana.edu).

<sup>1</sup> This conclusion is based on searches using PsycInfo, MedLine and Google Books, as well as the collections of the Kinsey Institute. The term *sexual excitement* (in English but also in German, for example), although not included in these searches, may have predated the use of the term *sexual arousal*.

Malchow, 1907), and *arousing desire* (Nascher, 1916) were commonly used around the turn of the century, but gradually disappeared during the 1930s and 1940s. Thus, the history of the term *sexual arousal* involves a transition from the predominant use of a verb (*to arouse*) to that of a noun (*sexual arousal*). However, as was the case for the verb, the noun could refer to psychological processes, physiological processes, or a combination of the two, and it often was left to the reader to infer the specifics from the context in which the term was used.

Although the past century has seen a number of important advances in the study of human sexual response, the current literature is still rife with ambiguity about what exactly is being felt or observed when someone is sexually aroused, and sex researchers have yet to arrive at a consensus on how to best define this state. Most would probably agree that in developing a definition one needs to address questions regarding the importance of peripheral (including genital) and central (including experiential) processes. Yet, definitions tend to be challenged rather than informed by findings from psychophysiological studies that show the relative independence of peripheral and central indicators of sexual arousal.<sup>2</sup> Although correlations in men between genital responses and self-reports of sexual arousal are, on average, substantial (Chivers et al., 2010), large variability can be found between studies, with some finding almost no, or at best weak, associations between the two (e.g., Both et al., 2004; Janssen et al., 2009; van Lankveld and van den Hout, 2004). Indeed, it can be argued that the introduction of psychophysiological methods in the 1960s – allowing for first time the concurrent measurement of genital and subjective reactions – is largely responsible for initiating, or at least invigorating, the continuing debate on what constitutes sexual arousal.

In addition to variations in correlations between subjective and physiological measures, numerous psychophysiological studies have revealed response patterns in men that defy simple, unidimensional conceptualizations of sexual arousal (e.g., Bach et al., 1999; Cranston-Cuebas and Barlow, 1990; Delizonna et al., 2001; George et al., 2006; van Lankveld and van den Hout, 2004). For example, experimentally induced distraction (e.g., by having men engage in mental arithmetic) during erotic film presentations has been found to decrease erections but not subjective sexual arousal (van Lankveld and van den Hout, 2004). Also, providing men with false feedback (e.g., by informing them that their erections do not measure up to those of the other subjects) has been found to decrease genital responses but not subjective arousal during subsequent stimulus presentations (Bach et al., 1999). More divergent patterns have also been reported. For example, Both et al. (2010) found that the repeated exposure to a sexual stimulus resulted in habituation in men's subjective sexual arousal. Genital responses, in contrast, *increased* over trials.

In addition to psychological and physiological indicators, or subjective and genital response components, sexual arousal has been described in behavioral terms. Beach (1942), who was one of the first to use the term *sexual arousal* in the animal literature, mainly referred to it in motivational terms, as something that leads to mating and that can be measured in terms of the frequency or latency of copulatory behaviors. The reliance in animal studies on behavior as an index of sexual arousal may at least in part be attributed to the challenges involved in assessing genital and subjective responses in animal models. In contrast, there is less of a tradition of using behavioral measures in human studies of sexual arousal.

So, what is sexual arousal? In short, we don't know. Although its main indicators (including, for men, penile erection) may be well recognized, we do not know what is necessary or sufficient to label someone as being *sexually aroused*. Most men may be capable of having erections. Most men may know what it feels like to be sexually aroused. But despite the generally high correlations between erections and subjective arousal (Chivers et al., 2010), men do not always report feeling sexually aroused when they have an erection, nor do they always experience an erection when they feel aroused. Erections occur during sleep (in particular Rapid-Eye-Movement or REM sleep), and have been studied both during the night and during daytime naps (e.g., Gordon and Carey, 1995). However, generally speaking, sleep-related erections are dissociated from erotic dream content or the experience of subjective sexual arousal (e.g., Karacan, 1982). As another example, men may experience erections in situations that are, at least at face value, devoid of sexual meaning, including accidents (Janssen et al., 2008). Consistent with this, psychophysiological studies have found that men can get erections to, for example, rape films while experiencing little to no subjective arousal (Janssen et al., 2002b). The opposite has been observed as well. For example, some men report experiencing sexual arousal in the absence of erections when they visit a strip club (Janssen et al., 2008). Psychophysiological studies, too, suggest that men can feel subjectively aroused in the absence of a genital response. For example, Janssen et al. (2009) found, in a sexually functional community sample of men, that about one-quarter of the participants met the criteria of a 'nonresponder' (penile rigidity of <10%). Cluster analyses confirmed differences in genital response, but low and high genital responders did not differ in subjective sexual arousal. Findings like the ones discussed above underscore the complexities involved in establishing the necessary and sufficient conditions for sexual arousal.

Some have proposed that the most parsimonious approach to defining sexual arousal, at least when it comes to men, is to discount subjective feelings and equate it with penile erection (Agmo, 2008). However, not only is this position unlikely to take our understanding of sexual arousal to new levels – after all, erections can be studied without the need to invoke higher-level constructs such as *sexual arousal* – it is also based on the empirically unsubstantiated assumption that a man's subjective state of sexual arousal finds its roots in his genitalia and, thus, that the "crucial component of the term 'subjective arousal' is genital blood flow" (Agmo, 2008, p. 313). In a less extreme form, Sachs (2000, 2007) has proposed that penile erection in a sexual context can be considered a reliable and valid indicator of male sexual arousal. Although this position acknowledges that not all erections are sexual, it invites circular reasoning as it transfers definitional challenges to the question of what makes a context "sexual." In contrast, other researchers (e.g., Rosen and Beck, 1988, cf. Janssen and Everaerd, 1993) have proposed that sexual arousal cannot be defined adequately "without highlighting the critical role of cognitive labeling and subjective experience" (p. 28). However, this position ignores the possibility that sexual arousal can be activated (and even impact behavior) at a level that fails to translate into the conscious experience of "feeling" aroused (e.g., Janssen et al., 2000).

Opinions not only differ in how to best define sexual arousal, scholars also disagree on how important definitions are to scientific progress. Sachs (2007), who presents a comprehensive overview of definitions of sexual arousal, believes that advances in the study of this construct are dependent upon improvements in our terminology and definitions. Yet, the history of related areas of scientific inquiry, including that of human emotion, suggests that explicit definitions often "are a result of scientific investigations, not a prerequisite for them" (Öhman, 1987, p.81). The position taken in this article is consistent with the latter position, in that *any* definition that assigns more importance to one indicator of sexual arousal over another, at this stage, can be expected to constrain scientific progress.

<sup>2</sup> A number of relatively well-validated instruments exist to assess genital responses in men, including measures of penile circumference, volume, and rigidity. For the assessment of experiential aspects of sexual arousal, most researchers rely on the use of questionnaires, which may include questions such as "how sexually aroused do you currently feel?" See Janssen et al. (2007) for a critical review of the measurement of genital responses and subjective sexual arousal in men.

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