‘HOT AND BOTHERED’

A PSYCHOPHYSIOLOGICAL EXAMINATION OF DESIRE AND AROUSAL IN
SEXUALLY FUNCTIONAL AND DYSFUNCTIONAL MEN AND WOMEN

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ABSTRACT

Research shows that desire and arousal problems are highly comorbid and interrelated issues, with both men and women reporting difficulties in telling them apart. These categories were thus recently merged (for women only) in the DSM-5 under the new diagnosis of Sexual Interest and Arousal Disorder (SIAD). This decision has been controversial, as no research has yet attempted to empirically distinguish these disorders through recruiting distinct groups of sufferers meeting clearly operationalized diagnostic criteria, and to compare them on psychophysiological, psychosocial or concordance (genital-subjective arousal agreement) patterns. The goal of this dissertation was to examine the differentiability of desire and arousal in sexually healthy and clinical populations of men and women, on psychophysiological and psychosocial patterns. The first study assessed the feasibility of recruiting distinct groups of desire versus arousal sufferers, using clearly defined operational criteria and found that desire and genital arousal difficulties were indeed differentiable. At the same time, our criteria led to the exclusion of 75% of those reporting sexual difficulties (and 96% using DSM-5 criteria), thereby raising questions about the utility of these diagnostic criteria and the generalizability of past research findings. The second study examined whether the eligible men with desire versus arousal disorders from study one could be differentiated on the basis of psychophysiological and psychosocial patterns. Results indicated that low desire versus low arousal sufferers had unique patterns of response, with those with both disorders showing greatest impairment on both psychophysiological and psychosocial factors. The third study entailed a parallel comparison with female desire versus arousal sufferers. Findings indicated overlap for desire versus arousal sufferers on psychosocial variables, yet somewhat distinct psychophysiological patterns. Overall, these results have important implications for the conceptualization, diagnosis and treatment of these sexual difficulties. Findings support the emergence of SIAD, and suggest that this combined diagnosis may be relevant for men as well as women. At the same time, results reveal unique genital arousal patterns for men versus women reporting arousal problems, with implications for the future classification of these difficulties.
RESUMÉ

Les évidences suggèrent que les troubles du désir et de l’excitation sexuels sont hautement interreliés, si bien que tous ont de la difficulté à les distinguer. Ces deux catégories ont été fusionnées dans le DSM-5 sous le nouveau diagnostique de trouble d’intérêt et d’excitation sexuel (et ce, pour les femmes seulement). Cette décision est controversée puisqu’à ce jour, il n’y a aucune étude qui a tenté de distinguer de façon empirique ces deux troubles en utilisant des critères diagnostiques clairs et opérationnalisés pour recruter. De plus, aucune étude empirique n’a comparé le désir sexuel à l’excitation sexuelle sur les réponses psychophysiologiques et psychosociales ni sur leurs concordances (concordance entre les mesures subjectives et génitales de l’excitation sexuelle). L’objectif de la présente dissertation est d’examiner les distinctions entre le désir sexuel et l’excitation sexuelle sur les types de réponses psychophysiologiques et psychosociales chez les personnes avec et sans trouble sexuel. La première étude a évalué la faisabilité de recruter des gens souffrant d’un trouble du désir sexuel versus d’un trouble de l’excitation sexuelle en utilisant des critères diagnostiques bien opérationnalisés. Les résultats ont montré que le trouble du désir sexuel et le trouble de l’excitation sexuelle pouvaient être différenciés. Toutefois, en utilisant nos critères diagnostiques, 75% des personnes affirmant éprouver des troubles sexuels ont été exclues (et 96% utilisant les critères diagnostiques du DSM-5) ce qui suscite des questions concernant les limitations de ces critères et la reproductibilité des résultats des études antérieures. La seconde étude a examiné si les hommes souffrant d’un trouble du désir sexuel versus d’un trouble de l’excitation sexuelle qui étaient éligibles dans la première étude pouvaient être différenciés sur les réponses psychophysiologiques et psychosociales. Les résultats ont suggéré que les hommes avec une baisse de désir sexuel versus une baisse de l’excitation sexuelle avaient des types de réponses uniques avec les hommes souffrant des deux troubles sexuels, démontrant la plus grande détérioration au niveau des facteurs psychophysiologiques et psychosociaux. La troisième étude était une comparaison parallèle entre les femmes souffrant d’un trouble du désir sexuel et d’un trouble de l’excitation sexuelle. Les résultats ont démontré un chevauchement significatif entre les femmes souffrant d’un trouble du désir sexuel et celles souffrant d’un trouble de l’excitation sexuelle sur les variables psychosociales tout en suggérant des types distincts de réponses psychophysiologiques. Pour conclure, ces résultats ont des implications considérables pour la conceptualisation, le diagnostic et les traitements de ces troubles sexuels. Les résultats
appuient l’émergence du trouble de l’intérêt et de l’excitation sexuels et suggèrent que ce diagnostic combiné pourrait être pertinent chez les hommes comme chez les femmes. En même temps, ces résultats suggèrent des types de réponses psychophysologiques différents chez les hommes par rapport aux femmes, avec des implications sur la classification future de ces difficultés.
CONTRIBUTION OF AUTHORS

This thesis consists of three papers, with a brief introduction and general discussion. All three papers have been co-authored by myself, Rhonda Amsel, and Dr. Yitzchak M. Binik. The following is a statement regarding the respective contributions of the various authors to these three papers.

Each of the papers resulted from research studies that were elaborated, conducted, analyzed and written by myself. Dr. Binik served in an advisory capacity during the formulation of research questions and the development of the protocol, and in an editorial capacity during the writing of the final manuscripts. Rhonda Amsel served as a statistical consultant and in an editorial capacity during the writing of the results sections for the three manuscripts.
STATEMENT OF ORIGINAL CONTRIBUTIONS

This dissertation is a manuscript-based thesis comprised of three peer-reviewed publications that provide original contributions to the field of sexual psychophysiology on sexual desire and arousal. The first paper, entitled “Disentangling desire and arousal: A classificatory conundrum” was published in 2013 in the Archives of Sexual Behavior, volume 42, pp. 1079-1100. This study was the first to test the feasibility of empirically separating desire and arousal disorders in both men and women, through the recruitment of distinct yet homogeneous groups, using explicitly defined operational criteria. It was also one of the first to compare the relative utility of the DSM-IV-TR versus the DSM-5 diagnostic criteria in capturing the range of sexual difficulties reported by participants suffering from desire and arousal difficulties. Finally, the clustering of sexual symptoms was also examined for both men and women, to identify potential sexual problem subtypes. The use of explicit operational criteria in this study led to the recruitment of distinct groups of low desire versus arousal sufferers, indicating that desire and genital arousal are indeed differentiable. In addition, cluster analyses revealed multiple sexual syndromes, marked by different combinations of desire and arousal symptoms, two of which were consistent with DSM-5 criteria for SIAD. However our high exclusion rates in this study due to the use of explicit diagnostic criteria (75% exclusion rate with the DSM-IV-TR criteria; 96% exclusion rate with the DSM-5) also highlights limitations of these criteria as they currently stand, and raises questions about the generalizability of our findings to past studies that have used heterogeneous or vaguely defined groups of desire and arousal sufferers.

The second manuscript entitled “How hot is he? A psychophysiological and psychosocial examination of the arousal patterns of healthy and dysfunctional men”, is currently in press in the Journal of Sexual Medicine. This publication is the first to examine whether disorders of desire and arousal are empirically differentiable in medically healthy men, on the basis of psychophysiological patterns of arousal, using novel and sophisticated measures of arousal (e.g., thermal imaging). It was also the first to examine whether desire and arousal disorders were characterized by unique concordance (i.e., genital-subjective arousal agreement) patterns, as well as psychosocial vulnerability factors. Results demonstrated that disorders of desire and arousal were indeed characterized by unique psychophysiological patterns: men with ED had lower genital arousal, men with low desire had lower subjective arousal and men with both disorders showed impairment in both genital arousal and subjective arousal. Men with
erectile difficulties also showed lower genital-subjective arousal agreement than other groups. Finally, low desire versus arousal sufferers showed somewhat unique psychosocial patterns, particularly as compared to healthy controls, with men with combined difficulties showing the greatest impairment on nearly all psychosocial variables. These results have important implications for the diagnosis and treatment of these sexual difficulties and suggest that in addition to solo diagnoses, a combined category of desire and arousal difficulties (resembling what was proposed for women in the DSM-5) may be relevant for men as well. These findings also support the use of thermography as a diagnostic tool for male erectile dysfunction.

The third manuscript entitled, “A streetcar named ‘derousal’? A Psychophysiological Examination of the Desire-Arousal Distinction in Sexually Functional and Dysfunctional Women” was recently submitted for publication to the Journal of Sex Research. This paper provides the first empirical attempt to differentiate women with disorders of desire versus arousal on the basis of psychosocial, psychophysiological and concordance (genital-subjective arousal agreement) patterns. It was also the first to examine the use of thermal imaging as a diagnostic tool comparing women with desire and arousal difficulties. Results indicated that while all groups showed equivalent levels of genital arousal, women with low desire reported less subjective arousal than controls or women with low arousal. Results also revealed unique concordance patterns for the different groups (whereby women with both disorders showed lower levels of genital-subjective arousal agreement). On the other hand, desire and arousal sufferers demonstrated significant overlap on psychosocial variables, with women with both disorders showing greatest impairment. Results provide initial evidence for the recent merging of desire and arousal disorders for women, and support the removal of female sexual arousal disorder as a diagnostic category in the DSM-5. Findings also add to a growing body of evidence indicating the relative independence of genital and subjective arousal for women, as compared to men. These findings have key theoretical implications for the measurement and treatment of desire and arousal difficulties in women.
ACKNOWLEDGEMENTS

I would like to dedicate this dissertation to all of the people who made this work possible, and to those who supported me through this often ‘crazy-making’ journey. First and foremost, I dedicate this work to Dr. Irv Binik, the most amazing supervisor and mentor I could ever have ‘desired’. Irv, thank you for letting me ‘woo you’ into taking me on, but more importantly, for believing in me more than I believed in myself, and for being the greatest cheerleader that I will ever have. Thank you for your stories, your wit, your wisdom, and for that incredible smile that always made everything feel more manageable. I will always treasure our chats (even the ones that made me cry!) and our intellectual tête-a-têtes, and feel so lucky to have had these years under your wing. Thank you for grooming me into the researcher and clinician that I am, and for being the model of the kind of supervisor I’d like to be; I am deeply honoured to be your last “Irvivor”, and I look forward to sharing many more great ideas with you in the years to come...

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INTRODUCTION

Sexual desire and arousal were first conceptualized as distinct and necessary phases of the human sexual response cycle in the 1970s (Kaplan, 1977; Lief, 1977). Since then, research on these sexual functions, and their dysfunctions, has burgeoned. Significant empirical work and clinical case reports have been published on the etiology, expression and treatment of problems in these domains, yet the majority of this work has been largely atheoretical in nature, with little consensus across studies not only in who to study, but also in what is being studied, and how to study it. In other words, despite the proliferation of work that has been done over the past four decades, the constructs of sexual desire and arousal have remained poorly defined, difficulties in these respective domains have been inconsistently and often unsuccessfully treated, and significant controversy still exists on where to draw the line between them. This controversy has been further complicated by the fact that to date, the high comorbidity of desire and arousal disorders (e.g., Segraves and Segraves, 1991) has been taken as the norm, with almost no empirical work attempting to tease apart these problems through the recruitment of separate groups of sufferers, using clearly defined operational criteria. In addition, those with desire and arousal problems have not yet been compared on either psychosocial or psychophysiological indicators to identify whether they are marked by unique profiles that would support their distinct classification. Such theoretically driven empirical work may be of significant importance in helping to define not only what these constructs are, but also if and how they differ.

Hence, the following literature review delineates the evolution of psychological conceptualizations of sexual desire and arousal and the reflection of these changing perspectives on the diagnostic criteria listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM) for their respective dysfunctions. Limitations of past definitions and theoretical models are highlighted and gaps in the combined empirical literature on desire and arousal are indicated. Overall, this review of the literature emphasizes the need for a systematic, cross-gendered attempt to empirically separate and compare desire and arousal sufferers using explicit operational criteria, and hence inspired the studies presented in this dissertation.

The first manuscript in this dissertation, entitled “Disentangling desire and arousal: A classificatory conundrum,” published in the Archives of Sexual Behavior (2013), begins with an assessment of the limitations of past empirical efforts to differentiate desire and arousal, and then reviews the results of our attempt to separate these disorders through the recruitment of distinct
groups of sufferers, using clearly defined operational criteria. Unexpectedly, however, the use of explicit diagnostic criteria in this study led to the exclusion of 75% of participants reporting sexual problems, and as such, we decided that an empirical and conceptual analysis of this high exclusion rate was warranted. The goals of this work were to provide a descriptive analysis of the sample composition, primary reasons for exclusion and predictors of study eligibility for participants screened for the study. Other goals were to evaluate the relative utility of the proposed DSM-5 diagnostic criteria (American Psychiatric Association (APA), 2013), as compared to the DSM-IV-TR criteria (APA, 2000), with respect to its ability to capture participants’ sexual difficulties, as well as to explore how sexual symptoms clustered for both men and women to identify whether distinct desire and arousal problem subtypes indeed exist.

The results of this analysis supported the distinction between desire and genital arousal difficulties and in fact, suggested that for both men and women, multiple sexual syndromes may exist, marked by different arousal and desire symptoms. However, this data was preliminary and based exclusively on self-reported sexual functioning as assessed during a diagnostic phone interview (see Appendix B). Hence, the second manuscript of the dissertation, entitled “How hot is he? A psychophysiological and psychosocial examination of the arousal patterns of sexually functional and dysfunctional men,” published in the Journal of Sexual Medicine (2014) presents the findings of a comprehensive comparison of the men determined to be eligible in study one, on psychosocial and psychophysiological indices. The primary objective of this work was to compare men that met DSM-IV-TR diagnostic criteria for disorders of desire and arousal to those with exclusively low desire, low arousal, and healthy controls, on patterns of genital and subjective arousal, as well as on a host of psychosocial variables, to identify whether groups were characterized by unique profiles. Results indicated distinct patterns of response for desire versus arousal sufferers, with those with both difficulties showing greatest impairment.

Thus the promising results from this study with men were followed up with a parallel study with the eligible women from study one to identify whether similar patterns could be found. This final manuscript of the dissertation, entitled “A streetcar named ‘derousal’? A psychophysiological examination of the desire-arousal distinction in sexually functional and dysfunctional women,” submitted for publication to the Journal of Sex Research presents the results of this psychophysiological study with women with desire and arousal disorders. The goal of this study was to extend our findings with men to determine whether women with desire
versus arousal disorders could similarly be empirically differentiated from each other and from healthy controls on the basis of their psychophysiological and psychosocial patterns. An additional objective was to examine the implications of these patterns for recent classification amendments to the DSM-5 diagnostic criteria for sexual desire and arousal disorders in women.
References


LITERATURE REVIEW

“Where perception is, there also are pain and pleasure, and where these are, there, of necessity, is desire”

– ARISTOTLE, Physica

OVERVIEW

The pursuit to define and understand sexual desire and arousal is an ancient one, with
discussion of these constructs dating back to the work of early Hindu and Buddhist philosophers
around 500BC. The Sanskrit word ‘kama’ was first used to refer to sexual desire, which was
broadly viewed as a longing or craving for sensory pleasures (Lochtefeld, 2002). That is, the
experience of desire, kāma, was conceptualized as the experience of pleasure, or arousal. Within
the field of psychology, reference to arousal and desire were first made in the late 1880s by great
thinkers such as William James, Krafft Ebbing, and of course, Freud, who viewed desire as an
unobservable drive towards the physiological changes associated with arousal (Freud, 1923). Yet
despite this long held recognition of the centrality of sexual desire and arousal to human sexual
experience, and the growing awareness and exploration of their possible perversions, to this day,
there remains a lack of consensus regarding what these constructs actually are, and if and how
they differ. Hence, the current literature review will provide a brief account of the evolution of
conceptual classifications of sexual desire and arousal, as depicted in consecutive versions of the
Diagnostic and Statistical Manual of Mental Disorders (DSM), published by the American
Psychiatry Association (APA). This focus on the DSM was chosen due to the highly influential
nature of this text in shaping North American perspectives on normality and abnormality, both
within research and the clinical realm. This review will consider the limitations of past
diagnostic conceptualizations in view of available empirical evidence, and gaps in the literature
with regards to empirical attempts to differentiate desire and arousal will be discussed.

EVOLVING CONCEPTUALIZATIONS

Since the late 1800s, extensive psychological theorizing has taken place about the nature
of sexual desire and arousal; however, these sexual functions (and their dysfunctions) did not
become formalized as key phases of sexual responding until recently, with the establishment of
Masters and Johnson’s human sexual response cycle in 1966, and Kaplan and Lief’s amendment
to this model (to include desire) in 1977 (Masters & Johnson, 1966; Kaplan, 1977; Lief, 1977).
On the basis of several studies on the physiological changes occurring in men and women during
sexual stimulation, gynecologists Masters and Johnson (1966) delineated what they assumed to
be a universal, and linear model of human sexual response, defined by four sequential stages: sexual excitement, plateau, orgasm and resolution. However, in view of the high prevalence of complaints of low desire by treatment seekers (which were even more common than problems of genital excitement or impaired performance), Kaplan (1977, 1979) and Lief (1977) independently suggested that sexual desire, which they defined as the “psychological attitude that motivates a person to seek out sexual experience and become responsive to sexual stimuli” (Kaplan, 1979, p.9-10) was a separate and necessary phase of the sexual response cycle. They further argued that this stage preceded and triggered all other phases of sexual response, including sexual arousal. Hence, Masters and Johnson’s model was expanded to recognize the important role of desire. The resulting sequential model (including desire, arousal, orgasm, and resolution) has come to shape our conceptualization of sexual function and dysfunction. Even the categorization of sexual disorders within the DSM ultimately became based on the first three stages of this model (i.e., disorders of desire, arousal and orgasm).

Prior to the formal categorization of sexual disorders in the DSM-III (APA, 1980), sexual difficulties were conceptualized quite differently. There had been no mention of desire within the DSM-I and II, and genital arousal impairment was not even recognized in women. In fact, aside from various forms of “deviant sexuality” (e.g., sexual sadism), the only “sexual disorders” that received attention were male psychogenic impotence and female dyspareunia (classified under the “psychophysiologic genitourinary reactions”) (APA, 1952, 1968), reflecting perhaps an already present cultural valuing of erections as symbols of male prowess, and assumptions of female sexual pain being tied to emotional/ psychogenic factors such as female “frigidity”. Interestingly, both of these sexual difficulties centered on features that directly impede intercourse. In contrast, the DSM-III expanded its focus, and introduced the concepts of disordered desire and arousal for both men and women, which were identified respectively as “inhibited sexual desire” and “inhibited sexual excitement” (as manifested by an impaired erection/ lubrication-swelling response). In both cases, it was also required that the disturbance not be “caused exclusively by organic factors (e.g., a physical disorder or medication) and is not due to another Axis I disorder (except another Sexual Dysfunction)” (Criterion C).

Since the DSM-III, the diagnostic criteria for disorders of desire and arousal have undergone a series of revisions. The term “inhibited” was removed from the DSM-III-R (APA, 1987) for both disorders due to its psychoanalytic and ambiguous connotations (Brotto, 2010),
and was replaced with “hypoactive” in the case of desire disorders, and with a “failure” of genital response or “lack of subjective excitement” in the case of the arousal disorders.

“Hypoactive” sexual desire disorder (HSDD) was defined as “persistently or recurrently deficient or absent sexual fantasies or desire for sexual activity”, marking the emergence of “sexual fantasies/thoughts” as a hypothesized core feature of the construct of sexual desire. In addition, although “hypoactive sexual desire disorder” (HSDD) was used as a diagnosis for both sexes, the arousal disorders were subdivided into “male erectile disorder” (ED) and “female sexual arousal disorder” (FSAD), both of which allowed for diagnoses to be made either based on an impaired genital response or a lack of subjective excitement. However, noted in the DSM-III-R text is the proviso that typically there would “be a disturbance in both the subjective sense of pleasure or desire, and objective performance” (p. 261). It is noteworthy that even here, the terms “subjective arousal/pleasure” and “desire” were used interchangeably, despite having separate diagnostic categories for disorders of desire and arousal. It is also of interest that the initial reduction of ‘sexual excitement’ to an ‘impaired genital response’ that was seen in the DSM-III, was ultimately replaced by a distinction between these constructs in the DSM-III-R, with equal importance being given to both features as central indicators of arousal (or a lack thereof). However, for reasons that are not entirely clear, this trend was again reversed in the DSM-IV.

With respect to HSDD, the DSM-IV (APA, 1994) and DSM-IV-TR (APA, 2000) retained Criteria A from the DSM-III-R: “persistently or recurrently deficient (or absent) sexual fantasies and desire for sexual activity”, with the addition that the criterion caused “marked distress or interpersonal difficulty” (Criteria B), and a proviso that in determining clinical significance, “the judgment of deficiency or absence is made by the clinician, taking into account factors that affect sexual functioning, such as age and the context of the person’s life.” These additional criteria indicate the emergence of recognition of the importance of context and personal satisfaction in determining whether sexual fluctuations are merely the inevitable byproduct of an environment that is not supportive of desire, or truly of a “pathological” nature.

In contrast to these more subtle amendments, the changes recommended for the arousal disorders were more significant. In both the DSM-IV and DSM-IV-TR (APA, 1994, 2000) lack of subjective excitement and pleasure was dropped entirely from Criterion A for both male and female arousal disorders. A diagnosis of FSAD was to be made strictly on the basis of an
impaired “genital lubrication-swelling response” (to the exclusion of other non-genital physiologic changes) and a diagnosis of Erectile Disorder (ED) was to be made only on the basis of erectile failure (and not reduced subjective excitement). This change was justified with the intent of maintaining “compatibility between the sexes and between the DSM-IV and the more medically oriented ICD-10” (Segraves, 1996), despite the minimal available evidence in favour of doing so (Graham, 2010). In addition, it was recommended that rather than retain the concept of subjective excitement in the diagnostic criteria, this construct instead be listed as an example of a Sexual Dysfunction Not Otherwise Specified (SDNOS) (302.70). Hence, overall, the DSM-IV criteria gave way to neglect of the role of subjective feelings of excitement in definitions of arousal, an exclusive emphasis on genital impairment for both men and women, and a maintained separation between desire and arousal disorders.

Much debate has since taken place regarding the validity of DSM-IV and DSM-IV-TR definitions of desire and arousal, fueled by conflicting empirical findings. In addition, attempts to resolve this debate have been complicated by the lack of consensus regarding what these constructs actually are, and how they should best be operationalized. Specifically, the DSM-IV-TR conceptualization of hypoactive sexual desire disorder (HSDD), with its exclusive emphasis on deficient sexual fantasies and desire for sexual activity (APA, 2000), has been strongly criticized for providing an incomplete representation of the expression of desire, particularly in women (for a review, see Brotto, 2010). It has been noted that unlike men, women do not regularly experience sexual fantasies, but rather, may consciously evoke fantasies during sexual activity as a way of boosting their levels of sexual arousal (Brotto, Heiman & Tolman, 2009). Women are also argued to be less likely to experience “spontaneous” urges for sexual activity but instead experience desire or sexual willingness in response to being sexually stimulated or aroused (termed “responsive desire”; Basson, 2000). They may also be motivated to engage in sexual activity for reasons outside of sexual desire (e.g., to feel close to their partners), and may present with other markers of desire that may be just as important (e.g., flirting, soliciting desire in others; Meana 2010). For example, in what has been termed the “incentive motivation model,” researchers have even gone on to suggest that sexual motivation does not exist “within” the individual (i.e., there is no “spontaneous desire”), but rather that all desire (and arousal) is triggered (i.e., responsive) and occurs as an emotional response to the presence of sexually relevant stimuli interacting with a sensitive sexual response system (Laan & Both, 2008; Laan &
Everaerd, 1995; Singer & Toates, 1987). To date, numerous definitions of desire have been offered, differing in the relative emphasis they place on the biological (e.g., hormones and neurotransmitters), behavioural (e.g., engagement in sexual activity), cognitive (e.g., sexual thoughts/ fantasies, wishes), motivational (e.g., drive or forces that incline towards sexual activity), emotional (e.g., feelings of pleasure, excitement, reward) and social (e.g., relationship and cultural influences) aspects of desire (e.g., Basson, 2000; Berridge, 1996; Baumeister, 2001; Giles, 2008; Levine, 1987, 2002; Regan & Berscheid, 1999; Tiefer, 2001). Such alternative formulations have differed in the degree to which they consider contextual factors, such as the adequacy of sexual stimulation, relationship status and satisfaction, incentives for sexual activity, aging, normative individual differences, sexual histories (e.g., trauma), sexual beliefs, and sexual responsivity/ arousability, in the distinction between “normal” and “abnormal” levels of desire. Unfortunately, none of these alternative formulations has yet received much direct empirical examination (for exceptions, see Giles & McCabe, 2009; Sand & Fisher, 2007) and to this day, there remains little consensus regarding the most viable operationalization of sexual desire.

It is also noteworthy that the same conceptual dilemma exists for men, albeit to a lesser degree. Specifically, while research has indicated that men experience sexual fantasies and a desire for sexual activity with greater frequency and intensity than women, men and women may actually be quite similar in how they express sexual desire (for a review, see Brotto, 2010b). That is, contrary to claims about a “male-centered” diagnostic conceptualization of desire, the current operationalization of HSDD may be equally narrow in its ability to capture the experience of desire in men. Significant within-gender variability is also evident in the expression of male desire, reinforcing the suggestion that for men, just as for women, no one common cognitive or behavioral definition of sexual desire exists (Regan & Berscheid, 1996).

Similarly, our conceptual understanding of sexual arousal is no more established than it is for desire. The DSM-IV-TR operationalization of arousal disorders focuses exclusively on genital impairment, to the neglect of subjective feelings of excitement (APA, 2000), which may be particularly unrepresentative of arousal difficulties in women. Specifically, a growing body of evidence has indicated a lack of concordance in women between physiological and self-report measures of arousal, as well as equivalent levels of genital arousal amongst women reporting arousal difficulties as compared to healthy controls (for a review, see Graham, 2010; Chivers, Seto, Lalumière, Laan & Grimbos, 2010). These findings have called into question the validity of
FSAD as a diagnostic category, and the majority of researchers now agree that physiological arousal is at best one piece of the overall picture of sexual arousal, particularly in women. The exclusive emphasis on genital impairment featured in the DSM-IV-TR criteria for arousal disorders for men (i.e., erectile dysfunction) has also been contested by men who identify their sexual arousal using multiple cues, only one of which is the presence of an erection (Janssen et al., 2008). Men have also been found to make distinctions between genital and subjective arousal (such that one can be experienced without the other), and lower concordance rates (i.e., genital-subjective arousal agreement) have typically been found in men with sexual difficulties (for a review, see Chivers et al., 2010). However, the exact nature of the interaction between self-report and genital indicators of arousal remains unknown for both men and women, and so it has been unclear how to weigh or reconcile the often discrepant information yielded from these different measures. To complicate matters, the construct of “subjective sexual arousal” (SA) has been operationalized in diverse and inconsistent ways, ranging from ‘awareness of genital change’ to ‘feelings of mental excitement’, with little agreement about the most intrinsic features of this construct.

In addition, with respect to both sexual desire and arousal, the field has found itself in a conceptual predicament: without consensus on how to independently define these constructs, it has become difficult, if not impossible to determine if and how they differ from each other. This is further complicated by the fact that while research has examined various correlates and expressions of these constructs (e.g., cues/ triggers for desire or arousal, diverse sexual behaviors, motivations/ incentives for sexual activity, correlations between subjective and physiological arousal, measurement of the arousal response to various stimuli), there has been very little research attempting to define the underlying phenomenology of these constructs or to qualify their similarities and differences (e.g., with respect to etiology, course, risk/ vulnerability factors, psychosocial profiles, etc.). Moreover, while numerous theories have recently been proposed to account for the workings of these constructs (e.g., incentive motivation model; “circular” models of sexual response etc.), few of these have been empirically tested. However, after over a decade of quantitative and qualitative research on the topic, three conclusions have emerged: 1) desire and arousal disorders are highly comorbid, particularly in women (Laumann, Paik & Rosen, 1999; Segraves & Segraves, 1991); 2) both men and women experience difficulty conceptually differentiating these constructs (Graham et al., 2004; Janssen et al., 2008); and 3)
contrary to what was assumed by Kaplan and others, sexual response is not necessarily a linear cycle, with desire leading to arousal; for both men and women, desire can be found at times to precede arousal, at other times follow it, and even to occur simultaneously (Basson, 2001). Consequently, due to the lack of available evidence to support the differentiation of desire and arousal, researchers have asserted that there is in fact no good reason to assume that feelings of desire and arousal are two fundamentally different things” (Laan & Both, 2008, p. 510) but rather, that they are “two sides of the same coin”.

As a result of these findings, the recent amendments to the DSM-5 (APA, 2013) have been the most radical yet. For women only, desire and arousal disorders were collapsed under the new diagnosis of Sexual Interest and Arousal Disorder (SIAD), a diagnosis requiring a combination of symptoms of both disorders. In addition, the exclusive categories of HSDD and FSAD were removed. In contrast, due to the small body of empirical literature that was available, and an already presumed gender difference in the desire-arousal distinction, independent diagnoses of erectile dysfunction and hypoactive sexual desire remained in place for men, with criteria changes directed mainly towards creating more specific operationalizations (i.e., specifying frequency and duration criteria) or the addition of dimensional descriptors (e.g., individual vulnerability vs. psychiatric comorbidity; partner/relationship/medical/ cultural and religious factors) (Brotto, 2010b, Segraves, 2010).

While these diagnostic changes mark a significant step forward in conceptualizations of desire and arousal, and remedy many of the problems identified with previous DSM operationalizations (e.g., accounting for relationship factors, comorbidity issues, broader expressions of desire/ arousal, specificity of duration and frequency criteria), these changes are currently based on limited empirical evidence. To date, despite the assertion that desire and arousal difficulties go hand-in-hand, there have been no strong empirical attempts to assess their differentiability by recruiting separate groups of desire and arousal disorder sufferers, using clearly defined operational criteria. Instead, SIAD rests primarily on a body of qualitative research indicating difficulties differentiating the constructs, and on clinical observation of their comorbidity (Brotto, 2010; Graham, 2010; Graham et al., 2004; Janssen et al., 2008). However, the mere comorbidity of symptoms/ syndromes does not guarantee that these issues are one in the same, particularly in the absence of a grounded understanding of why this may be the case, or without first making a systematic attempt to empirically differentiate them. Secondly, it is not
clear why the diagnosis of SIAD was limited exclusively to women, particularly in view of recent evidence indicating men’s parallel difficulties in differentiating desire and arousal and the high comorbidity rates of desire and arousal disorders (Janssen, McBride, Yarber, Hill, & Butler, 2008; Segraves & Segraves, 1991). Third, as has been the case with each prior version of the DSM, the symptom criteria in the DSM-5 are not empirically derived, nor have they been empirically substantiated. In fact, it is not clear how the specific symptoms comprising a diagnosis of SIAD were selected from all possible indicators to represent the joint construct of desire and arousal. While two of the six symptoms are carried forward from previous diagnostic definitions of desire and arousal (i.e., reduced sexual interest, reduced sexual fantasies), the remaining four represent new additions, emerging primarily from clinical reports/observation (e.g., reduced receptivity/initiation, reduced sexual excitement/pleasure, reduced genital and nongenital sensations), or from theoretical supposition (e.g., reduced sexual interest/arousal in response to any internal or external erotic cues (e.g., written, verbal, visual); derived from the Incentive Motivation model). However, there has actually been very little empirical examination of the validity of these symptoms as central indicators of desire and/or arousal disorders.

While the majority of researchers are currently in agreement about the interrelated nature of desire and arousal, the field is still lacking in a strong theoretical account for exactly how and why these constructs might be related (for a recent attempt, see Laan & Both, 2008). In addition, while various reviews exist of the separate literatures on desire and arousal (e.g., Brotto, 2010; Graham, 2010; Meana, 2010), the majority of these only briefly address the arousal-desire distinction, mostly to note the challenges in separating them. Finally, most theoretical or empirical work on desire or arousal has pertained exclusively to either men or women, or to sexually functional or dysfunctional populations, with few attempts to integrate the literature across the sexes and across sexual functioning status (for an exception, see Baumeister, Catanese & Vohs, 2001; Chivers et al., 2010).

It may be reasonable to question at this point whether the pursuit to define and distinguish desire and arousal is in fact a useful one. However, while the debate may seem at first like a mere exercise in semantics, its effects are far reaching. The power of language to affect perception (e.g., of normality versus abnormality) has long been recognized in fields such as communications, marketing, and sociology, and its impact in the mental health domain is no less important. Whether desire and arousal are ultimately seen as equivalent functions will impact
how researchers and clinical practitioners understand and approach these issues, particularly with respect to the development and selection of assessment and treatment methods. It will also affect how individuals understand their own sexual functioning, and the types of self-diagnoses that are made.

Hence, in view of the aforementioned gaps in the theoretical and empirical literature, the current dissertation project aimed to advance the field through an empirical examination of the differentiability of desire and arousal in sexually healthy and clinical populations of men and women, on psychophysiological and psychosocial patterns. Specifically, we sought to determine the feasibility of distinguishing desire and arousal through the recruitment of people meeting DSM-IV-TR\(^1\) diagnostic criteria exclusively for disorders of desire, arousal, both disorders of desire and arousal, as compared to a matched sample of men and women without sexual difficulties. In order to determine diagnoses, a comprehensive interview assessing numerous theoretically supported facets of desire and arousal, including those comprised in DSM-IV and DSM-5 definitions of these constructs, was developed and employed (see Appendix E). Eligible participants completed a psychophysiological examination of levels of genital arousal, subjective arousal and desire, in response to neutral and erotic stimuli, using sophisticated psychophysiological tools, as well as both continuous and discrete (retrospective) measurement of arousal patterns (see Appendix F for an example of retrospective arousal measurement). Participants also completed a package of standardized questionnaires assessing various hypothesized psychosocial vulnerability factors for these sexual difficulties to identify whether groups were characterized by unique psychosocial profiles. What follows are the results of three studies: the first examines the feasibility of recruiting distinct groups of desire versus arousal sufferers using explicit operational criteria, and the other two studies provide a comparison of the resulting groups on psychophysiological and psychosocial indices, first in men and then in women. This dissertation represents the first direct empirical comparison of men and women with desire versus arousal disorders on psychophysiological patterns in response to sexual stimuli, as well as on numerous psychosocial factors proposed to influence these facets of sexual functioning. On the basis of this empirical work, this thesis concludes with a refined

\(^1\) At the start of this dissertation research, the DSM-5 had not yet been released, and proposed diagnostic criteria for SIAD had not yet been published. Hence, for the purpose of this dissertation, participants were recruited in line with explicitly operationalized DSM-IV-TR criteria; however, DSM-5 symptom criteria were also assessed.
conceptualization of the relationship between desire and arousal for men versus women, as well as with suggestions for the classification, and measurement of these sexual difficulties. Proposed directions for future research are also offered.
References


Journal of Sexual Medicine, 7, 2015–2030.
Levine, S.B. (2002). Reexploring the concept of sexual desire. Journal of Sex & Marital
Therapy, 28, 39–51.


DISENTANGLING DESIRE AND AROUSAL: A CLASSIFICATORY CONUNDRUM

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Abstract

A controversial proposal to collapse disorders of desire and arousal is pending in the *DSM-5*. Yet no study has attempted to empirically distinguish these disorders by using explicit operational criteria to recruit and compare distinct groups of low desire versus low arousal sufferers. The goal of the current study was to see whether it was possible to find medically healthy men and women meeting clearly operationalized *DSM-IV-TR* criteria for HSDD and/or FSAD/ED, and compare them to matched controls on patterns of desire and arousal. To assess operational criteria, respondents completed a comprehensive telephone-screening interview assessing *DSM-IV-TR* and *DSM-5* criteria, as well as standardized self-report measures of sexual functioning. The use of operationalized *DSM-IV-TR* criteria to recruit participants led to the exclusion of over 75% of those reporting sexual difficulties, with the primary reason for exclusion being failure to meet at least one central diagnostic criterion for HSDD or FSAD/ED. The application of the proposed *DSM-5* criteria was even more restrictive, and led to the exclusion of all but 4 men and 1 woman using the original four-symptom criteria, and 4 men and 5 women using the revised three-symptom criteria. Cluster analyses supported the distinction between desire and genital arousal difficulties, and suggest that different groups with distinct clusters of symptoms may exist, two of which are consistent with the *DSM-5* criteria. Overall, results highlight the need for revisions to the diagnostic criteria, which, as they stand, do not capture the full range of many people’s sexual difficulties.

KEY WORDS: Hypoactive sexual desire disorder (HSDD), female sexual arousal disorder (FSAD), erectile dysfunction (ED), diagnosis, classification
Introduction

The questionable validity of current diagnostic conceptualizations of arousal, desire and their distinction has been the topic of extensive ongoing discussion. This has been propelled by the controversial proposal to collapse disorders of arousal and desire in the fifth upcoming version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), under the new diagnosis of Sexual Interest/Arousal Disorder (SIAD; Brotto, 2009, 2010; Graham, 2009; see Table 1 for diagnostic criteria). This proposal was originally made for both men and women (with small gender variations in diagnostic criteria) and has been justified on the basis of three bodies of evidence: 1) quantitative data indicating the high comorbidity of arousal and desire difficulties in men and women (Basson et al., 2003; Corona et al., 2004; Donahey & Carroll, 1993; Fugl-Meyer & Fugl-Meyer, 2002; Laumann, Paik, & Rosen, 1999; Rosen, Taylor, Leiblum, & Bachmann, 1993; Rosen et al., 2000; Sanders, Graham, & Milhausen, 2008; Segraves & Segraves, 1991); 2) qualitative data pointing to the difficulties experienced by men and women in differentiating these constructs (Brotto, Heiman, & Tolman, 2009; Graham, Sanders, Milhausen, & McBride, 2004; Janssen, McBride, Yarber, Hill, & Butler, 2008); and 3) findings indicating the non-linear sequence of sexual response stages for both men and women, with desire occasionally preceding arousal, sometimes following it, and occasionally being indistinguishable from it (Graham et al., 2004; Janssen et al., 2008). On the basis of these findings, it has been concluded that “…there is no good reason to assume that feelings of desire and arousal are two fundamentally different things” (Laan & Both, 2008, p. 510) but rather, that they are “two sides of the same coin”.

While empirical evidence supporting the division of arousal and desire disorders is undeniably sparse, it may be premature to entirely throw out this distinction before identifying the theoretical and empirical reasons that might account for this negligible research base. At the forefront of theoretical confounds is the lack of consensus regarding the operational definitions of the constructs of desire and arousal in both women and men. Specifically, the current diagnostic conceptualization of hypoactive sexual desire disorder (HSDD), with its exclusive emphasis on deficient sexual fantasies and desire for sexual activity (APA; American Psychiatric Association, 2000), has been strongly criticized for providing an incomplete representation of the expression of desire, particularly in women (for a review, see Brotto, 2009). While several other formulations have been forwarded as alternatives (e.g., Basson, 2000; Everaerd & Laan, 1995;
Laan & Both, 2008; Levine, 2002; Meana, 2010; Regan & Berscheid, 1999; Schnarch, 2000; Singer & Toates, 1987) to account for contextual factors such as relationship status and satisfaction, incentives for sexual activity, aging, responsivity to a sexual stimulus, and the adequacy of sexual stimulation, to date there has been little empirical examination of the viability of these models (for exceptions, see Giles & McCabe, 2009; Sand & Fisher, 2007).

Similarly, our conceptual understanding of female sexual arousal is no more established than it is for desire. The current diagnostic operationalization of female sexual arousal disorder (e.g., FSAD) focuses exclusively on a “persistent and recurrent” impairment in genital response, to the neglect of subjective feelings of excitement (APA, 2000). Yet in view of a substantial body of evidence indicating desynchrony between physiological and self-report measures of arousal and thus calling this definition into question, the majority of researchers now agree that physiological arousal is at best one piece of the overall picture of sexual arousal, particularly in women (for a review, see Chivers, Seto, Lalumière, Laan, & Grimbos, 2010; Graham, 2009). However, the exact nature of the interaction between self-report and genital indicators of arousal remains unknown, and so it is unclear how to weigh or reconcile the often discrepant information yielded from these different measures. To complicate matters, the construct of “subjective sexual arousal” (SA) has been operationalized in diverse and inconsistent ways, ranging from “awareness of genital change” to “feelings of mental excitement”, with little agreement about the most intrinsic features of this construct. Hence, with respect to both sexual desire and arousal, we find ourselves in a conceptual predicament: without consensus on how to define (and thus, measure) these constructs, it is difficult, if not impossible to determine if and how they differ from each other.

While much research attention has been allocated towards better defining and distinguishing arousal and desire in women, very little has been comparatively devoted to studying this issue in men. Yet it is noteworthy that for men, the same conceptual dilemma exists (albeit to a lesser degree). Specifically, with respect to desire, research indicates that men experience sexual fantasies and a desire for sexual activity with greater frequency and intensity than women, yet men and women may actually be quite similar in how they express sexual desire (for a review, see Brotto, 2010). That is, contrary to claims about a “male-centered” diagnostic conceptualization of desire, the current operationalization of HSDD may be equally narrow in its ability to capture the experience of desire in men. Significant within-gender variability is also
evident in the expression of male desire, reinforcing the suggestion that for men, just as for women, no one common cognitive or behavioral definition of sexual desire exists (Regan & Berscheid, 1996). With respect to sexual arousal, the exclusive operationalization of arousal disorders as impairments in genital response (i.e., erectile dysfunction; ED) is also contested by men who identify their sexual arousal using multiple cues, only one of which is the presence of an erection (Janssen et al., 2008). Men also make distinctions between genital and subjective sexual arousal (such that one can be experienced without the other), and report similar difficulties distinguishing desire from mental arousal (for a review, see Brotto, 2010). Thus, comparable conceptual difficulties exist in operationalizing and differentiating desire and arousal in men, particularly with respect to their overlap with “mental arousal” – a construct that until recently had been virtually overlooked.

In addition to theoretical arguments, empirical concerns also caution against making hasty conclusions about the differentiability of arousal and desire disorders in men and women. Specifically, as far as we know, there has yet to be a systematic attempt to assess the feasibility of empirically distinguishing these disorders by recruiting and comparing distinct groups of HSDD sufferers to those with disorders of arousal. In fact, the few empirical studies that have purported to differentiate or compare these disorders in men and women have typically done so through the recruitment of a low desire or arousal group, or a clinical group with heterogeneous sexual difficulties, from which they have attempted to roughly partial out for comparison those with arousal versus desire disorders (e.g., Berman, Berman, Toler, Gill, & Haughie, 2003; Corona et al., 2004; Clayton, DeRogatis, Rosen, & Pyke, 2012; DeRogatis et al., 2010; el Sakka, 2006; Nutter & Condron, 1985; Maserjian et al., 2012; Schiavi, Schreiner-Engel, White, & Mandeli, 1988; Srilatha, Adaikan & Chong, 2007; Wiegel, Meston, & Rosen, 2005). The majority of these studies have also been marked by a number of other methodological limitations, each of which will be considered and improved upon within the current study.

Studies that have compared individuals with low desire to those with low arousal (with and without diagnosis of the other) have typically been characterized by vaguely specified recruitment strategies (e.g., no details provided about the textual content of advertisements, convenience samples employed etc.) (DeRogatis et al., 2010; el Sakka, 2006; Nutter & Condron, 1985; Schiavi et al., 1988; Srilatha et al., 2007; Wiegel et al., 2005), vague or narrow inclusion criteria (e.g., all participants required to be in stable, nonconflictual, long-term relationships)
(Derogatis et al., 2010; el Sakka, 2006; Schiavi et al., 1988) and clinical groups that have not been selected or differentiated in accordance with standardized diagnostic criteria (and only occasionally with cutoff scores on questionnaires) (Berman et al., 2003; Corona et al., 2004; el Sakka, 2006; Nutter & Condron, 1985; Schiavi et al., 1988; Srilatha et al., 2007). These limitations thus cast doubt on the general representativeness of these samples to desire and arousal sufferers. In addition, researchers have often neglected to ensure or to specify that their control and clinical groups were free of other medical or psychological difficulties that might influence sexual functioning (Corona et al., 2004; el Sakka, 2006; Nutter & Condron, 1985; Srilatha et al., 2007; Wiegel et al., 2005). While comorbid sexual dysfunction has often been stipulated as an exclusion criterion, few researchers have reported the extent of co-occurring subclinical sexual difficulties in purportedly distinct clinical groups. In fact, it has not even been clear that members of the low desire groups were free of low arousal symptoms, and vice versa (e.g., Berman et al., 2003; Corona et al., 2004; Derogatis et al., 2010; Nutter & Condron, 1985; Wiegel et al., 2005). Finally, most of these studies have operationalized low arousal exclusively in physiological terms (to the neglect of subjective feelings of excitement), relied exclusively on self-report of an impaired genital response (without corroboration by physiological measurement) and made no attempt to assess or select groups on the basis of low mental arousal as compared to low desire and genital arousal (e.g., Berman et al., 2003; Corona et al., 2004; Derogatis et al., 2010; el Sakka, 2006; Nutter & Condron, 1985; Srilatha et al., 2007; Wiegel et al., 2005). Although this is in line with DSM-IV-TR definitions of FSAD/ED, this limited conceptualization and assessment of arousal has precluded researchers from better understanding the relationship between the subjective and physiological components of arousal. In summary, studies comparing low desire and arousal groups have not sufficiently described or controlled the clinical characteristics of their purportedly distinct samples, thus making it difficult to draw any strong conclusions about the similarities and differences between these study populations.

In contrast to the few studies that attempted to tease apart and compare individuals with arousal versus desire difficulties, other studies have opted instead to recruit a clinical group comprised of those suffering from disorders of both desire and arousal, which bypasses the complications of trying to separate these highly comorbid problems (e.g., Brotto, Basson, & Luria, 2008; Caruso et al., 2004; Meston & McCall, 2005). These studies presented with similar methodological issues, including ambiguous recruitment strategies, nonadherence to established
diagnostic criteria in the selection of clinical groups, unclear methods regarding the assessment of comorbid and subclinical sexual difficulties (including separation of arousal and desire problems), and little detail about the exclusion of respondents who may have failed to meet diagnostic criteria for both disorders. In addition, by combining people with arousal and desire difficulties into one ambiguously defined group, these studies inadvertently assume that one clinical condition (e.g., FSAD) is essentially unaltered by the presence of another comorbid condition (e.g., HSDD), thereby neglecting the possibility that there may be interactions between these dysfunctions that may be clinically meaningful (e.g., the forming of a new type of disorder that is different from either one alone).

Finally, unlike the above studies in which attempts were made to differentially select for disorders of desire and arousal, the majority of empirical studies on low desire and arousal have been less stringent about the “purity” of their clinical group, taking comorbidity of sexual difficulties as a “given”. In addition to the methodological limitations previously discussed, many of these studies have opted to recruit participants with either low desire (Arnow et al., 2009; Buster et al., 2005; Meston & Gorzalka, 1996; Meston, 2003; McCall & Meston, 2007a; DeRogatis et al., 2008; Rosen, Connor, & Maserejian, 2010; Segraves et al., 2001; Stoleru et al., 2003; van der Made et al., 2009), or low arousal (Brotto, Basson, & Gorzalka, 2004; Calvalheira, Brotto, & Leal, 2010; Caruso, Intelisano, Lupo, & Agnello, 2001; Ferguson et al., 2003; Laan, van Driel, & van Lunsen, 2008; Liao et al., 2008; McCall & Meston, 2007b; Meston, 2006; Meston, Rellini, & Telch, 2008; Meston, Rellini, & McCall, 2010; Rosen et al., 2000) as compared to a healthy control and/or another clinical group, with few efforts made to screen out or separate those with comorbid sexual difficulties. While some comorbidity of sexual difficulties is to be expected in a clinical sample, few studies specified the exact nature or extent of this comorbidity, and so it is unclear to which clinical populations these study results can be generalized. In addition, the possibility that interactions between these varied sexual difficulties might have altered the severity or form of the resulting dysfunction has been unacknowledged. Finally, even in those cases where differential diagnoses were made between arousal and desire disorders within a clinically heterogeneous group, the small sample sizes precluded meaningful group comparisons (Bancroft et al., 2005; McCall & Meston, 2006; Nobre, 2009; Rowland & Heiman, 1991; Segraves et al., 2001). Hence, in each of these studies, the clinical groups (even when separated into categories of low arousal or desire) had sexual difficulties that might best be
characterized as heterogeneous in nature, consequently precluding the researchers from answering any specific questions they may have initially had about the distinct qualities of either disorders of desire or arousal.

**Aims**

The reliable identification and differentiability of arousal and desire difficulties across men and women is an issue that should be addressed by a systematic, cross-gendered attempt to empirically separate and compare these difficulties. A prerequisite to doing so, however, first involves the explicit operationalization of the diagnostic criteria for arousal and desire disorders. Hence, the initial goal of the current study was to use clearly operationalized *DSM-IV-TR* criteria for arousal and desire disorders to assess the probability of finding medically and psychologically healthy participants who, in fact, meet these criteria (see Table 2 for criteria).

Specifically, the current study aimed to recruit men and women meeting *DSM-IV-TR* criteria for HSDD (with no difficulties with arousal), those with ED or FSAD (and no difficulties with desire), those meeting diagnostic criteria for disorders of both desire and arousal, and those with no reported sexual difficulties. We also aimed to identify whether we could empirically separate groups on the basis of low subjective arousal difficulties (SAD), as distinct from either low desire or low genital arousal. Participants that met operational criteria went on to participate in a psychophysiological study comparing groups on their genital and subjective arousal in response to a sexual stimulus, as well as their self-reported patterns of desire and arousal (larger study still underway).

However, using explicitly operationalized *DSM-IV-TR* criteria to recruit participants proved to be complicated and led to the exclusion of 71.7% of those that were screened and over 75% of those reporting sexual difficulties (not including those that dropped out or were temporarily excluded). In view of this large exclusion rate, an analysis of this recruitment data seemed warranted. Hence, the current study will provide a descriptive analysis of the sample composition, primary reasons for exclusion and predictors of study eligibility for those who were screened in accordance with selected operational criteria (see method for details). A secondary goal was to evaluate the relative utility of the diagnostic criteria proposed for the *DSM-5* (both the original 2009 criteria and the revised 2011 version)\(^2\), as compared to current *DSM-IV-TR* criteria.

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\(^2\) At the time of study administration and manuscript preparation, revisions to the proposed 2009 *DSM-5* criteria had not been released. While we have attempted to test the impact of the
criteria, with respect to its ability to capture the range of sexual difficulties reported by study respondents. A final goal was to explore the clustering of sexual symptoms for both men and women in this study to identify potential sexual problem subtypes. We hypothesized that the diagnostic criteria currently proposed for the DSM-5 would also be empirically untenable and would lead to the exclusion of an even greater proportion of individuals than the DSM-IV-TR.

**Method**

**Participants**

Two hundred and twenty-seven men and women (113 men, 114 women) were recruited from health clinics and the community in response to two sets of advertisements, the first recruiting healthy controls (“Sexual Arousal: Is it in your mind or body?”), and the second recruiting individuals with low desire and arousal (“Do you have low sexual interest and/or difficulty becoming sexually aroused?”). Advertisements solicited “medically healthy, heterosexual men and women between the ages of 18-50 to participate in a study examining how feelings of sexual desire and mental arousal impact physical sexual arousal.” Advertisements for both groups were placed online (i.e., Craigslist, Kijiji, university classifieds, local websites), in local newspapers, on flyers posted throughout the community (e.g., laundromats, cafes, and community centres), and were read over the local radio. Low desire and arousal participants were also recruited via posters and information pamphlets (with the same headings specified above) distributed to local sexologists and psychologists, sexual health clinics, and local hospitals.

Advertisements for the latter were also placed on the webpage of a university-affiliated sex and couple therapy service, and assessment staff at this clinic provided study information to all new clients seeking treatment for arousal and/or desire difficulties.

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3 The remaining text of the ad comprised a description of the procedure for the larger study, terms of confidentiality and other ethical information presented in accordance with Research Ethics Board guidelines. The full textual content of advertisements is available upon request.
Operational Criteria

Operational criteria were assessed via a detailed telephone screening as well as through sexual functioning questionnaires sent to those participants who qualified for participation after the phone screening (see Measures for more details). Participants were excluded if they reported any of the following: being outside the specified age range (18-50)\(^4\); non-heterosexual orientation\(^5\); untreated sexually transmitted infection or disease; diagnosis or treatment (e.g., medication use) within the past 6 months of any psychopathology known to affect sexual functioning (e.g., depression, eating disorders); current untreated Axis 1 disorders (subthreshold symptomatology was permitted); having no prior sexual experience; discomfort or objections to watching sexually explicit videos; and avoidance of gynecological/urological exams due to feared genital pain. Additionally, the following exclusion criteria aimed to rule out other factors impacting sexual function, including use (within the past six months) of medications with sexual side effects (e.g., antidepressants); a history of genital/pelvic surgeries or injuries (e.g., prostatectomy, oophorectomy); hormonal therapy/treatment (e.g., cancer treatment); or any chronic medical conditions with possible sexual side effects (e.g., diabetes, polycystic ovarian syndrome). Further exclusion criteria for women included being pregnant or breastfeeding, being peri- or post-menopausal, and having menstrual cycle irregularities (e.g., due to medical conditions or contraceptives such as Depo Provera) within the past 6 months; this was done in order to rule out the confounding effects of these hormonally-based reproductive factors, which have been associated with significant changes in sexual functioning (Basson, 2007; Derogatis et al., 2004; Morrell, Dixen, Carter, & Davidson, 1984; Witting et al., 2008; van Goozen et al., 1997). While no stipulations were put on contraceptive use or relationship status/duration, despite their association with changes in sexual functioning, groups were matched on these variables, as well as on age (+/- 3 yrs).

\(^4\) The upper end of the age range was extended from 45 to 50 after a few months of study recruitment. Providing that women were not yet menopausal, there was no empirical reason to assume that women between the ages of 45 and 50 would differ from their slightly younger counterparts. Prior to this modification in criteria, one man and one woman between the ages of 45-50 were excluded.

\(^5\) Since participants were being recruited for a larger psychophysiological study in which the sexual stimulus employed across all subjects was an erotic film clip depicting heterosexual activity, individuals who self-identified as non-heterosexual had to be excluded.
In order to be selected for the control group, participants needed to deny having “any sexual difficulty” in response to an open-ended question on the telephone screening interview (i.e., “do you believe you’re currently experiencing any sexual difficulties?”), and negate the presence of any specific sexual symptoms in response to directed interview questions assessing the diagnostic criteria for the sexual disorders. Participants were also required to have engaged in sexual activity within the past six months. Assignment to clinical groups required freely reporting low desire or low arousal in response to the open-ended question about whether the participant “believed they were experiencing any sexual difficulties”, in addition to follow-up endorsement of the symptom being present 75% of the time over the past 6 months, in the majority of sexual situations, and the cause of significant distress or interpersonal interference (See Table 2 for category-specific criteria). The only exception to this was for the question assessing the DSM-5 criterion of receptivity to a sexual stimulus. In the absence of explicit operationalization of the criterion “sexual interest/ arousal being rarely (2009 wording) or infrequently elicited (2011 wording) by a sexual stimulus”, we chose a cutoff of receptivity occurring less than 15% of the time.

Given the highly intertwined nature of most sexual difficulties, it was not realistic to completely exclude participants with mild comorbid sexual difficulties from our low desire and/or arousal groups (e.g., severe impairment in genital arousal would inevitably present some difficulties reaching orgasm). However, unlike past studies, the extent of permissible comorbid sexual symptoms was tightly regulated such that no participant was permitted to meet the diagnostic criteria for any other sexual disorder (unless they were in the combined low desire/arousal group), as assessed by items on the telephone screening interview. For example, while some difficulty reaching orgasm was allowed, it was to be of less than 6 months duration, occurring less than 75% of the time, and not generalized across all sexual situations. Women with superficial dyspareunia were included only if their pain occurred exclusively during intercourse and could be determined to be the result of vaginal dryness resulting from low sexual arousal. In other words, comorbid sexual difficulties were permitted if they were determined to be secondary to desire or arousal difficulties. Efforts were made to keep HSDD and FSAD/ED groups homogeneous with respect to comorbid arousal and desire difficulties, respectively, by excluding anyone with more than mild, transient and situational symptoms of the other disorder.
Participants’ reports of sexual difficulties on the telephone screening were also required to be generally corroborated by their domain scores on the sexual functioning measures. In line with established cutoffs for controls, healthy women were required to obtain a total score above 26.55 on the FSFI (out of a possible total of 36) (Wiegel et al., 2005). In addition, given that a woman could meet this total cutoff score while still scoring in the dysfunctional range on an individual scale, control women were also required to have a raw score of “4” or more (out of 5) on each of the items for the individual domains. Similarly, healthy men were required to have a total score above 65 on the IIEF (out of a possible total of 75), and a raw score of “4” or more (out of 5) for each of the items across individual domains. Participants who reported sexual difficulties that were uncorroborated by domain scores (e.g., scoring “4s” or “5s” on desire questions on the FSFI/ IIEF despite reports of low desire on the phone screening, or who reported sexual difficulties on the FSFI/ IIEF despite reporting no sexual difficulties on the phone screen), were excluded.

Procedure

All respondents to study advertisements completed a detailed telephone screening, which was conducted by the PI, or by a trained research assistant who was instructed to regularly confer with the PI for clarification if a participant’s eligibility status was in question. During the telephone screening, all participants were first provided with a detailed description of the screening interview as well as the requirements of the larger study, and were asked for their consent to be queried about their physical and mental health, relationship and sexual history, experience with watching erotic material, and on the diagnostic criteria for the sexual disorders. If a subject was determined to be ineligible early in the telephone screening (e.g., she was postmenopausal or had an interfering medical condition), the interview was immediately terminated and the participant was thanked for their time. Those who met inclusion criteria assessed during the phone interview were emailed a measure of sexual functioning to complete.

Low desire and arousal participants were initially selected based on whether they met specific cutoff scores on the sexual functioning questionnaires (chosen in accordance with means reported by previous investigators for control and clinical groups; Meston, 2003; Rosen et al., 2000). However, this criteria was later modified in recognition of the fact that the FSFI was not designed to be a diagnostic tool, and does not yet possess well-validated clinical cutoff scores for all sexual domains (for recent efforts at this, see Gerstenberger et al., 2010; Wiegel et al., 2005).
and send back. Participants whose responses on the screening interview were corroborated by sexual functioning measures were then invited to participate in the psychophysiological study of desire and arousal (study in progress). Those whose responses were not corroborated were debriefed about their exclusion, thanked for their time, asked for their consent to be contacted about relevant future studies, and offered information about treatment resources. Detailed records were kept about reasons for exclusion for all ineligible participants.

The above screening procedure received approval from our Research Ethics Board as part of the larger psychophysiological study. Participants received no monetary reimbursement for their participation in this portion of the study.

Measures

**Telephone Screening Interview.** This interview consists of three parts: part one provides participants with a detailed description of the larger study and with the terms of their consent; part two queries those who consent to continue with the interview on their medical, reproductive and mental health, use of medications, relationship and sexual history, and experience with watching erotic material; and part three assesses participants on gender-specific DSM-IV-TR and DSM-5 criteria for the sexual disorders (including frequency, onset/duration, contextual occurrence, distress and percentage change associated with the difficulty). Specifically, part three assesses women over the past 6 months on their experience of the following: i) absent or reduced ability to attain or maintain an adequate lubrication or blood flow swelling response (despite their verbal reports of adequate sexual stimulation) (i.e., “Have you experienced any difficulty attaining or maintaining an adequate lubrication or genital blood flow response until completion of sexual activity?”) (DSM-IV-TR and DSM-5 criterion); ii) absent/reduced interest in sexual activity (i.e., “Would you say that you’ve experienced little or no interest in sexual activity?”) (DSM-IV-TR and DSM-5 criteria), and absent/reduced pleasurable sexual thoughts or fantasies (i.e., “How often have you experienced positive or pleasurable sexual thoughts or fantasies?”) (DSM-IV-TR and DSM-5 criteria); iii) absent/reduced sexual interest/receptivity demonstrated in multiple ways (e.g., including lack of initiation, rare receptivity to a partner’s attempts to initiate, no seeking of sexual material, decreased attraction to others) (i.e., “Have you noticed a lack of sexual interest and responsiveness in multiple sexual situations? Which ones?”) (DSM-5 criterion); iv) low percentage of sexual interest/responsiveness to any sexual stimulus/cue (e.g., to pornography or erotic literature, to a partner’s attempts to initiate, or to attractive others) (i.e.,
“What percentage of the time have you experienced sexual interest in response to being in a sexual situation, such as when your partner initiated sexual activity, or you saw or read erotic material?”) (DSM-5 criterion); v) absent/ reduced ability to attain or maintain feelings of mental excitement/ pleasure (despite reports of adequate stimulation) (DSM-5 criterion) (i.e., “Have you experienced difficulty attaining or maintaining feelings of being mentally excited or ‘turned on’ until you completed sexual activity with a partner or by yourself?”); vi) difficulty reaching orgasm (i.e., “Have you experienced difficulty reaching orgasm during sexual activity by yourself or with a partner?”); and vii) difficulty with genital pain (i.e., “Have you experienced difficulties with genital pain during intercourse or sexual activity?”). Items vi and vii (above) were assessed in order to rule out the probability of another sexual disorder taking precedence.

Likewise, in addition to criteria two through seven (listed above), men are also assessed over the past 6 months on their experience of the following: i) difficulties attaining or maintaining an erection until completion of sexual activity (i.e., “Have you experienced difficulties attaining or maintaining an erection either by yourself or with a partner?”); ii) difficulties with premature ejaculation (i.e., “Have you experienced difficulties with premature ejaculation, following minimal stimulation, before, on or shortly after penetration?”). For each of the above categories, all participants (clinical and control) are asked if they’ve had any difficulty in that domain over the past 6 months, either by themselves or with a partner, with the response options of “yes”, “no”, “not applicable”, or “I don’t know” (e.g., in response to whether they’d experienced lubrication difficulties during masturbation, or were still having morning erections). Any affirmative responses are further explored with follow up questions about the frequency and duration of the difficulty, contextual occurrence (i.e., situational versus global), identified causes, percentage of change from normal response, and associated distress or interpersonal interference. This interview takes approximately 15-20 minutes to complete.8

Female Sexual Function Index (FSFI; Rosen et al., 2000). Women completed the FSFI, a 19-item measure divided into 6 factor-analytically derived subscales (desire, arousal, lubrication, orgasm, satisfaction, and pain), that yields both individual domain scores as well as a total score, with lower scores indicative of greater sexual dysfunction. Each subscale has

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7 Due to experimental error, questions about subjective arousal were not included in the initial version of the screening interview. The late addition of these questions resulted in missing data for this diagnostic criterion for the first 73 participants.

8 Copies of this interview are available upon request.
demonstrated acceptable internal consistency (Cronbach’s alpha ranging from 0.82 to 0.98, Wiegel, Meston & Rosen, 2005). Previous authors have reported acceptable inter-item reliability values for sexually healthy women (Cronbach’s alpha = 0.82-0.92), and for women diagnosed with FSAD (Cronbach’s alpha = 0.89-0.95) (Meston, 2003) and HSDD (Cronbach’s alpha = 0.52-0.94) (Rosen et al., 2000). Wiegel and colleagues have found strong support for the discriminant validity of the FSFI between women with and without sexual dysfunction, for both the total score and the individual subscale scores, although a high degree of overlap was found across the different diagnostic groups (Wiegel et al., 2005). While specific domain cutoff scores have recently been suggested to differentiate clinical and control groups (e.g., Gerstenberger et al., 2010), these have not yet been well-validated.

**International Index of Erectile Functioning (IIEF; Rosen et al., 1997).** The IIEF is a widely used, multi-dimensional self-report instrument for the evaluation of male sexual function. It is comprised of 15 items, divided into 5 subscales: erectile functioning, intercourse satisfaction, orgasmic function, sexual desire, and overall satisfaction. The psychometric validity and reliability of this measure have been well-established, and it has since been adopted as the ‘gold standard’ measure of male sexual functioning, particularly for its sensitivity and specificity as a diagnostic tool to evaluate the severity of erectile dysfunction (ED), and to measure of treatment efficacy in clinical trials of ED (Rosen, Cappelleri, Lipski, Smith & Pena, 1999). It has been recommended that a total score of 65 be considered the cutoff score that places a man at risk for sexual dysfunction. In addition, clinical and control cutoff scores for the individual domains of the IIEF have been well-established (Rosen et al., 1997).

**Statistical Analyses**

All statistical analyses were conducted with SPSS (v. 16.0.1, SPSS Inc., Chicago, IL, USA). Descriptive analyses were conducted to examine demographic characteristics of eligible and ineligible participants and to assess primary reasons for exclusion in the latter sample. For both sexes, descriptive analyses were also used to compare inclusion rates using DSM-IV-TR versus proposed DSM-5 criteria. Chi square analyses and t-tests were conducted to examine predictors of eligibility (e.g., relationship status, age) in the current study. T-tests were also conducted to test for differences between eligible and ineligible participants on self-reported levels of sexual functioning (as indicated by scores on the FSFI/ IIEF). In order to handle “zero category scores” on these measures (so as not to bias domain scores towards the dysfunctional
pole of the response scale), we followed the recommendations of Meyer-Bahlburg and Dolezal (2007), whereby “missing values” were estimated on the basis of group means for those without sexual activity within the past month. Finally, k-means cluster analysis, using pairwise deletion for missing data, was used to determine potential sexual disorder subtypes using desire and arousal symptom variables. K-means cluster analysis is non-hypothesis driven and non-hierarchical method that uses Euclidean distance to group cases into potential clinically relevant groups (McLachlan, 1992). Pairwise deletion for missing data was used in order to avoid the exclusion of too many participants, given that unequal numbers of participants provided responses to each of the items. The only substantial amount of missing data occurred for the variable of subjective arousal during masturbation (due to its late inclusion as a question on the screening interview), with 49 women and 59 men providing information.

Only participants that met basic inclusion criteria (e.g., were medically and psychologically healthy) were asked questions regarding their sexual functioning on the screening interview. In addition, healthy control participants who denied any sexual difficulties in response to the open-ended and DSM disorder-specific questions on the telephone interview were not asked any follow-up questions pertaining to the sexual categories (e.g., regarding frequency, duration, generalizability, etc.). Both of these situations resulted in significant amounts of missing data. Ineligible participants with missing data on all sexual functioning variables (part 3 of the screening interview) were included only in preliminary descriptive analyses (i.e., demographics, reason for exclusion). To manage missing data for any sexual category for which a control participant denied difficulties (both with a partner and during masturbation), the following assumptions were made: 1) frequency of the sexual difficulty occurs less than 75% of the time (dichotomous variable: 1 = > 75% of the time; 0 = < than 75% of the time); 2) the duration of the difficulty is 0 months; 3) there is no distress or interpersonal difficulty caused by performance in that sexual domain. The same assumptions were made regarding those sexual categories for which clinical participants reported no sexual difficulty (by themselves or with a partner).

Results

Participant Demographics

Two hundred and twenty-seven people (113 men, 114 women) responded to study advertisements. For the men, 29 called to participate in the control group, and 65 to participate in
the clinical group; the remaining 19 men were excluded before their sexual functioning status could be determined. For women, 33 were screened for the control group, and 65 for the clinical group; the sexual functioning status for the remaining 16 women is unknown. A breakdown of recruitment by site for eligible and ineligible participants is presented in Table 3.

Overall, the mean age for men in this study was 32.57 (SD = 11.00) and for women was 28.35 (SD = 9.18). Mean ages for men and women according to sexual functioning status are presented in Figures 2 and 3. Of the 113 men who were interviewed, approximately half were single (n = 56) and the other half (n = 45) were in committed sexual relationships. This was true for those reporting sexual difficulties (37 single, 27 partnered) as well as healthy controls (14 single, 15 partnered). The majority (n = 76) spoke English as a first language, 29 spoke French and the remaining 8 spoke identified another language as their mother tongue. Of the 114 women who were interviewed, most were in committed sexual relationships (n = 68) and only 38 were single. This was the case for those reporting sexual difficulties (41 in committed sexual relationships, 24 single), as well as for healthy controls (23 in committed sexual relationships, 10 single). The majority of women spoke English (n = 88), 21 spoke French, and 5 identified another language as their mother tongue.

**Reasons for Exclusion: Stage One**

Of the 227 participants who were assessed over the phone, 15 (6.7%) (10 men, 5 women) were excluded early on in the screening interview before providing any demographic or sexual functioning information (e.g., because they were outside of the prescribed age range, had no prior sexual experience, etc.). Another 20 (9.4%) participants (9 men, 11 women) were excluded after providing information about medical, reproductive and mental health (but prior to providing information on sexual functioning). Hence, the sexual functioning status (sexual difficulties versus no sexual difficulties) for the abovementioned participants remains unknown. Primary reasons for exclusion (more than one may apply per person) for the above groups are presented in Figures 2 and 3.

**Reasons for Exclusion: Stage Two**

Of the 192 participants who provided information about their sexual functioning (94 men, 98 women), 108 (56%) (51 men, 57 women) did not meet inclusion criteria for either the clinical or control group. Exclusion rates, broken down by sexual functioning status, are presented in Figures 2 and 3. Of the remaining 84 participants, an additional 15 (18%) dropped out (10 men,
5 women), and another 20 (24%) (10 men, 10 women) were temporarily excluded (i.e., because we had reached our half-way mark in the desired sample size for the control group and wanted to recruit remaining subjects to match our clinical subjects; or because clinical subjects did not yet meet the duration criteria for a sexual difficulty)\(^9\). This left 23 men (11 controls, and 12 clinical) and 26 women (10 controls, 16 clinical) who met the operational criteria for the larger study.

Overall, primary reasons for exclusion for both men and women were the presence of ongoing sexual fantasies despite reports of low desire, frequency of sexual difficulties lasting less than 75% of the time, duration of sexual difficulties less than 6 months, situational (partner or context specific) nature of sexual difficulties, having another sexual difficulty that was considered primary, FSFI/IIEF scores that were outside of the appropriate range for their group, and lack of distress about sexual difficulties. In addition, for female controls, a primary reason for exclusion was reports of sexual difficulties and FSFI scores beyond what was considered normative for the healthy control group. Reasons for exclusion, exclusion rates, and sexual functioning status for the abovementioned participants are presented in Figures 2 and 3. All remaining analyses were conducted exclusively with the data from the 192 participants who provided information about their sexual functioning.

**Predictors of eligibility**

Comparisons between eligible and ineligible participants were made on a number of variables, including sexual functioning scores, age, and relationship status. The results from t-tests comparing women on FSFI scores are presented in Table 4; similar comparisons for men on IIEF scores are presented in Table 5. Results pertaining to women revealed that eligible controls had significantly higher (or more “sexually functional”) levels of desire, lubrication and total FSFI scores than ineligible controls. Similarly, women eligible for the HSDD and/or FSAD group had significantly lower scores on the domains of desire, lubrication and their total FSFI scores than their ineligible counterparts, but did not differ from ineligible subjects on their domain scores for arousal, orgasm, pain, or satisfaction. Results pertaining to men revealed significant differences between eligible and ineligible controls on the domains of desire, orgasm function, and total IIEF scores (all higher in those eligible); in contrast, men eligible for the

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\(^9\) Drop-outs and those temporarily excluded from participating were not included in the calculation of overall exclusion rates or any further statistical analyses.
HSDD and/or ED group had a significantly lower total IIEF score, as well as lower scores on all IIEF domains, except intercourse satisfaction and overall satisfaction.

Relationship status and age were also examined as predictors of study eligibility. For men, of those who were eligible, 12 were single and 11 were in committed sexual relationships; of those who were ineligible, 27 were single and 23 were in committed sexual relationships. For women, of those eligible, 4 were single, and 22 were in committed sexual relationships; of those excluded, 25 were single and 32 were in committed sexual relationships. The chi square test assessing the relationship between eligibility and relationship status in men was not significant ($\chi^2(1) = 0.21, p = 0.884$), but was significant in women ($\chi^2(1) = 6.369, p < .05$), indicating that women were more likely to meet operational criteria if they were in a committed sexual relationship than if they were single. With respect to age, the mean for men who met screening criteria was 29.70 ($SD = 8.97$), and for women was 27.08 ($SD = 6.89$). For those ineligible, mean age for men was 34.04 ($SD = 11.76$), and mean age for women was 28.46 ($SD = 9.73$). T-tests assessing the impact of age were nonsignificant, indicating that age was not a significant determinant of eligibility status in the current study for either men ($t(88) = -1.62, p = .11$) or women ($t(93) = -.67, p = .51$).

Of the 23 men that were considered eligible, 11 were entered in the control group, 6 met criteria for HSDD, 4 for ED and low subjective arousal, and 2 for a combination of HSDD, ED, and SAD. Of the 26 women that were eligible, 10 were entered in the control group, 3 met criteria for HSDD, 1 for FSAD, 4 for HSDD and SAD, 3 for FSAD and low SAD, 2 for HSDD and FSAD, and 3 for a combination of HSDD, SAD, and FSAD.

**Comparing DSM-IV-TR and DSM-5 criteria**

In the absence of explicit quantitative operationalization of the frequency, receptivity and distress criteria in the proposed *DSM-5* criteria for SIAD, the following (arbitrary) assumptions were made: 1) The frequency of *each* reported difficulty should be greater than 75%; 2) Receptivity to a partner’s initiations should occur less than 25% of the time to meet criteria for being “rarely or never receptive to a partner’s attempts to initiate” (wording of 2009 proposal); 3) Only those reporting responsivity to a sexual stimulus less than 15% of the time were considered to have “desire rarely or never triggered by a sexual stimulus” (wording of 2009 proposal) and 4) Only those reporting distress about at least 2 of their symptoms met distress criteria for SIAD.
As compared to the 12 men and 16 women who were considered eligible for a clinical group using *DSM-IV-TR* criteria, only 4 men and 1 woman would have been eligible using the 2009 *DSM-5* criteria for SIAD (following the above assumptions). Using the modified 3-symptom cutoff recently proposed for a diagnosis of SIAD (APA, 2011), 4 men and 5 women would have been eligible. See Table 6 for a detailed presentation of the proportion of people meeting criteria for each of the SIAD symptoms and for SIAD diagnoses, as well as means for symptom number, distress, frequency, and duration. See Figure 1 for a proportional depiction of the distribution of SIAD symptoms across men and women.

**K-Means Cluster Analyses**

K-means cluster analyses were run separately for men and women using all participant responses to screening interview questions for desire and arousal related variables. Any participant (eligible or ineligible, clinical or control) who provided information on sexual functioning variables (93 men, 95 women) was included in the analyses. The following standardized variables from the phone screening interview were entered into exploratory cluster analyses: frequency of sexual fantasies, presence/absence of sexual interest, presence/absence of sexual pleasure/excitement with a partner, presence/absence of sexual pleasure/excitement during masturbation, percentage of receptivity to a sexual stimulus, presence/absence of genital arousal with a partner, presence/absence of genital arousal during masturbation, and presence/absence of distress about each of the sexual difficulties.

We explored solutions of 2-7 clusters for both men and women, comparing them on the bases of theoretical integrity, sample size, symptom profile coherence, distance between cluster centroids, and pooled within group variation for each solution. For both men and women, a 4-group solution provided the most coherent and homogenous clusters. For men, the 4-cluster solution resulted in the correct classification of 91.4% of the sample, and yielded clusters with reasonable sample sizes (each cluster was comprised of 20-30% of the total sample). Clusters also significantly differed on all variables, and symptom profiles within each cluster appeared to be distinct and meaningful (see Table 7a). The following represents the results from these analyses:

*Cluster 1: Erectile Dysfunction Group.* Almost exclusively, this group reported erectile difficulties with a partner and during masturbation, with high accompanying distress about these
difficulties. However, they retained relatively normal levels of sexual interest, sexual thoughts, responsiveness, and mental arousal, and were not distressed in these domains.

*Cluster 2: Healthy Sexual Functioning Group (Controls).* This group was primarily comprised of people who were screened for the control group and that reported no sexual difficulties. They also reported high sexual responsiveness, frequent thoughts about sex, and no distress.

*Cluster 3: Relational dysfunction.* The men in this group were experiencing sexual difficulties almost exclusively within their relationships, and not within their solitary sexual lives. The group was marked by very low sexual interest, low sexual responsiveness, low mental arousal with a partner, and high distress about these difficulties. The men in this group experienced no difficulties with erection, normal frequency of sexual thoughts/fantasies, and no difficulties with mental arousal during masturbation.

*Cluster 4: Combined low desire and arousal group.* The men in this group experienced significant symptoms in every domain. They had erectile difficulties with a partner and by themselves, low mental arousal with a partner and while masturbating, low sexual interest, low frequency of sexual thoughts, and distress about all of these difficulties.

For women, the 4-cluster solution resulted in the correct classification of 84.4% of the sample (which was larger than for any other cluster solution) and yielded clinical groups with reasonable sample sizes (the control group represented 45% of the sample; all others comprised approximately one third of the remaining sample). Groups identified by the 4-cluster solution significantly differed on all variables and symptom profiles within each cluster appeared to be distinct and meaningful (see Table 7b). The following represents the results from these analyses:

*Cluster 1: Low Desire Group.* The women in this group suffered from low sexual interest, low sexual responsiveness, low to moderate mental arousal with a partner, and distress about each of these difficulties. They reported no difficulties with genital arousal, either by themselves or with a partner, and mental arousal during masturbation remained normal. Frequency of sexual thoughts was lower, but remained within the normal range.

*Cluster 2: Healthy Sexual Functioning Group (Controls).* This group was primarily comprised of people who were screened for the control group and that reported no sexual difficulties. They also reported high sexual responsiveness, frequent thoughts about sex, and no distress.

*Cluster 3: Relational dysfunction group.* Parallel to men, the women in this group had sexual difficulties primarily within their relationships, and not within their solitary sexual lives. Like the
women in cluster 1, they reported low sexual interest, moderate sexual responsiveness, and low mental arousal with a partner, but also experienced low genital arousal only with a partner. They experienced distress only about their mental and physical arousal difficulties. The women in this group experienced no difficulties with mental or physical arousal during masturbation, and reported a normal frequency of sexual thoughts/fantasies.

Cluster 4: Combined low desire/arousal group. Parallel to the men, the women in this group experienced significant symptoms in every domain. They had lubrication difficulties with a partner and by themselves, low mental arousal with a partner and while masturbating, low sexual interest, low frequency of sexual thoughts, and distress about all of these difficulties.

Discussion

The current study represents the first empirical attempt to differentiate disorders of desire and arousal through the targeted recruitment of distinct groups of individuals meeting clearly operationalized DSM-IV-TR criteria for either or both of these disorders. To our surprise, the operational criteria used in the current study resulted in the exclusion of 71.7% of those screened, and over 75% of those complaining specifically of arousal and desire difficulties. The primary reason for exclusion for the latter was the failure to meet central DSM-IV-TR criteria for HSDD or an arousal disorder. Furthermore, secondary findings indicated that the application of proposed DSM-5 criteria was even more restrictive. Using the 2009 criteria for the DSM-5 led to the exclusion of 96% of those reporting sexual difficulties, while using the most recently modified criteria led to the exclusion of 92% of those with sexual complaints.

Implications for the DSM-IV-TR Criteria

These significant exclusion rates in part cast doubt on the validity and relevance of current DSM-IV-TR operationalizations of disorders of arousal, and particularly desire. For example, the primary reason for exclusion from the HSDD group was the presence of regular sexual thoughts/fantasies (averaging multiple times/week for men, and once/week for women) despite reports of drastically reduced sexual interest in almost all partnered sexual activity. This suggests that contrary to the assumption inherent in the central DSM-IV-TR criterion for HSDD, the occurrence of sexual thoughts/fantasies and the desire or motivation to engage in sexual activity may reflect distinct sexual processes, that although comorbid, do not inevitably co-occur. This notion was supported by the cluster analyses, which revealed one group with low sexual interest (e.g., for their partners) despite ongoing sexual thoughts, and another group that
experienced a dampening in all facets of desire (including fantasies). Whether this separation between sexual thoughts and interest reflects differences in syndrome severity (with more severe problems of desire marked by impairment in more aspects of desire), or a distinction between relational versus solitary sexual difficulties, is a question that remains to be tested by future research. Some recent work however has yielded preliminary support for the distinction between dyadic and solitary desire in healthy men and women, and suggests that the two subtypes might involve different facets of desire, and distinct underlying processes (Spector, Carey, & Steinberg, 1996; van Anders, 2012).

Overall, it seems that the desire to engage in sexual activity may be a relational process that is determined more by the type of mental associations one has with the prospect of a sexual interaction with a particular partner, than by any independent libidinal state. Hence, in an unsatisfying sexual relationship, an individual may experience little desire to engage in sexual activity with his or her current partner, while still retaining the ability to experience pleasurable thoughts or fantasies about sexual activity that is independent of their current relationship (e.g., of past or imagined positive sexual encounters). In such cases, the individual may simply be suffering from low sexual desire for the kind of sexual activity they expect to have with a partner. As a result, it is perhaps not surprising that where there is low interest for partnered sexual activity, there is often low sexual responsivity, and low mental arousal during that activity (as revealed in the cluster analyses), as one’s thoughts and feelings during the sexual activity are likely shaped by negative expectations or a decision of “non-interest”, thus preventing an openness to the sexual experience (e.g., pleasurable sensations). While this theory requires empirical examination, overall, these results suggest the need for modifications to current operationalizations of these diagnostic criteria as well as exploration of possible desire subtypes that might better capture the range of the sexual difficulties experienced by numerous men and women.

**Implications for the DSM-5 Criteria**

The abovementioned eligibility problems are compounded when using the proposed *DSM-5* operationalization for SIAD. A closer examination of the symptom distribution across participants indicated that despite the high comorbidity of sexual difficulties in this study, the 2009 proposed *DSM-5* requirement of four out of six symptoms was in fact empirically untenable for most participants, and resulted in the exclusion of many participants with clinically
significant sexual difficulties (i.e., only 22% of women, and 12% of men endorsed four symptoms). The more recent three-symptom version of the DSM-5 criteria was much more viable: approximately 61% of women and 43% of men presented with three symptoms (see Table 6). On average, the men in this study presented with two sexual symptoms, while the women had approximately three. However, after considering the full operational criteria (e.g., frequency, duration, distress), the three-symptom version led to the exclusion of only four fewer participants than the four-symptom version. This is because of those participants with multiple sexual difficulties, only a few actually met the frequency, duration and distress criteria for the requisite number of symptoms. In fact, as shown in Table 6, the number one reason for exclusion from the category of SIAD (three-symptom version) was because of an insufficient frequency of comorbid symptoms (average around 50%), and not because of the criteria for duration, distress or even number of symptoms. Consequently, the majority of individuals meeting DSM-IV-TR criteria for a disorder of desire or arousal in the current study were excluded when using DSM-5 criteria. On the other hand, these results support the recent symptom amendment to the DSM-5 criteria (requiring three, rather than four symptoms), and suggest that it may be a step in the right direction.

In addition, results from exploratory cluster analyses support the possible existence of distinct syndromes marked by the presence of multiple symptoms of both low desire and arousal. For example, the men and women in cluster 4 presented with significant sexual symptoms in every domain – low desire, low thought frequency, low mental arousal, low genital arousal, and marked distress about each of these difficulties. While not all of these difficulties had necessarily occurred for a sufficient duration and frequency of time to warrant a diagnosis of SIAD, the conglomeration of symptoms presented by these men and women is consistent with the profile for SIAD. However, as the DSM-5 criteria currently stands, different permutations of three (or four) symptoms could all result in a diagnosis of SIAD, despite the fact that there may be meaningful differences in the resulting group profiles, symptom development and underlying processes. It would be worthwhile for future researchers to explore patterns in the order of appearance of these symptoms, as well as differential etiologies that might have shaped the emergence of these different syndromes (for a recent attempt, see Brotto, Pekau, Labrie & Basson, 2011).
Specifically in addition to a combined low sexual arousal and desire group, cluster analyses also suggested the possible existence of two other clinical syndromes, both for men and women. For men, one of these groups was characterized exclusively by genital arousal difficulties (with no accompanying problems with desire), whereas for women, the parallel group was marked by low desire and low responsiveness (with no accompanying problems with genital arousal). In line with recruitment patterns, these results support the separation of desire and genital arousal difficulties for both men and women (indicating that they do not always go hand-in-hand), and point to the presence of other “subtypes” of arousal and desire difficulties, potentially with distinct etiologies and profiles. It is noteworthy that for men, one of these subtypes was marked exclusively by impaired arousal, whereas for women, the parallel group was marked by low desire, which is consistent with empirical evidence pointing to erectile dysfunction as the most common sexual disorder amongst men, and low desire as the most common problem amongst women (Laumann et al., 2005).

Finally, it is also noteworthy that for both men and women, another group emerged that could best be described as having sexual problems exclusively within their relationships, and not within their solitary sexual lives. These men and women had low sexual interest, low sexual responsiveness, and low mental arousal with a partner, but a normal frequency of sexual thoughts, and no difficulties with mental or physical arousal during masturbation. While the men experienced distress about each of these difficulties, the women experienced distress only about their difficulties with arousal (including their lubrication problems with a partner). This highlights the importance of examining context, and particularly the relationship context, when assessing sexual difficulties, and may encourage the use of more couple-based or interpersonal treatment approaches when treating men and women with this pattern of difficulties.

Although exploratory, these results support the possible existence of combined sexual interest/ arousal groups for both men and women, but also reveal other syndromes marked uniquely by desire or arousal symptoms that may warrant diagnosis. As a parallel to this, a diagnosis of mixed anxiety-depressive disorder was included in the DSM-IV-TR to represent the frequent comorbidity of depression and anxiety symptoms, yet the individual diagnoses were retained to account for the proportion of people presenting almost exclusively with one symptom (depression or anxiety), with its distinct etiology and action mechanism. Future research should continue to examine whether these desire and arousal subtypes can be replicated, or others.
uncovered, using larger and more representative samples, and with greater attention to identifying distinct symptom patterns and etiological mechanisms that might shape these profiles.

**Sample Representativeness**

In addition to having implications for the operationalization of disorders of desire and arousal, the high exclusion rates in the current study may also reflect the presence of a large subpopulation of individuals concerned about what are subclinical sexual difficulties, and often the byproduct of bigger relationship problems. An examination of the characteristics of ineligible participants (particularly men) revealed that they had higher scores on multiple scales of sexual functioning measures (indicating better sexual functioning), with the exception of “overall satisfaction”, on which they scored no differently from participants with clinically significant difficulties. They were also more likely to report situational (context-specific) sexual difficulties, rather than generalized dysfunction, as well as sexual difficulties of diagnostically insufficient frequency and duration, or that were likely the result of other comorbid health problems. This was as true of those recruited from hospitals and clinics (treatment-seekers) as those recruited from the community. These results suggest that there may be a large proportion of individuals who experience more mild and transient sexual difficulties about which they are nonetheless concerned, reportedly in fear that something is “wrong with them” or because of the relationship conflict that ensues for them. This raises the possibility that distress about sexual difficulties may result more as a byproduct of the belief that one has a sexual difficulty (perhaps as suggested by one’s partner), than from actual symptom severity. This finding also suggests that misconceptions about sexual functioning may be quite common, and speaks to the need for widespread sexual education about the influence of context, and the line between “normal” and “abnormal” sexual functioning. Before doing so, however, it seems imperative that a consensus be reached on where this distinction actually lies.

At the same time, the high exclusion rates in the current study may also cast doubt on the representativeness of the samples studied by previous investigators, and consequently, on the generalizability of their findings. For example, the same individual who was excluded from participating in the current study due to situational and subthreshold arousal or desire difficulties (e.g., of insufficient severity or duration) would likely have been included in many previous studies that did not use clearly operationalized diagnostic criteria. Secondly, participants that
failed to meet operational criteria in the current study were more likely to have a comorbid sexual problem of equal or greater salience, had more psychological and medical disorders and treatment, and were more likely to be single and of older age. In contrast, most past studies have allowed high levels of comorbidity with other psychological, medical and sexual difficulties; thus it is likely that previous investigators have diagnosed individuals with a sexual dysfunction whose difficulties might have been better accounted for within a medical or relational context. Finally, the majority of past studies have primarily included only those in stable sexual relationships. Given that recent work has found relationship status to be one of the strongest predictors of distress about sexual difficulties, and was found to be a robust predictor of eligibility in the current study, the exclusion of single individuals from past studies significantly limits our understanding of the generalizability of past study findings and of their selected diagnostic criteria (e.g., distress). With all this in mind, it is not surprising that the use of more explicit and stringent operational criteria in the current study resulted in a higher exclusion rate than has been seen in previous clinical research.

However, it should also be noted that attempts to compare exclusion rates with the relevant literature are complicated by the fact that the majority of clinical trials on sexual dysfunction do not report exclusion rates, those that report rates rarely report reasons, and when reasons are reported, seldom are people excluded because they do not fit the diagnostic criteria for a sexual dysfunction. In the case of the latter, this is likely in part due to the fact that the most of these studies do not clearly operationalize diagnostic criteria for the sexual disorders (even when they use the DSM), but instead tend to select participants on the basis of FSFI/ IIEF scores or otherwise self-reported problems.

To exemplify this problem, of the eighty-three clinical trials that we were able to find on sexual dysfunction via computerized searches of the literature, the majority (44/ 83; 53%) did not report exclusion rates for those found to be ineligible after screening (e.g., Berman et al., 2001; Bradford & Meston, 2011; Goldstein et al., 2012; Heiman et al., 2006; Jones & McCabe, 2011). Of the remaining thirty-nine studies that did report exclusion rates, rates ranged from 2.9% (Van Ahlen, Zumbé, Stauch, & Hanisch, 2010) to 90% (Meston & Worcel, 2002), with a mean of 33.02%, median of 29.15% and mode of 35.2%. These rates are considerably lower than the overall exclusion rate in the current study. In addition, the majority of these studies (32/ 39; 82%) did not discuss the reasons why people were excluded, except to note that they didn’t meet
general inclusion criteria (which included a very wide variety of issues) (e.g., Carrier et al., 2005; Goldfischer et al., 2011; Meston & Worcel, 2002).

We found only seven studies that presented both exclusion rates after screening, as well as reasons for exclusion (Andersson et al., 2011; Maserjian et al., 2012; Melnik & Abdo, 2005; Padma-Nathan et al., 2003; Schiavi, White, Mandell & Levine, 1997; Schneider et al., 2011; Segraves, Clayton, Croft, Wolf, & Warnock, 2004). Of these, four (57%) excluded people because they did not meet operationalized criteria for a sexual disorder (Andersson et al., 2011; Melnik & Abdo, 2005; Maserjian et al., 2012; Padma-Nathan et al., 2003), with the three others excluding participants because of general, medical or comorbid psychiatric conditions (Schiavi et al., 1997; Schneider et al., 2011; Segraves et al., 2004). Of the four studies that excluded people because of failure to meet diagnostic criteria for the sexual disorders, rates ranged from .04% (where the diagnosis couldn’t be verified; Andersson et al., 2011), to 41% (where subjects did not meet cutoffs on the FSFI arousal scale; Maserjian et al., 2012), with a mean exclusion rate of 17.8%. Again, this is considerably lower than in the current study, where approximately 63% of women (or 80%, when including those ineligible due to general medical or psychological conditions) and approximately 80% of men (or 85%, when including general medical or psychological conditions) were excluded because they did not meet operationalized sexual dysfunction diagnostic criteria. In sum, while the majority of past clinical trials have not reported rates or reasons for exclusion, those that have done so have typically produced rates much lower than those in the current study, thus highlighting the importance of examining the operational criteria employed when drawing conclusions about sample representativeness and the generalizability of study findings.

Finally, it could also be said that despite our wide recruitment of individuals from both clinical and community contexts, our high exclusion rates reflect difficulties with reaching our target demographic. Unfortunately, there currently remains a large gap in the empirical literature that speaks to exactly who the target demographic for recruitment is. To date, there have been few attempts to validate diagnostic criteria for HSDD or arousal disorders on specific populations, and so it remains unclear for whom these criteria are most relevant.

Limiting the generalizability of our findings, the current study excluded those who were pregnant, breastfeeding, and peri or postmenopausal, groups in which decreases in desire and arousal have frequently been reported. Like many other community based studies in this field,
participants also self-selected for the study, and hence may not be representative of the general population of desire and arousal sufferers. In addition, no restrictions were placed on contraceptive use, including combined contraceptives, which have been associated with changes in sexual functioning. However, attempts were made in this case to match participants in different groups on the basis of their chosen type of contraceptive, and so sexual functioning differences due to contraceptive use would likely have evened out across subjects. Finally, study results can only be generalized to heterosexual participants, as anyone identifying as queer, homosexual or bisexual was excluded from participating (see operational criteria for rationale). Future work is clearly needed in order to ascertain the validity of the operational criteria for disorders of desire and arousal, as well as the populations for whom these diagnostic criteria are most valid.

**Limitations**

Several important limitations of the current study should be noted, the first of which pertains to the operational criteria employed in the current study. In the absence of explicit operationalization of *DSM-IV-TR* and *DSM-5* criteria for disorders of desire and arousal, several reasoned assumptions needed to be made. For example, given the lack of normative data regarding the frequency of sexual thoughts/fantasies in both normal and low desire populations, it was not clear what cutoff to use in deciding whether one’s frequency of sexual thoughts was in fact “deficient”. Hence, a somewhat arbitrary cutoff of less than once/week (which marked the bottom half of the response option distribution) was chosen. In addition, while the proposed diagnostic criteria for SIAD comprises specifications about the frequency (e.g., “rarely or never”; “typically”; “all or almost all occasions”), severity (e.g., “absent or markedly reduced”) and distress-related aspects of sexual difficulties (e.g., “problem causes clinically significant distress”), it is not clear how these terms are being operationalized, and whether they pertain to each symptom, or to the syndrome as a whole. Thus, in the absence of explicit operationalization of these qualifiers, once again, several reasoned assumptions needed to be made (see results). It is therefore important when interpreting study findings about the viability of *DSM-IV-TR* and *DSM-5* criteria that the results of the current study be examined within the context of the operationalization that was chosen. Moreover, future researchers should continue to test and compare other operationalizations to ascertain the set of criteria that best captures these underlying clinical syndromes.
Second, the current study was not designed specifically to test the viability of *DSM-5* criteria, and was conducted prior to the most recent criteria modifications. As such, while we were able to examine most components of this diagnosis on the basis of self-report, the assessment was not ideal. Specifically, it was not possible during the phone screening to comprehensively ascertain whether the individual’s “desire was rarely or never triggered by any internal or external sexual/erotic stimulus”, as prescribed by the *DSM-5* criterion, nor is it clear exactly how to accurately test this criterion. Other symptoms such as the “frequency or intensity of genital and nongenital sensations during sexual activity” were assessed during psychophysiological testing for our larger ongoing study, but not at the time of screening, and so are being approximated by participant responses to questions about other common indicators of genital arousal (e.g., lubrication and blood flow/swelling for women and erectile difficulties for men). Moreover, in the absence of a finalized set of criteria for SIAD in men at the time of study conduction, it was decided that the same criteria that has been proposed for women be tested on men. It is noteworthy that overall, similar patterns were found for both men and women. Cluster analyses supported the existence of a combined arousal/desire disorder for men as well as women, and suggest that speculated gender differences might not in fact be so large. Future research should continue to test the relevance of these criteria on men and women using more comprehensive, sophisticated and multifaceted measures than are traditionally employed in this area.

Next, as previously noted, only those participants that met basic inclusion criteria during the phone screening went on to provide detailed information about sexual functioning and to complete measures of sexual functioning. Moreover, those who did not endorse difficulties (in response to question probes assessing the sexual disorders) were not asked all follow-up questions about their sexual functioning in that domain (i.e., regarding the frequency, duration, and generalizability of symptoms). This resulted in a fair amount of missing data. In order to statistically deal with this missing data, several reasoned assumptions once again had to be made (see statistical analyses) that may not have been entirely representative of the individual’s experience.

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10 An examination of participant responses to interview questions posed at the time of psychophysiological testing revealed high levels of consistency between reported levels of genital and nongenital sensations and lubrication/erectile difficulties (unpublished research).
Finally, decisions about sexual functioning status in the current study were made exclusively on the basis of self-report on sexual functioning measures, and in response to questions on the phone interview. Given the inherent subjectivity of self-report measures, and their susceptibility to errors and biases in reporting (e.g., regarding the frequency of a difficulty), exclusive reliance on such measures is limiting. Hence, the resulting assignment to clinical groups (e.g., HSDD or FSAD/ ED) in the current study should not be considered the equivalent of formal clinical diagnoses. At the same time, it is noteworthy that the domain and total sexual functioning scores on the FSFI/ IIEF for clinical participants were at the more dysfunctional end of the ranges reported by previous investigators (e.g., Meston, 2003; Gerstenberger et al., 2010; Rosen et al., 1997, 2000; Wiegel et al., 2005).  

**Conclusion**

The results of the current study, although preliminary, support the separation of desire and genital arousal difficulties, as well as the possible existence of multiple sexual syndromes marked by different arousal and desire symptoms. Overall, these results speak to the need for a revision of the *DSM-IV-TR* criteria for disorders of desire and arousal, but also call for a re-examination of the operationalization of the proposed *DSM-5* diagnostic criteria, and the investigation of other disorder subtypes not currently captured by a diagnosis of SIAD. Future research should continue to examine the validity of distinct operational criteria for different disorders of arousal and/or desire, using more diverse samples and sophisticated methodology, and with attention to the nature of the demographic represented by these criteria (e.g., gender, age, culture/ ethnicity, relationship status, psychiatric/ medical history, developmental history etc). In addition, attempts should be made to compare subgroups of desire and arousal sufferers on the basis of the time course and severity of their symptoms, risk and vulnerability factors, treatment responsiveness, and underlying mechanisms. This work is imperative in order to better understand and treat the full range and nature of these complicated sexual difficulties.

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11 An examination of participant diagnoses obtained through comprehensive interviews at the time of psychophysiological testing revealed consistency with those provided at the time of screening.
References


DeRogatis, L.R., Allgood, A., Auerbach, P., Eubank, D., Greist, J., Bharmal, M., Zipfel, L., & Guo, C-Y. (2010). Validation of a women’s sexual interest diagnostic interview – short form (WSID-SF) and a daily log of sexual activities (DLSA) in postmenopausal women with hypoactive sexual desire disorder. *Journal of Sexual Medicine, 7*, 917-927.


methodological critique and suggestions for improvement. *Journal of Sex & Marital Therapy, 33*, 217-224.


Table 1. Proposed DSM-5 criteria for Sexual Interest and Arousal Disorder (SIAD)

<table>
<thead>
<tr>
<th>Criteria and Specifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Lack of sexual interest/ arousal of at least 6 months duration as manifested by at least 4 of the following indicators:</td>
</tr>
<tr>
<td>(1) Absent/ reduced interest in sexual activity</td>
</tr>
<tr>
<td>(2) Absent/ reduced sexual/ erotic thoughts or fantasies</td>
</tr>
<tr>
<td>(3) No initiation of sexual activity and rarely/ never receptive to partner’s attempts to initiate</td>
</tr>
<tr>
<td>(4) Absent/ reduced sexual excitement/ pleasure during sexual activity (on all or almost all sexual encounters)</td>
</tr>
<tr>
<td>(5) Desire is rarely or never triggered by any internal or external sexual/ erotic stimulus (e.g., written, verbal, visual)</td>
</tr>
<tr>
<td>(6) Absent/ reduced genital and/or nongenital sensations during almost all sexual activity</td>
</tr>
<tr>
<td>B) The problem causes clinically significant distress or impairment</td>
</tr>
<tr>
<td>C) The sexual dysfunction is not better accounted for by another Axis I disorder (except another sexual dysfunction) and is not due exclusively to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition</td>
</tr>
</tbody>
</table>

Addition of the following specifiers:

1) Lifelong (since the onset of sexual activity) vs. Acquired
2) Generalized vs. Situational
3) Partner factors
4) Relationship factors
5) Individual vulnerability factors
6) Cultural/ religious factors
7) With medical factors relevant to prognosis, course or treatment

Note. At the time of manuscript preparation, the Sexual Dysfunction Workgroup had been exploring three possible options for the diagnostic criteria in men: 1) To preserve the DSM-IV-TR title and criteria for HSDD; 2) To use the same criteria that has been proposed for women (making this a gender-neutral diagnosis); or 3) To remove criterion A6 above, and require X out of 5 symptoms to be present instead. No conclusion had been reached on which option to proceed with, or the number of symptoms that would be necessary for men to meet criteria for this disorder. Final decisions were pending the results of field trials.
Table 2. Inclusion Criteria for Control and Clinical Study Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>A) No reported sexual difficulty to open-ended question on phone screener</td>
<td>A) No reported sexual difficulty to open-ended question on phone screener</td>
</tr>
<tr>
<td></td>
<td>B) No sexual symptoms endorsed in response to DSM criteria questions on phone screener</td>
<td>B) No sexual symptoms endorsed in response to DSM criteria questions on phone screener</td>
</tr>
<tr>
<td></td>
<td>C) Sexual fantasies ≥ once/week</td>
<td>C) Sexual fantasies ≥ once/week</td>
</tr>
<tr>
<td></td>
<td>D) IIEF score ≥ 65, with raw scores ≥ 4 on each subscale item</td>
<td>D) FSFI score ≥ 26.55, with raw scores ≥ 4 on each subscale item</td>
</tr>
<tr>
<td>HSDD</td>
<td>A) Reports of low/ decreased desire to open-ended question on phone screener</td>
<td>A) Reports of low/ decreased desire to open-ended question on phone screener</td>
</tr>
<tr>
<td></td>
<td>B) Sexual fantasies &lt; once/week (&lt; 3 times/month)*</td>
<td>B) Sexual fantasies &lt; once/week (&lt; 3 times/month)*</td>
</tr>
<tr>
<td></td>
<td>C) Little/ no interest in sexual activity</td>
<td>C) Little/ no interest in sexual activity</td>
</tr>
<tr>
<td></td>
<td>D) Symptoms have lasted ≥ 6 months</td>
<td>D) Symptoms have lasted ≥ 6 months</td>
</tr>
<tr>
<td></td>
<td>E) Symptoms generalized across most sexual contexts</td>
<td>E) Symptoms generalized across most sexual contexts</td>
</tr>
<tr>
<td></td>
<td>F) Causes distress/ interpersonal interference</td>
<td>F) Causes distress/ interpersonal interference</td>
</tr>
<tr>
<td></td>
<td>G) No reported genital pain</td>
<td>G) FSFI score &lt; 26.55, and reports low desire on desire subscale items</td>
</tr>
<tr>
<td></td>
<td>H) IIEF score &lt; 65, and reports low desire on desire subscale items</td>
<td>H) Comorbid arousal, pain and orgasmic difficulties are situational, occur &lt; 75% of the time, and of lesser duration than HSDD</td>
</tr>
<tr>
<td></td>
<td>I) Comorbid arousal, PE and orgasmic difficulties are situational, occur &lt; 75% of the time, and of lesser duration than HSDD</td>
<td></td>
</tr>
<tr>
<td>ED/FSAD</td>
<td>A) Reports low arousal or erectile difficulties to open-ended question on phone screener</td>
<td>A) Reports low arousal or lubrication difficulties to open-ended question on phone screener</td>
</tr>
<tr>
<td></td>
<td>B) Difficulties attaining or maintaining</td>
<td>B) Difficulties attaining or maintaining</td>
</tr>
</tbody>
</table>
erections until completion of sexual activity  adequate lubrication/ blood flow until completion of sexual activity  
C) Able to achieve morning erections  
D) Symptoms have lasted ≥ 6 months  
E) Symptoms generalized across most sexual contexts  
F) Causes distress/ interpersonal interference  
G) No reported genital pain  
H) IIEF score < 65, and reports erection difficulties on ED subscale items  
I) Comorbid desire, PE and orgasmic difficulties are due to ED, are situational, occur < 75% of the time, and for < 6 months

**CLDA**

A) Reports either low arousal and/or low desire to open-ended question on phone screener  
B) Meets criteria B through H above for HSDD and ED  
C) Comorbid PE and orgasmic difficulties are situational, occur < 75% of the time, and have lasted < 6 months

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| H) IIEF score | FSFI score < 26.55, and reports low arousal on lubrication subscale items  
| G) Comorbid desire, pain and orgasmic difficulties are associated with low arousal, are situational, occur < 75% of the time, and for < 6 months  

---

**CLDA**

B) Meets criteria B through F above for HSDD and FSAD, and criteria G for HSDD  
C) Comorbid pain and orgasmic difficulties are situational, occur < 75% of the time, and have lasted for < 6 months

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In the absence of normative data on the frequency of sexual fantasies in men and women with and without low sexual desire, we had to establish somewhat arbitrary cutoffs. Since we were interested in a six month time period, the following frequency options for sexual fantasies were identified: multiple times per day, daily, several times per week, once per week, 1-3 times per month, every few months, and almost never. Those reporting low desire were required to fall in the bottom half of this distribution, with a cutoff of fantasies no more than 3 times per month.

**CLDA = Combined Low Desire and Arousal Group.**
Table 3. Recruitment sources for eligible and ineligible participants

<table>
<thead>
<tr>
<th>Recruitment Source</th>
<th>Eligibility rates for clinical subjects</th>
<th>Eligibility rates for control subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online (Craigslist, Kijiji, university classifieds)</td>
<td>25.4% eligibility (n = 64): 15 included, 44 excluded (3 temporary exclusion, 2 D/O*)</td>
<td>55% eligibility (n = 33): 15 included, 12 excluded (6 temporary exclusions)</td>
</tr>
<tr>
<td>Poster/ pamphlet advertising</td>
<td>9.1% eligibility (n = 14): 1 included, 10 excluded (3 D/O)</td>
<td>0% eligibility (n = 3): 0 included, 1 excluded (2 temporary exclusions)</td>
</tr>
<tr>
<td>Newspaper advertisements</td>
<td>31.9% eligibility (n = 49): 15 included, 32 excluded (2 D/O)</td>
<td>27.3% eligibility (n = 17): 3 included, 8 excluded (6 temporary exclusions)</td>
</tr>
<tr>
<td>Word of mouth</td>
<td>11.1% eligibility (n = 10): 1 included, 8 excluded (1 D/O)</td>
<td>60% eligibility (n = 6): 3 included, 2 excluded (1 D/O)</td>
</tr>
<tr>
<td>Hospitals/ clinics</td>
<td>12.5% eligibility (n = 9): 1 included, 7 excluded (1 D/O)</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

* D/O = Drop-out

Note: percentages pertain to the proportion of subjects per recruitment source that were eligible for participation, and do not include those that dropped out.
Table 4. *T*-tests comparing FSFI scores between eligible and ineligible women

<table>
<thead>
<tr>
<th>FSFI Domain</th>
<th>Controls</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eligible</td>
<td>Ineligible</td>
<td><em>t (df)</em></td>
<td>Eligible</td>
<td>Ineligible</td>
<td><em>t (df)</em></td>
</tr>
<tr>
<td>Desire</td>
<td>4.80 (0.75)</td>
<td>3.95 (1.04)</td>
<td>2.16* (20)</td>
<td>1.92 (1.14)</td>
<td>2.80 (0.72)</td>
<td>-2.85* (34)</td>
</tr>
<tr>
<td>Arousal</td>
<td>5.49 (0.40)</td>
<td>4.80 (1.19)</td>
<td>1.74 (20)</td>
<td>2.28 (0.58)</td>
<td>2.82 (0.97)</td>
<td>-1.94 (34)</td>
</tr>
<tr>
<td>Lubrication</td>
<td>5.91 (0.20)</td>
<td>5.15 (0.90)</td>
<td>2.83* (12.30)</td>
<td>3.23 (0.98)</td>
<td>4.10 (1.08)</td>
<td>-2.47* (34)</td>
</tr>
<tr>
<td>Orgasm</td>
<td>5.64 (0.40)</td>
<td>4.83 (1.34)</td>
<td>1.99 (13.28)</td>
<td>2.63 (1.03)</td>
<td>2.99 (1.26)</td>
<td>-0.93 (34)</td>
</tr>
<tr>
<td>Pain</td>
<td>6.82 (2.88)</td>
<td>5.75 (0.51)</td>
<td>1.27 (20)</td>
<td>4.25 (1.26)</td>
<td>4.27 (1.28)</td>
<td>-0.03 (34)</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>5.44 (0.63)</td>
<td>4.28 (1.98)</td>
<td>1.92 (13.60)</td>
<td>2.39 (0.87)</td>
<td>2.91 (1.92)</td>
<td>-0.96 (34)</td>
</tr>
<tr>
<td>Total</td>
<td>33.20 (1.25)</td>
<td>28.77 (5.19)</td>
<td>2.86* (12.50)</td>
<td>17.06 (3.63)</td>
<td>19.59 (4.34)</td>
<td>-1.84 (34)</td>
</tr>
</tbody>
</table>

*p < .05*
Table 5. *T*-tests comparing IIEF scores between eligible and ineligible men

<table>
<thead>
<tr>
<th>IIEF Domain</th>
<th>Controls</th>
<th></th>
<th>Clinical</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eligible</td>
<td>Ineligible</td>
<td>Eligible</td>
<td>Ineligible</td>
</tr>
<tr>
<td></td>
<td>Subjects:</td>
<td>Mean (SD) (n = 11)</td>
<td>Subjects:</td>
<td>Mean (SD) (n = 11)</td>
</tr>
<tr>
<td></td>
<td>Ineligible Subjects:</td>
<td>Mean (SD) (n = 4)</td>
<td></td>
<td>Mean (SD) (n = 22)</td>
</tr>
<tr>
<td></td>
<td>t (df)</td>
<td></td>
<td>t (df)</td>
<td></td>
</tr>
<tr>
<td>Erectile Dysfunction</td>
<td>28.00</td>
<td>22.75</td>
<td>11.05</td>
<td>18.32</td>
</tr>
<tr>
<td>(4.38)</td>
<td>(4.99)</td>
<td>(6.70)</td>
<td>(7.54)</td>
<td></td>
</tr>
<tr>
<td>Intercourse Satisfaction</td>
<td>13.44</td>
<td>12.25</td>
<td>6.09</td>
<td>7.59</td>
</tr>
<tr>
<td>(1.64)</td>
<td>(2.22)</td>
<td>(2.43)</td>
<td>(3.16)</td>
<td></td>
</tr>
<tr>
<td>Orgasm Function</td>
<td>9.64</td>
<td>6.75</td>
<td>4.09</td>
<td>6.77</td>
</tr>
<tr>
<td>(0.67)</td>
<td>(3.59)</td>
<td>(2.07)</td>
<td>(2.65)</td>
<td></td>
</tr>
<tr>
<td>Sexual Desire</td>
<td>9.09</td>
<td>6.50</td>
<td>3.82</td>
<td>5.95</td>
</tr>
<tr>
<td>(1.22)</td>
<td>(1.73)</td>
<td>(1.54)</td>
<td>(2.38)</td>
<td></td>
</tr>
<tr>
<td>Overall Satisfaction</td>
<td>8.36</td>
<td>7.25</td>
<td>3.45</td>
<td>4.68</td>
</tr>
<tr>
<td>(1.86)</td>
<td>(0.96)</td>
<td>(1.85)</td>
<td>(2.34)</td>
<td></td>
</tr>
<tr>
<td>Total Score</td>
<td>68.55</td>
<td>55.55</td>
<td>29.00</td>
<td>43.32</td>
</tr>
<tr>
<td>(7.92)</td>
<td>(10.63)</td>
<td>(2.17)</td>
<td>(2.85)</td>
<td></td>
</tr>
</tbody>
</table>

* *p < .05, ** *p < .01, *** *p < .001
Table 6. Proportion of men and women with sexual difficulties meeting symptom and diagnosis criteria for SIAD

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Men (n = 65)</th>
<th>Women (n = 65)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td></td>
<td>meeting</td>
<td>with</td>
</tr>
<tr>
<td></td>
<td>criteria</td>
<td>distress</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced interest</td>
<td>49 (76.6%)</td>
<td>40 (64.5%)</td>
</tr>
<tr>
<td></td>
<td>(12.5%)</td>
<td></td>
</tr>
<tr>
<td>Reduced thoughts/fantasies</td>
<td>8 Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>(12.5%)</td>
<td></td>
</tr>
<tr>
<td>Reduced initiation/receptivity</td>
<td>7 (12.5%)</td>
<td>28 (51.9%)</td>
</tr>
<tr>
<td></td>
<td>(51.9%)</td>
<td></td>
</tr>
<tr>
<td>Reduced mental arousal</td>
<td>41 (67.2%)</td>
<td>33 (70.2%)</td>
</tr>
<tr>
<td></td>
<td>(70.2%)</td>
<td></td>
</tr>
<tr>
<td>Desire untriggered</td>
<td>4 (7.2%)</td>
<td>28 (51.9%)</td>
</tr>
<tr>
<td></td>
<td>(7.2%)</td>
<td></td>
</tr>
<tr>
<td>Reduced genital arousal</td>
<td>45 (72.6%)</td>
<td>36 (58.1%)</td>
</tr>
<tr>
<td></td>
<td>(58.1%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DSM-5 4-sx criteria met</td>
<td>4 (6.3%)</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>DSM-5 3-sx criteria met</td>
<td>4 (6.3%)</td>
<td></td>
</tr>
</tbody>
</table>

Note: ED = Erectile Dysfunction; SAD = Subjective Arousal Difficulties; HSDD = Hypoactive Sexual Desire Disorder; FSAD = Female Sexual Arousal Disorder; Respons = Responsivity; _mo_ = month; _sxs_ = symptoms; \( \bar{X} \) = mean (average); _freq_ = frequency
Table 7a. Cluster Analysis Characteristics - Men

<table>
<thead>
<tr>
<th>CLUSTER</th>
<th>ED Group</th>
<th>Sexually Healthy Group</th>
<th>Relational Dysfunction</th>
<th>Combined Sexual Arousal &amp; Desire Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>23 (24.7%)</td>
<td>34 (36.5%)</td>
<td>17 (18.3%)</td>
<td>19 (20.4%)</td>
</tr>
<tr>
<td>Mean age</td>
<td>31.70</td>
<td>29.32</td>
<td>30.76</td>
<td>32.74</td>
</tr>
<tr>
<td>SEXUAL SYMPTOM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED with partner</td>
<td><strong>High</strong></td>
<td>Low</td>
<td>Low</td>
<td><strong>High</strong></td>
</tr>
<tr>
<td>ED during masturbation</td>
<td><strong>High</strong></td>
<td>Low</td>
<td>Low</td>
<td><strong>High</strong></td>
</tr>
<tr>
<td>ED distress</td>
<td><strong>High</strong></td>
<td>Low</td>
<td>Low</td>
<td><strong>High</strong></td>
</tr>
<tr>
<td>Thought frequency</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td><strong>Very Low</strong></td>
</tr>
<tr>
<td>Sexual interest</td>
<td>Normal</td>
<td><strong>High</strong></td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Desire distress</td>
<td>Low</td>
<td>Very Low</td>
<td>Moderate</td>
<td><strong>Very High</strong></td>
</tr>
<tr>
<td>Responsivity</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Distress about responsivity</td>
<td>Low</td>
<td>Low</td>
<td><strong>Very High</strong></td>
<td><strong>Very High</strong></td>
</tr>
<tr>
<td>SA with partner</td>
<td>Normal</td>
<td><strong>Very High</strong></td>
<td>Low</td>
<td><strong>Very Low</strong></td>
</tr>
<tr>
<td>SA during masturbation</td>
<td>Normal</td>
<td>High</td>
<td>Normal</td>
<td><strong>Very Low</strong></td>
</tr>
<tr>
<td>SA distress</td>
<td>Low</td>
<td>Very Low</td>
<td><strong>High</strong></td>
<td><strong>High</strong></td>
</tr>
</tbody>
</table>

Note: items in bold reflect remarkable features of the group that discriminate it from others
Table 7b. Cluster Analysis Characteristics - Women

<table>
<thead>
<tr>
<th>CLUSTER</th>
<th>Low Desire Group</th>
<th>Sexually Healthy Group</th>
<th>Relational Dysfunction</th>
<th>Combined Sexual Arousal &amp; Desire Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>18 (18.75%)</td>
<td>44 (45.83%)</td>
<td>16 (16.67%)</td>
<td>18 (18.75%)</td>
</tr>
<tr>
<td>Mean age</td>
<td>28.17</td>
<td>26.09</td>
<td>29</td>
<td>28.06</td>
</tr>
</tbody>
</table>

SEXUAL SYMPTOM

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Low</th>
<th>High</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSAD with partner</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSAD during masturbation</td>
<td></td>
<td></td>
<td></td>
<td>Very High</td>
</tr>
<tr>
<td>FSAD distress</td>
<td></td>
<td></td>
<td>Very High</td>
<td>High</td>
</tr>
<tr>
<td>Thought frequency</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Very Low</td>
</tr>
<tr>
<td>Sexual interest</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Desire distress</td>
<td>High</td>
<td>Low</td>
<td>Normal</td>
<td>High</td>
</tr>
<tr>
<td>Responsivity</td>
<td>Low</td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Distress about responsivity</td>
<td>Moderate</td>
<td>Low</td>
<td>Normal</td>
<td>High</td>
</tr>
<tr>
<td>SA with partner</td>
<td>Low/Moderate</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>SA during masturbation</td>
<td>Normal</td>
<td>High</td>
<td>Normal</td>
<td>Moderate</td>
</tr>
<tr>
<td>SA distress</td>
<td>Moderate</td>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

Note: items in bold reflect remarkable features of the group that discriminate it from others
Figure 1. Frequency distribution of SIAD symptoms for men and women with sexual difficulties. The proportion of participants (as an absolute number) with a given number of symptoms is presented on the Y-axis. Number of symptoms is presented on the X-axis. Frequency distributions were normally distributed for both men and women: the majority presented with either two or three symptoms.
Figure 2. Flow of inclusion/exclusion of men through recruitment stages. The number of men included/excluded at each stage are presented, along with mean ages and standard deviations for main subgroups.
Note: SD = sexual dysfunction; SAD = subjective arousal difficulties; a N’s for reasons for exclusion may exceed subsample totals, as more than one reason for exclusion may apply to a single participant. b “Other” reasons for exclusion from the clinical group include the following: language barrier, non-heterosexual orientation, discomfort with procedure.
Figure 3. Flow of inclusion/exclusion of women through recruitment stages. The number of women included/excluded at each stage are presented, along with mean ages and standard deviations for main subgroups.

Note: SD = sexual dysfunction; SAD = subjective arousal difficulties. a N’s for reasons for exclusion may exceed subsample totals, as more than one reason for exclusion may apply to a single participant. b Other reasons for exclusion from the clinical group included the following: non-heterosexual orientation, discomfort with the procedure, and no prior sexual experience.
Past empirical work comparing desire and arousal disorders has typically employed groups with heterogeneous sexual difficulties, vaguely specified recruitment strategies, vague or narrowly defined inclusion criteria, and clinical groups that have not been selected or differentiated in accordance with standardized diagnostic criteria (and only occasionally with cutoff scores on questionnaires). Hence, to improve upon past work, the previous study was the first to assess the feasibility of empirically distinguishing desire and arousal disorders through the recruitment of distinct groups of sufferers, using explicitly defined DSM-IV-TR operational criteria. However, in the absence of accepted operational criteria for the sexual disorders, we had to turn to the empirical literature for best standards, making educated and somewhat arbitrary decisions where necessary. To our surprise, the use of these explicit criteria led to the exclusion of 75% of those reporting desire and arousal difficulties, with the primary reason for exclusion being the failure to meet a central diagnostic criterion for a sexual disorder (e.g., frequency or duration cutoffs). In addition, the use of DSM-5 criteria proved to be even more stringent, and led to the exclusion of 95% of participants, thus highlighting limitations of the diagnostic criteria as they stand, as well as raising questions about the generalizability of past work that has failed to use operational criteria or to specify exclusion rates on the basis of these criteria. At the same time, using these operational criteria led to the recruitment of distinct groups of low desire versus arousal sufferers, indicating that desire and genital arousal are indeed differentiable. In addition, cluster analyses revealed multiple sexual syndromes, marked by different combinations of desire and arousal symptoms, two of which were consistent with DSM-5 criteria for SIAD.

At the same time, these results were highly preliminary, as determination of desire and arousal problems was made exclusively on the basis of self-report on sexual functioning measures and in response to diagnostic questions on a telephone screening interview. As such, the resulting assignment to clinical groups could not be considered the equivalent of formal diagnoses. In addition, desire and arousal sufferers were not compared on any other psychosocial variables, and there was no objective measurement of sexual functioning; hence, it was not possible to determine whether these distinct groups or subtypes were indeed characterized by unique profiles.

The aforementioned limitations thus prompted the next study, entitled, “How hot is he? A psychophysiological and psychosocial examination of the arousal patterns of sexually functional
and dysfunctional men,” in which we selected the men who met strict operational criteria in the previous study for either the low desire, low arousal, combined low desire and arousal, or healthy control group, and compared them on their psychophysiological patterns (i.e., genital and subjective arousal) in response to a sexual stimulus. We also compared them on a battery of psychosocial measures including body image, trauma, emotion regulation, mood, and sexual attitudes, in order to identify whether desire and arousal sufferers do indeed have unique profiles that would support their classification as distinct, and independent categories. Finally, to improve upon the previous study and to ensure reliability of preliminary diagnoses of low desire and arousal, all men completed a comprehensive semi-structured diagnostic interview assessing DSM-IV-TR and DSM-5 criteria for the sexual disorders.
HOW HOT IS HE?
A PSYCHOPHYSIOLOGICAL AND PSYCHOSOCIAL EXAMINATION OF THE AROUSAL PATTERNS OF SEXUALLY FUNCTIONAL AND DYSFUNCTIONAL MEN

In Press in the Journal of Sexual Medicine
(DOI: 10.1111/jsm.12562)

Reference:
Abstract

Introduction. Despite much theorizing about the interchangeability of desire and arousal, research has yet to identify whether men with desire versus arousal disorders can be differentiated based on their psychophysiological patterns of arousal. Additionally, little research has examined the relationship between subjective (SA) and genital arousal (GA) in sexually dysfunctional men. Aims. To compare patterns of SA and GA in a community sample of men meeting DSM-IV-TR criteria for hypoactive sexual desire disorder (HSDD), erectile dysfunction (ED), both HSDD and ED (ED/HSDD), and healthy controls. Methods. Seventy-one men (19 controls, 13 HSDD, 19 ED, 20 ED/HSDD) completed self-report measures and watched two 15-minute film clips (neutral and erotic), while GA and SA were measured both continuously and discretely. Main Outcome Measures. Groups were compared on genital temperature (as an indicator of GA), SA, and psychosocial variables (i.e., body image, emotion regulation, sexual attitudes, sexual inhibition/excitation, mood, and trauma). Results. Genital temperature increased for all groups during the erotic condition, yet men with ED and ED/HSDD showed less GA than men without erectile difficulties. All groups increased in SA during the erotic condition, yet ED/HSDD men reported less SA than controls or ED men. SA and GA were highly correlated for controls, and less strongly correlated for clinical groups; men with ED showed low agreement between SA and GA. Groups also differed on body image, sexual inhibition/excitation, sexual attitudes and alexithymia. Conclusion: Low desire versus arousal sufferers have unique patterns of response, with those with both difficulties showing greatest impairment. Results have important implications for the diagnosis and treatment of these disorders.

Keywords: Erectile Dysfunction (ED), Hypoactive sexual desire disorder (HSDD), Sexual Arousal, Sexual Dysfunction, Psychophysiology, Thermography, Classification, Diagnosis
Introduction

Disorders of desire and arousal have often been found to be highly comorbid, with some studies with men reporting comorbidity rates just under 50% [1]. Despite this, very few empirical studies have attempted to compare men with erectile dysfunction (ED), hypoactive sexual desire (HSDD), or both of these disorders to identify whether they are characterized by distinct psychological or physiological profiles (for exceptions, see 2-6). Currently, the few empirical studies that have compared these groups have been constrained by various methodological limitations (e.g., vague or non-DSM operationalizations of sexual disorders, groups with heterogeneous sexual difficulties or participants with comorbid medical problems etc.) that have precluded decisive conclusions about this distinction (for a discussion of limitations, see 7). To our knowledge, there has not yet been a single empirical study directly comparing men with DSM diagnoses of HSDD to men with ED on psychophysiological patterns of sexual functioning to see if they have unique identifying patterns of response.

Recently, disorders of desire and arousal were collapsed in the DSM-5 for women [8]; due to insufficient available evidence, this proposal was not extended to men, although there has been some suggestion that it may be relevant for them as well [7, 9]. Currently, some qualitative research indicates that men, like women, experience difficulties distinguishing desire from arousal, particularly subjective arousal, and it is not yet clear whether these constructs can be empirically disentangled [10]. At the same time, men appear to make distinctions between genital (GA) and subjective arousal (SA), such that one can be experienced without the other, although the evidence here is mixed [11]. A significant amount of empirical research on the concordance between subjective and genital arousal indicates that these are more strongly correlated for men (r = .66) than for women (r = .26), although a couple of exceptions have been noted [12]. Two methodological moderators of the gender difference – stimulus variation and timing and method of the assessment of self-reported sexual arousal – have been identified to eliminate the statistical significance of the gender difference in concordance when between subjects correlations were examined, however more research is needed here. Few studies however, have examined the relationship between SA and GA in men with distinct sexual difficulties. Those that have done so either have not compared correlations between healthy and dysfunctional groups [13-14] or have yielded inconsistent results, with some finding lower correlations in men with mixed sexual difficulties [15-17], some finding higher correlations [18]
and some finding no difference at all [19-20]. In addition, none of these studies have compared arousal or concordance levels among men with distinct or homogenous sexual dysfunctions (e.g., HSDD vs ED); instead, the sexually dysfunctional group typically presented with heterogeneous sexual difficulties. Furthermore, as noted by Chivers and colleagues in their review [11], although studies in men have typically found no effect of sexual functioning status on concordance ratings, no clinical research on sexual functioning has yet examined concordance as a study outcome.

**Aims**

Hence, the goal of the current study was to determine whether men with desire versus arousal disorders could be differentiated from each other and from controls based on their psychophysiological and psychosocial patterns of arousal. In particular, we wanted to compare patterns of SA and GA in a community sample of men meeting clearly operationalized DSM-IV-TR criteria for hypoactive sexual desire disorder (HSDD), erectile dysfunction (ED), both HSDD and ED, and an age-matched group of healthy controls. Genital arousal was measured using a thermal imaging camera, which measures changes in genital temperature (caused by changes in blood flow) as an indicator of arousal, while participants watched films and continuously reported on their levels of subjective arousal. While thermography has been used in previous studies as a measure of arousal (see 11 for a review), it has not yet been used in a comparison of distinct clinical groups to healthy controls, and so its diagnostic utility in differentiating sexual disorders remains unknown. Discrete post-film measures of arousal and desire were also administered.

We also wanted to examine whether groups differed on psychosocial variables previously established to be relevant to sexual functioning, in order to derive clearer profiles of these groups. Specifically, researchers studying male sexual dysfunction have found significant associations with a wide array of psychosocial factors, including depression (21-22), anxiety (23-24.), decreased positive affect (25), low sexual excitation (26), high sexual inhibition (27), dysfunctional or erotophobic sexual beliefs (28-29), alexithymia (or poor interoceptive awareness) (30), negative body image (9, 31), and histories of childhood trauma (32-33). However, very few of these studies have attempted to compare men with distinct sexual difficulties (e.g., ED vs. HSDD) to identify whether they are characterized by unique psychosocial profiles. Moreover, the few studies that have included multiple sexual dysfunction
groups have typically selected only one or two variables on which to make comparisons (e.g., alexithymia alone, rather than the range of emotion regulation deficits; 34). Hence, in the current study, groups were compared on an array of standardized and validated measures assessing sexual functioning, body image, sexual excitation and inhibition, sexual attitudes, mood/distress, emotion regulation, mood and traumatic experiences.

We had four main hypotheses: 1) Given that the impairment in ED is one of insufficient/unretained blood flow to the penis, we predicted that men with ED and with ED/HSDD would show less genital arousal (i.e. lower and less temperature change) in response to the erotic film than men with HSDD or healthy controls. 2) In contrast, since the impairment in HSDD is primarily one of low sexual interest or excitement, rather than impaired genital arousal, we expected that men with HSDD and ED/HSDD would show less continuous and discrete SA in response to the erotic film than those with ED or healthy controls. 3) We predicted that all groups would show positive correlations between GA and SA but expected that these correlations would be higher for sexually functional rather than dysfunctional men. 4) We hypothesized that men with ED and HSDD would have unique psychosocial profiles, and that men with ED/HSDD would show greater impairment on psychosocial and psychophysiological variables than all other groups.

Methods

Participants

Seventy-one men (19 controls, 52 clinical) were recruited from clinics and the community in response to advertisements. Clinical participants were also recruited via information distributed to local sexologists, urologists, psychologists, psychological and sexual health clinics, and local hospitals. Inclusion criteria were assessed via a detailed telephone-screening interview (for details, see 7) as well as through scores on a standardized sexual functioning questionnaire (International Index of Erectile Functioning; IIEF). Participants were excluded for the following reasons: being outside the specified age range (18-50);^1^ non-heterosexual orientation;^2^ untreated sexually transmitted infection; diagnosis or treatment within

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^1^ In order to minimize the risk of arousal interference due to age-related physiological conditions with sexual side effects, we restricted our sample to those under the age of 50, for whom such conditions are less common.

^2^ Given that the same sexual stimulus employed across all subjects was an erotic film clip depicting heterosexual activity, individuals who self-identified as non-heterosexual had to be
the past 6 months of any psychopathology known to affect sexual functioning (e.g., depression); no prior sexual experience; objections to watching sexually explicit videos; avoidance of urological exams; use of medications with sexual side effects (e.g., antidepressants); a history of genital/pelvic surgeries or injuries (e.g., prostatectomy); hormonal therapy/treatment (e.g., cancer treatment); or any chronic medical conditions with possible sexual side effects (e.g., diabetes). Groups were matched on relationship status and age (+/- 3 yrs).

Control participants were required to be free of any sexual difficulties. Assignment to clinical groups required freely reporting low desire or low arousal in addition to follow-up endorsement of the symptom being present at least 50% of the time over the past 6 months, in the majority of sexual situations, and the cause of significant distress or interpersonal interference (For a details on operational criteria, see 7). Given the highly intertwined nature of most sexual difficulties, it was not realistic to exclude participants with mild comorbid sexual difficulties from our low desire and/or arousal groups (e.g., severe erectile difficulties would inevitably present some difficulties reaching orgasm). However, the extent of comorbid sexual symptoms was tightly regulated such that they were permitted only if they were determined to be secondary to desire or arousal difficulties (i.e., they were less chronic, less severe, and had a more recent onset than the arousal and desire difficulties. They were also identified by participants as being of secondary concern). Efforts were made to keep HSDD and ED groups homogeneous with respect to comorbid arousal and desire difficulties, respectively, by excluding anyone with more than mild, transient and situational symptoms of the other disorder.

Of the 270 men recruited, 80 were eligible (70.4% exclusion rate) and were tested between July 2009 and July 2013 (For details on ineligible participants, and implications of high exclusion rates, see 7)4. Of these 80 men, the data for 9 men was excluded from all analyses due

3 The frequency criterion was ultimately reduced from 75% to 50% after three years of testing due to recruitment difficulties. The mean frequency of sexual difficulties reported at screening was approximately 50%; however even those who initially reported sexual difficulties 75% of the time showed frequency fluctuations, such that at testing, the majority reported difficulties 50-75% of the time.

4 The majority of interested participants were excluded due to failure to meet central diagnostic criteria for either of the sexual disorders (e.g., severity or duration criteria). This exclusion rate may speak to a larger issue regarding the ability of DSM criteria to capture the range of sexual difficulties experienced in the general population.
to equipment failure or technical difficulties that led to missing data for an entire film condition (e.g., missing temperature data for the erotic condition).

**Measures**

*Equipment*

*Thermography.* A TSA ImagIR thermal imaging system provided by Seahorse Bioscience (North Billerica, MA) was used to monitor genital temperature. In line with procedures used by Kukkonen and colleagues [12], the sampling interval was set at eight frames per second for this experiment. The sensitivity of this camera was 0.07°C and it had an operating range from 15°C to 40°C. The camera was placed 1.0m diagonally left from the participant, at a height of 1.09m, angled at approximately 30 degrees (so that as erection occurred, the tip of the penis did not obstruct the view of the rest of the penis). Two regions of temperature measurement were selected for all analyses: one on the genitalia (midway along the shaft of the penis) and a control spot was chosen on the inner right thigh to determine the specificity of temperature change during sexual arousal. Ambient room temperature was also monitored for each participant and was maintained so that there was less than 1.5°C variation within each testing session (Average baseline room temperature = 24.3°C, SD = 1.49; average erotic room temperature = 24.4°C; SD = 1.53).

*DVD Goggles.* I-O display systems i-theater goggles (Sacramento, CA), connected to a DVD player and laptop computer through a switchbox, were used to display the videos and subjective questionnaires privately to each participant.

*Intercom.* A standard intercom was used for communication between the participant and female investigator, who was in the adjoining room.

*Stimulus Materials.* The first neutral film clip consisted of still images of nature, accompanied by calming music to allow for body temperature to stabilize [35]. The second baseline video segment consisted of a Canadian Film Board travelogue of the Yukon and Alaska [36]. The erotic film clip was selected from a list of films validated to reliably elicit arousal [37], and consisted of a variety of sexual activities (in order of increasing intensity) including kissing/foreplay and mutual masturbation (5 minutes), mutual oral sex (5 minutes) and vaginal intercourse (5 minutes). The films were presented privately to participants through the DVD goggles and earphones.

**Main Outcome Measures**
**Time 1 (Screening): Sexual Functioning**

Men completed the widely used and well-validated International Index of Erectile Functioning (IIEF; [38]) at screening to assess levels of sexual functioning (Chronbach’s alpha = .80).

**Time 2 (Pre-testing) Measures:**

*Sexual Functioning and Attitudes Measures*

To further assess sexual functioning, participants completed the Male Sexual Health Questionnaire (MSHQ; [39]), comprising 25 items and 4 subscales, with higher scores indicating better sexual functioning. (Chronbach’s alpha = .90). The Sexual Inhibition (SIS) and Sexual Excitation (SES) Scale (SIS-SES; [40]) was completed to assess avoidance and approach indicators of sexual arousal. This well validated scale consists of 45 items, and consists of two sexual inhibition subscales (SIS1 and SIS2; Chronbach’s alphas = .79 and .69 respectively), and one sexual excitation subscale (SES; Chronbach’s alpha = .93). Higher SIS scores indicate less inhibition, whereas higher SES scores indicate less excitation potential. To assess sexual attitudes, men completed the Sexual Opinion Survey (SOS;[41]) which consists of 21 items rated on a 7-point scale, with higher scores indicating more erotophilia (Chronbach’s alpha = .85).

*Body Image Measures*

To assess body preoccupation and distress, men completed the Body Shape Questionnaire (BSQ; [42]), which is a well validated 34-item measure, rated on a 6 point scale, with higher scores indicating more body shape dissatisfaction (Chronbach’s alpha = .97). They also completed the 15-item Body Image Self-Consciousness Scale (BISC; [43]), which assesses concern about body image during physical intimacy with a partner. Items are rated on a 6-point Likert scale, with higher scores indicating greater body image self-consciousness (Chronbach’s alpha = .91).

*Emotion Regulation Measures*

To assess emotion regulation difficulties, men completed two measures: 1) the Toronto Alexithymia Scale (TAS; [44]), which is a highly reliable and well validated 20-item measure of alexithymia (separating difficulties identifying emotions, describing emotions, and externally oriented thinking), with higher scores indicating higher alexithymia (Chronbach’s alpha = .82); 2) the Difficulties in Emotion Regulation Scale (DERS; [45]), which is a 36 item scale assessing
emotion regulation difficulties. Items are rated on a 5-point scale with higher scores indicating more emotion dysregulation (Chronbach’s alpha = .94 for the DERS).

*Time 3 (Testing) Measures*

**Demographic and Diagnostic Information.**

A demographic interview (i.e., assessing age, ethnicity, education, medical/psychological/sexual history, relationship satisfaction/concerns) was administered by the primary investigator at the outset of the testing session. Sexual disorder diagnoses were obtained via the administration of a 63-item Sexual Arousal and Desire Interview (SADI), that assesses the DSM-IV-TR and DSM-5 diagnostic criteria for sexual disorders (e.g., frequency, duration, severity, generalizability, distress), as well as other facets of desire and arousal.\(^5\)

**Mood Measures**

Participants completed the 20-item Positive and Negative Affect Schedule (PANAS;[46]) to assess mood state before and after viewing the films, and to assess changes in mood due to the stimuli (Chronbach’s alpha = .85 for positive and negative mood subscales prior to watching films, and .90 for both scales following the films). Men also completed two gold standard mood measures to assess depressive and anxious symptomatology: the Beck Depression Inventory (BDI; [47]) and the State-Trait Anxiety Inventory (STAI;[48]). Higher scores on both of these measures indicate greater psychopathology. Chronbach’s alphas were .90 for the BDI and .93 for the STAI.

**Trauma Measures**

Participants completed the Childhood Trauma Questionnaire (CTQ;[49]) to assess childhood histories of abuse and neglect. This 28-item measure is comprised of 5 subscales that can be combined into an overall trauma score (with higher scores indicating more trauma) and is considered the gold standard in the assessment of child abuse (Chronbach’s alpha = .90). To assess lifetime exposure to a variety of traumatic events, men also completed the Stressful Life Events Screening Questionnaire (SLESQ;[50]), a 13-item self-report measure with good validity and test-retest reliability.

**Continuous Measure of Sexual Arousal**

In order to continuously record subjective sexual arousal, a Windows-based computer

\(^5\) Copies of these interviews are available upon request.
program was developed in our laboratory [12], which requires participants to use a standard two-button PC mouse to indicate subjective ratings of sexual arousal. To note increases or decreases in SA, participants clicked on the right or left button, respectively. Arousal was rated on a 10-point scale with 0 equaling no sexual arousal whatsoever and 10 denoting the most sexually aroused a participant could feel. The numeric level of arousal was indicated to participants using auditory stimuli presented through a speaker located next to the examination table; each click on the mouse was followed by an announcement of the number that participants had indicated. An auditory reminder occurred if there was inactivity (no clicking) for a 60s interval.

Discrete Subjective Measures of Desire and Arousal

Discrete, Likert-style questions concerning mood, desire, and subjective appraisals of physical and mental arousal were asked at the outset of the experiment (a brief 9-item version; Chronbach’s alpha = .86 for sexual functioning items) and then following the baseline video (28-item measure), via the DVD goggles. For each question, participants were instructed to provide their answer by speaking into the intercom system beside them. Following the erotic film, a paper-based version of the post baseline film questionnaire was completed (this was done to minimize any discomfort in reporting sexual responses as well as to allow for the open-ended nature of three additional questions pertaining to participant reactions to the film). Items on these post-film questionnaires assessed perceptions of physiological sexual arousal, mental arousal, solitary and relational desire, mood, distraction, and participant reactions to the camera (i.e., whether the presence of the camera affected self-reported arousal levels) and to the film. All Likert-scale items were rated on a 7-point scale, ranging from “not at all” to “the most ever”. Chronbach’s alphas = .96 (overall sexual functioning), .95 (desire subscale), .80 (subjective arousal subscale), and .94 (physical arousal subscale) for the post-baseline film, and .97 (overall sexual functioning), .94 (desire subscale), .93 (subjective arousal subscale), and .94 (physical arousal subscale) for the post-erotic film measure.

Procedure

This study was reviewed and approved by the University’s Institutional Review Board, and written informed consent was obtained from each participant. Eligible participants were scheduled to come into our university-based psychophysiological laboratory for a 3.5-hour testing session. Prior to psychophysiological testing, participants were emailed (or mailed) questionnaires to complete and return before their appointment in order to minimize their time
spent in the lab (see Measures for list of questionnaires). On the day of testing, participants completed two semi-structured interviews: the first assessed basic demographic, health and relationship information; the second assessed the diagnostic criteria for the sexual disorders. Following this, they completed questionnaires about their mood, and trauma histories.

Participants were then instructed to undress from the waist down and to make themselves comfortable in the testing chair to watch the films. Participants watched two neutral films and one erotic video, each 15 minutes in duration, during which the camera recorded genital temperature. Between films, participants completed questionnaires assessing their desire and arousal levels in response to the films, by calling their answers out loud into the intercom beside them. After the third film, participants completed a paper-based version of the questionnaire and a mood measure. Participants were then debriefed and compensated with CAD$75. All clinical subjects were provided with educational feedback about their results, as well as treatment recommendations and referrals, if relevant.

**Data Analysis**

To assess differences in genital temperature between film conditions and group status, genital temperature was averaged into three time intervals: the first 5 minutes, the mid 5 minutes and the last 5 minutes. Means for temperature are reported in degrees Centigrade for all analyses. A three-way, mixed design ANOVA with two repeated factors (time and condition) was first conducted. Independent variables were film condition (baseline/erotic), group status (HSDD, ED, ED/HSDD, Control), and time of temperature recording (first 5 minutes, second 5 minutes, third 5 minutes) as the repeated factor. The same analysis was applied to test for group and condition differences in continuous SA across time. All significant results were further assessed using tests of simple main effects and Tukey HSD post-hoc tests. For all significant interactions, we used the error term of that interaction; to control for violations of sphericity, the Greenhouse-Geiser procedure was applied, and the harmonic mean of the sample sizes was used to adjust for the unequal sample sizes between groups. To assess whether groups also showed an increase in discrete levels of SA after the erotic film, as compared to the neutral film, a two-way repeated measure ANOVA was conducted, with group as the between subject factor and condition as the within subjects factor.

To assess the relationship between SA and GA, we conducted within and between-subjects analyses using Pearson correlations. With respect to the former, a correlation was
obtained for each subject for the relation between continuous subjective and genital ratings of arousal across 15 minutes of the erotic condition. The mean of the within-subjects correlation was then calculated for each group, and group differences in mean correlation values were compared using a one-way ANOVA (using group membership as the independent variable, and mean concordance value as the outcome variable). For between-subject analyses, the correlation of average GA and average SA was calculated for each of the three five minute segments of the erotic condition, and levels of agreement for the three time segments were compared across groups. The relationship between discrete and continuous measures of subjective arousal was examined using Pearson product moment correlations between the average continuous subjective arousal rating and the discrete self-report rating of overall sexual arousal for each group.

Finally, in order to assess group differences in mood, body image, emotion regulation, trauma histories, sexual attitudes, experience and beliefs, and sexual functioning, one-way ANOVAs were performed, with Tukey’s post hoc tests to follow up on significant differences.

**Power**

Using analyses of variance with a three-way mixed design, a sample size of 71 is sufficient to detect a difference of 0.65 SDs between standardized means, with moderate to large effect sizes, and an alpha of 0.05 and a beta of 0.2 [51]. This sample size is also sufficient to detect moderate to large differences using chi square and correlational analyses.

**Results**

**Participant Demographics**

The data from seventy-one men were included in our final analyses: 19 in the control group, 13 in the HSDD group, 19 in the ED group, and 20 in the HSDD/ED group. There were no significant group differences with respect to age ($M = 32.72, SD = 10.17$, range of means $= 30.63-34.68$; $F (3, 67) = .500, p = .68$), relationship status (38% single, 20% dating, 42% married/ committed; $\chi^2 (15) = 19.021, p = .21$), relationship duration ($M = 53.42$ mths, $SD = 67.42$; $F (3, 39) = 1.376, p = .26$), cultural identity (54.9% Canadian, 8.5% Western European, 7% East Indian/ Pakistani, 7% Latin, % 22.6 other (with no other group exceeding 5%); $\chi^2 (27) = 24.746, p = .59$) religiosity (36.6% agnostic/ spiritual, 14.1% atheist, 16.9% Catholic, 12.7% Muslim, 19.7% other; $\chi^2 (18) = 21.155, p = .27$), education (60% completed a Bachelor’s degree at minimum; $\chi^2 (12) = 7.749, p = .80$), language (54% English, 25% French, 21% other; $\chi^2 (6) = 8.534, p = .20$) income (65% earned under $40,000; $\chi^2 (15) = 7.97, p = .93$), medical history,
(11.3% had a noninterfering medical condition; \( \chi^2 (3) = 1.52, p = .68 \)), or age of sexual debut (\( M = 17.39, SD = 4.14; F (3, 67) = .799, p = .50 \)). However, significant group differences emerged for history of psychological treatment (\( \chi^2 (3) = 8.25, p = .04 \)), degree of relationship satisfaction (\( \chi^2 (15) = 32.210, p = .006 \)) and sexual satisfaction (\( \chi^2 (18) = 40.366, p = .002 \)), frequency of watching pornography (\( F (3, 67) = 5.954, p = .001 \)) time since last partnered sexual activity (\( F (3, 67) = 3.631, p = .017 \)) last masturbation experience (\( F (3, 66) = 3.17, p = .03 \)) and number of sexual partners approached significance (\( M = 13.25, SD = 2.49; F (3, 66) = 2.561, p = .06 \)).

Results of post hoc tests on these group differences, as well as psychosexual information for this sample are presented in Table 1.

**Stimulus Effects**

To ensure that the erotic stimulus was successful in increasing arousal in our controls, we conducted paired t tests comparing average genital temperature (°C) at baseline (B) versus erotic (E), and found significant differences in the predicted direction (Bx = 31.85, Ex = 33.51, \( t(18) = -6.957, p < .001 \)). Paired t tests comparing average thigh temperature (°C) at baseline versus erotic showed no significant differences between conditions (Bx = 29.76, Ex = 29.66, \( t(18) = 1.268, p = .22 \)), confirming that temperature increase was specific to the genitals. Significant differences were also found for average SA levels at baseline versus erotic for controls (Bx = .46, Ex = 5.07, \( t(18) = -10.675, p = .000 \)), indicating that our erotic film had its intended effect.

**Genital Arousal Patterns**

A three-way mixed design ANOVA with two repeated factors revealed significant main effects for condition (Bx = 32.049, Ex = 33.016; \( F (1, 67) = 67.503, p < .001 \)) and time (\( F (2, 134) = 56.161, p < .001 \)) on genital temperature (°C), both of which were in the predicted directions. Significant interactions were also found for time x condition (\( F (2, 134) = 108.198, p < .001 \)) and condition x group (\( F (3, 67) = 5.147, p = .003 \)).

The test for the significant condition x group interaction at baseline was not significant (\( F (3, 67) = .39, p = .76 \)), indicating that groups did not differ in genital temperature during the neutral film. In contrast, as predicted, the simple main effects test for the groups during the erotic condition was significant (\( F (3, 67) = 2.76, p = .05 \)). Pairwise comparisons revealed that controls had significantly higher average genital temperature than men with ED (\( p = .002 \)) and ED/HSDD (\( p = .006 \)). HSDD men also had higher average genital temperature than men with ED (\( p = .006 \)) and ED/HSDD (\( p = .016 \)). In addition, although simple main effect tests of the change in
temperature from baseline to erotic for each group revealed that genital temperature significantly increased for controls \((p < .001)\), HSDD men \((p < .001)\), ED/HSDD men \((p = .008)\), and men with ED \((p = .017)\), the change in temperature was significantly greater for controls (mean change of 1.66°C) than for ED men (mean change of .56°C) or combined men (mean change of .61°C) \((p's < .001)\). The change in temperature for men with HSDD (mean change of 1.10°C) did not significantly differ from other groups.

Following up on significant time x condition interactions for genital temperature revealed a significant linear decrease in temperature across time at baseline \((F(1,70) = 30.425, p < .001)\), and a significant linear \((F(1,70) = 103.340, p < .001)\), and quadratic \((F(1,70) = 48.993, p < .001)\), trend for temperature over time at erotic. Temperature linearly increased from time 1 to time 2, and then began to taper off (see Figure 1). Planned group comparisons for the quadratic trend during erotic revealed significant differences between HSDD and ED men \((p = .046)\).

Subjective Arousal Patterns

A three-way ANOVA with two repeated factors revealed significant main effects for condition \((Bx = .69, Ex = 4.04; F(1, 67) = 167.659, p < .001)\) and for time \((F(2, 134) = 17.567, p < .001)\), in the predicted directions. We also found significant time x condition \((F(2, 134) = 19.145, p < .001)\) and condition x group \((F(3, 67) = 7.306, p < .001)\) interactions (see Figure 2).

The test of simple main effects on the significant condition x group interaction at baseline was not significant \((F(3, 67) = .19, p = .90)\), indicating that the groups did not differ in average subjective arousal levels during the neutral film. However, the simple main effects test for groups during the erotic condition was significant \((F(3, 67) = 3.74, p = .015)\). Pairwise comparisons on group differences in SA revealed that men with ED/HSDD had significantly lower average SA levels than controls \((p < .001)\), men with ED \((p < .001)\), and men with HSDD \((p = .015)\). In addition, although simple main effects tests for the change in SA from baseline to erotic revealed that SA significantly increased for all groups \((p's < .001)\), the change was significantly greater for controls (mean change of 4.61 units) and ED men (mean change of 4.12) than for combined men (mean change of 1.66) \((p's < .001)\). Controls also changed in SA significantly more than men with HSDD (mean change of 2.95) \((p = .03)\).

Following up on significant time x condition interactions for continuous SA revealed no significant difference across time during baseline \((F(2, 140) = .813, p = .45)\), but a positive linear \((F(1, 70) = 28.032, p < .001)\) and quadratic trend \((F(1, 70) = 5.229, p = .03)\) for SA.
during the erotic film (see Figure 2). Planned group comparisons for the quadratic trend during erotic revealed significant differences between ED and combined men \((p = .017)\).

**Group Differences in Discrete Levels of Subjective Arousal and Post-Erotic Film Responses**

A two-way repeated measure ANOVA revealed a significant main effect for condition \((Bx = .76 \text{ Ex } = 4.58; F(1, 67) = 190.370, p < .001)\) in the predicted direction. A significant condition x group interaction was also found \((F(3, 67) = 5.357, p = .002)\). A simple main effects test indicated that the group comparison at baseline was not significant \((F(3, 67) = .20, p = .896)\), whereas it was significant at erotic \((F(3, 67) = 11.63, p = .001)\). Tukey’s post hoc tests indicated that men with ED/HSDD had significantly lower discrete subjective arousal levels during the erotic film than controls \((p < .001)\), ED men \((p = .004)\), or men with HSDD \((p = .026)\). Controls also had significantly higher discrete SA levels than HSDD men \((p = .047)\). The comparison of discrete levels of SA at baseline versus erotic was also significant for every group \((all \ p’s < .001)\), indicating that discrete SA increased from baseline to erotic for each group.

A breakdown of participant reports of camera effects, film segment preferences, comparative arousal, film effects on mood and overall levels of sexual response (i.e., desire, physical and subjective arousal) during the erotic film, are presented in Table 2 (separated by group status). Overall, there were no significant group differences in camera effects \((\chi^2(6) = 2.537, p = .42)\), film clip preference \((\chi^2(12) = 10.041, p = .61)\), arousal as compared to partnered sex \((\chi^2(6) = 9.198, p = .16)\), the effects of the film on relaxation \((F(3, 67) = .164, p = .92)\), distraction \((F(3, 67) = .810, p = .49)\), anxiety \((F(3, 67) = .252, p = .86)\) or enjoyment \((F(3, 67) = 1.358, p = .26)\). However, groups did significantly differ on subscales for post-film/ responsive desire \((F(3, 67) = 12.01, p < .001)\), physical arousal \((F(3, 67) = 5.27, p = .002)\), and subjective arousal \((F(3, 67) = 8.06, p < .001)\). Results of post hoc tests on these group differences are presented in Table 2.

**Discrete and Continuous SA Across Conditions**

To assess whether there was an interaction between condition and the measure of SA, we conducted a three-way repeated measures ANOVA, with measure (discrete/ continuous) and condition (baseline/ erotic) as the within subjects factors, and group as the between subject factor. Results revealed a significant condition x measure interaction \((F(1, 67) = 4.198, p = .04)\) but no measure x group interaction. A follow up simple main effects test indicated no differences between measures at baseline \((F(1, 67) = .15, p = .699)\), but found a significant difference at
erotic \( (F(1, 67) = 9.72, p = .003) \), with continuous SA ratings being lower \( (M = 4.04, SD = 2.43) \) than discrete SA ratings \( (M = 4.58, SD = 2.44) \). However, in general, both discrete and continuous SA measures showed a significant increase in SA ratings from baseline to erotic (both \( p \)'s < .001).

The relationship between mean continuous SA and discrete SA during the erotic condition was also examined for each group. All correlations were positive and significant, ranging from .45 for men with ED \( (p = .05) \), to .70 for controls \( (p = .001) \), .72 for HSDD men \( (p = .006) \), and .75 for ED/HSDD men \( (p < .001) \).

**Correlation between Subjective and Physiological Measures**

Results of between-subject correlational analyses examining the overall level of agreement between average GA and SA revealed positive, significant correlations for the first two five-minute segments of the erotic condition for controls \( (r1 = .56, r2 = .47, p \text{'}s < .05; r3 = .17) \), which were the preferred segments of the film. Correlations for men with HSDD \( (r \text{'s } = .22, .44, .13) \) and men with ED/HSDD \( (r \text{'s } = .37, .21, .20) \) were positive, but nonsignificant at all time points. In contrast, correlations for men with ED were negative and nonsignificant \( (r \text{'s } = -.09, -.10, -.04) \). Tests of differences between correlation coefficients, using Fisher’s \( z \) transformation, showed that only controls and ED men significantly differed \( (p < .05) \).

We also calculated within-subjects correlations across the 900 seconds of the erotic condition, and for the first 5 minutes, second 5 minutes and last 5 minutes, to examine if there were individual differences in men’s capacity to track the concordance between their SA and GA, and whether this differed by group status. Results indicated positive, modest correlations for each group, with weakest correlations during the last five minutes of the film (which was the least subjectively preferred segment). Although the mean correlation value was higher for controls \( (rx = .60; rx1 = .62, rx2 = .32 rx3 = .13) \) than for men with HSDD \( (rx = .44; rx1 = .61, rx2 = .12, rx3 = -.01) \), ED \( (rx = .48; rx1 = .52, rx2 = .24, rx3 = .04) \), or ED/HSDD \( (rx = .41; rx1 = .41, rx2 = .32, rx3 = .31) \), these differences were not statistically significant \( (F(3, 67) = 1.191, p = .32) \). Age, mood, and frequency of watching porn were also examined as possible covariates of within subject correlations, but no significant differences were found.

**Psychosocial Differences**

Results of one-way ANOVAs indicated that groups significantly differed on sexual inhibition due to fear of performance failure \( (F(3, 67) = 13.61, p < .001) \), sexual excitation \( (F(3, 67) = 9.72, p = .003) \), and sexual desire \( (F(3, 67) = 13.61, p < .001) \).
67) = 26.51, \( p < .001 \)), depressive symptoms (\( F(3, 67) = 4.12, \ p = .01 \)), pre-film positive affect (\( F(3, 67) = 2.6, \ p = 0.06 \)) and post film positive affect (\( F(3, 67) = 3.04, \ p = .04 \)) negative sexual attitudes (\( F(3, 67) = 8.28, \ p < .001 \)), body image self-consciousness (\( F(3, 67) = 2.81, \ p = .046 \)), overall sexual functioning on the IIEF (\( F(3, 67) = 43.05, \ p < .001 \)), overall sexual functioning on the MSHQ (\( F(3, 67) = 38.96, \ p < .001 \)) and alexithymia (\( F(3, 67) = 5.39, \ p = .002 \)). Groups did not significantly differ with respect to trait-based anxiety (\( F(3, 67) = 1.34, \ p = .27 \)), body image satisfaction (\( F(3, 67) = 1.31, \ p = .28 \)), pre or post film negative affect (\( F(3, 67) = .07 \) and \( .57, \ p's = .97 \) and \( .64 \)), general emotion regulation skills (\( F(3, 67) = 1.14, \ p = .34 \)), sexual inhibition due to fear of consequences (\( F(3, 56) = 1.24 \ p = .30 \)) lifetime trauma histories (\( F(3, 67) = .14, \ p = .94 \)) or childhood trauma (\( F(3, 67) = .10, \ p = .96 \)). Means, standard deviations, effect sizes, and results of post hoc tests are shown in Table 3.

**Discussion**

The primary goal of this study was to determine whether desire and arousal disorders were differentiable in medically healthy men on the basis of psychophysiological patterns of arousal, and indeed we found they were. In line with hypotheses, men with erectile difficulties (ED and ED/HSDD) had lower average genital temperature and less temperature change during the erotic condition than other groups. In contrast, despite having levels of GA that were comparable to controls, men with low desire showed less change in continuous SA (or in other words, got less ‘turned on’) during the erotic condition, and reported less desire, physical arousal and overall SA on post-film measures, as compared to healthy controls. As predicted, combined ED/HSDD men showed the most severe impairment during the erotic condition, with lower average GA and SA levels, and less change from baseline than other groups, according to both continuous and discrete measures. In addition, consistent with past findings, within-subject correlations for genital-subjective arousal agreement were larger than between-subject correlations for all groups of men (11). Using within-subjects correlational analyses, no significant differences were found between men in the different groups in their level of agreement between their SA and GA responses; however, between-subjects analyses revealed that at the group level, there was stronger agreement between SA and GA levels for healthy men, while men with ED showed almost a complete disconnection between these two levels of functioning. Finally, desire and arousal sufferers were also differentiable on the basis of various psychosocial variables. Consistent with past research, men with ED reported greater inhibition
due to fear of performance failure (27), as well as more histories of psychological treatment, whereas men with HSDD reported less excitation/ arousability (26), less positive moods and sexual attitudes (29), less masturbation and pornography seeking (9), and greater alexithymia (34). Again, these difficulties were compounded in men with ED/ HSDD who in addition to the above, also reported more body image self consciousness and a longer duration without partnered sexual activity. In contrast, groups did not significantly differ on body image satisfaction, trait-based anxiety, pre or post film negative affect, trauma histories, or other emotion regulation skills aside from alexithymia. It should be noted that levels of trauma, negative affect and anxiety in this sample were relatively low for all groups, however, and null effects for emotion regulation and body image satisfaction may have been attributable to the large amount of within-group variability for these factors. In addition, findings with respect to body image are consistent with the literature, whereby it has been found that regardless of the degree of negativity of the individual’s body image, the important question for sexual functioning appears to be how much those body image concerns are on the mind of the individual during sex (52).

The results of this study may have important implications for the way we conceptualize and classify desire and arousal difficulties. Specifically, the current findings support the distinction between SA and GA, particularly in men with sexual difficulties. In line with past research findings (11), these constructs were closely intertwined in healthy men (as evidenced by the strong positive correlation averaging around 0.6), but diverged in those with sexual difficulties, particularly men with ED, such that one could be experienced without the other (for a review of past studies on concordance, see 11). This divergence was particularly evident during the non-preferred final five minutes of the erotic film. At the same time, results also support past qualitative findings on the interconnection between desire and mental arousal [10] and suggest that these mental processes may go largely hand in hand. This was true not only for controls and ED men in the current study, but also for men with ED/HSDD, whose levels of SA mirrored their reports of low desire.

It is important to note, however, that while men with combined ED/HSDD experienced significantly lower levels of SA in response to the erotic film, this was not true of men with HSDD alone (although they did show a trend in this direction). HSDD men did however report lower levels of desire in response to the erotic film, as compared to healthy controls. It remains
unclear whether this trend captures a subtle but important distinction between desire and SA, or is simply an artifact of our small HSDD group sample size. It may be that SA is an experience that occurs “in the sexual moment”, while desire arises when one takes a step “out of the moment” to reflect on what one is feeling. HSDD men, for example, may hold negative attitudes about sexual activity with a partner, and/or be disconnected from their sexual feelings, leading to correspondingly low levels of sexual motivation or resistance to sexual experiences (53). This nonsexual cognitive lens may not, however, preclude HSDD men from ultimately becoming turned on (SA) once they have entered into a sexual situation (albeit likely to a lesser degree than highly desirous men). In addition, it is noteworthy that our HSDD group was heterogeneous in nature, ranging from men with generalized sexual apathy to those lacking sexual interest exclusively in their relationships. Unfortunately, the impact of this group variation on SA levels could not be examined due to the small number of men in our HSDD group (for a discussion of obstacles to recruiting HSDD men, see 7) but should be teased apart in future work.

In addition, our findings with the ED/HSDD group have implications for the relevance of Sexual Interest and Arousal Disorder (SIAD) for men – SIAD emerged as a diagnostic category exclusively for women in the DSM-5 [8] to account for the comorbidity of desire and arousal difficulties. Similarly, the men in our ED/HSDD group presented not only with comorbid erectile difficulties and low desire, but also reported low levels of responsiveness, SA, and physical arousal sensations and would likely have met diagnostic criteria for SIAD. However, it currently remains unclear whether the presenting syndrome in this group is simply the combination of (or a more severe version) the symptoms of either disorder alone, or whether it represents a new syndrome in its own right (characterized by generalized inhibition of mental and physical excitement). Future research on the etiology and presentation of this combined syndrome, as compared to each disorder alone, is greatly needed.

Overall, these results also have direct implications for the treatment of desire and arousal disorders. Our results with respect to HSDD suggest that these men may benefit from cognitive work to restructure their negative sexual attitudes and inhibitory thoughts, replacing them with more erotic imaginings (e.g., simmering techniques to increase arousability). Mindfulness and emotion regulation work may also help to facilitate connection with one’s sexual feelings (emotional and physical) and detachment from nonsexual thoughts or negative emotions (53). Indeed, recent research indicates that intentional redirection of attention towards genital
sensations/physical sexual cues increases the experience of sexual arousal, likely in the way that sensate focus exercises do (54). On the other hand, men with ED may benefit from sexual education about the inhibitory impact of performance-based fears on erectile functioning, relaxation exercises to facilitate connection with pleasurable physical sensations, and mindfulness work to assist in being “in the moment” (55). In working with men with ED/HSDD, it may also be important to explore the chronology and connection between desire and arousal difficulties, as well as to provide education on the interaction between mind and body processes.

At the same time, these results should be considered within the context of several important limitations. First, we had a high exclusion rate in this study (70.4%), and our remaining sample was relatively young and predominantly heterosexual, which raises questions about the generalizability of our sample to those studied by past researchers. An earlier examination of reasons for exclusion revealed that the majority of participants were excluded due to failure to meet a central diagnostic criterion for either of the sexual disorders (e.g., frequency, severity, or duration criteria). That is, ineligible participants were more likely to report mild, transient, or situational (context-specific) sexual difficulties, as well as difficulties that were the result of other comorbid medical, psychological or sexual problems (7). While we believe that our inclusion criteria thus allowed for a more systematic and stringent examination of the unique profiles of desire and arousal sufferers, they also however, limit possible comparisons with previous research, given that only a minority of past researchers have clearly operationalized their inclusion criteria for the sexual disorders. In other words, the same individual who was excluded from participating in the current study due to situational and subthreshold sexual difficulties would likely have been included in previous studies that did not use clearly operationalized diagnostic criteria. At the same time, it is not clear whether our exclusion rates and patterns were in fact different from previous studies. Attempts to compare current exclusion rates with the relevant literature are complicated by the fact that the majority of clinical trials on sexual dysfunction have not reported exclusion rates, those that reported rates rarely reported reasons, and when reasons were reported, seldom were people excluded because they did not fit the diagnostic criteria for a sexual dysfunction, as rarely have diagnostic criteria been explicitly operationalized (for a more detailed discussion of this issue, see 7). Second, although we chose a well-validated film to enhance arousal in men [37], the majority of men in our study reported only moderate levels of enjoyment in response to the erotic film; it is possible
that we would have found stronger arousal effects (and potentially stronger group differences) with a more preferred stimulus. Third, our sample size was small, particularly for men with HSDD, which limited our power to find differences between HSDD men and other groups. It also limited the kinds of analyses that we could do. For instance, it is likely that men who have difficulty attaining erections differ from men who exclusively have trouble maintaining them, both in their psychophysiological profiles and in underlying mechanisms, but we were unable to tease apart this heterogeneity in our analyses. Despite these challenges, strong patterns nonetheless emerged that differentiated desire and arousal difficulties; it seems reasonable to assume that such patterns would be only more pronounced with more amply powered analyses.

**Conclusions**

In conclusion, the current study marks a first step towards empirically differentiating and profiling desire and arousal disorders in men using clear criteria and standardized measures. These findings have important theoretical implications for the classification of these disorders, and support the use of thermography as a diagnostic tool that can differentiate problems of desire and arousal in men. Future research using multi-method techniques (e.g., brain imaging in conjunction with thermal imaging) and cross gender comparisons may help us better disentangle this complicated mind-body conundrum.
References


Table 1. Group Differences in means, standard deviations and sample proportions (%) for psychosexual variables

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Controls</th>
<th>HSDD</th>
<th>ED</th>
<th>HSDD/ED</th>
</tr>
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<td></td>
<td>(N = 71)</td>
<td>(n = 19)</td>
<td>(n =13)</td>
<td>(n = 19)</td>
<td>(n = 20)</td>
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<td></td>
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<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
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<tr>
<td>Sexual history:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td># of partners*</td>
<td>13.25 (2.49)</td>
<td>21.34 (2.94) a</td>
<td>13.54 (2.49) ac</td>
<td>15.13 (2.29) ac</td>
<td>6.25 (2.49)c</td>
</tr>
<tr>
<td>age of sexual debut</td>
<td>17.39 (4.14)</td>
<td>18.52 (5.18)</td>
<td>17.62 (3.33)</td>
<td>16.89 (4.34)</td>
<td>16.62 (3.29)</td>
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<tr>
<td>last had sex (days)*</td>
<td>40.58 (6.71)</td>
<td>11 (4.93) a</td>
<td>39.56 (5.97) ac</td>
<td>32.49 (3.99) ac</td>
<td>98.80(9.06) bc</td>
</tr>
<tr>
<td>last mast. (days)*</td>
<td>34.81 (11.15)</td>
<td>4.33 (1.36) a</td>
<td>139.24 (18.45)b</td>
<td>6.76 (2.34) a</td>
<td>79.21(13.42) ab</td>
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<td>porn freq (#/ mth)</td>
<td>6.74 (8.92)</td>
<td>9.82 (9.37) a</td>
<td>1.27 (2.07) b</td>
<td>11.1 (10.34) a</td>
<td>3.25 (6.69) b</td>
</tr>
<tr>
<td>Psych history:</td>
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<td></td>
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<td>Past treatment</td>
<td>15 (21.4)</td>
<td>1 (5.3) a</td>
<td>1 (7.7) ac</td>
<td>7 (36.8) b</td>
<td>6 (30) bc</td>
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<td>Relationship sat:</td>
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<td></td>
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<tr>
<td>Satisfied</td>
<td>30 (69.8)</td>
<td>12 (100) a</td>
<td>5 (50) b</td>
<td>5 (50) b</td>
<td>8 (72.7) a b</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>9 (20.9)</td>
<td>0</td>
<td>4 (40) b</td>
<td>3 (30)</td>
<td>2 (18.2)</td>
</tr>
<tr>
<td>Neither</td>
<td>4 (9.3)</td>
<td>0</td>
<td>1 (10) b</td>
<td>2 (20)</td>
<td>1 (9.1)</td>
</tr>
<tr>
<td>Sexual sat:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>19 (44.2)</td>
<td>11 (91.7) a</td>
<td>4 (40) b</td>
<td>1 (10) b</td>
<td>3 (27.3) b</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>14 (32.6)</td>
<td>0</td>
<td>3 (30)</td>
<td>4 (40)</td>
<td>1 (9.1)</td>
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<tr>
<td>Neither</td>
<td>10 (23.2)</td>
<td>1 (8.3)</td>
<td>3 (30)</td>
<td>5 (50)</td>
<td>7 (63.6)</td>
</tr>
</tbody>
</table>

Note: a, b, c: Groups that share an alphabetical superscript do not significantly differ according to Tukey’s post hoc tests. * = Square root transformations were done on these variables to correct for positive skewness that resulted in violations of homogeneity of variance (p’s = .001). Means presented derive from squaring the means of the transformed data. Last mast = days since last masturbation; Porn Freq = frequency of porn watching per month (# of times/ month); Relationship sat = relationship satisfaction; Sexual sat = sexual satisfaction
Table 2. Group differences in means, standard deviations and sample proportions (%) for post film subjective ratings of camera and film effects

<table>
<thead>
<tr>
<th>Question</th>
<th>Total (N = 71)</th>
<th>Controls (n = 19)</th>
<th>HSDD (n = 13)</th>
<th>ED (n = 19)</th>
<th>HSDD/ED (n = 20)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
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<tr>
<td><strong>Camera effects:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased arousal</td>
<td>13 (18.3)</td>
<td>4 (21)</td>
<td>3 (23.1)</td>
<td>4 (21)</td>
<td>2 (10)</td>
</tr>
<tr>
<td>Decreased arousal</td>
<td>30 (42.3)</td>
<td>9 (47.4)</td>
<td>6 (46.1)</td>
<td>7 (36.8)</td>
<td>8 (40)</td>
</tr>
<tr>
<td>No effect</td>
<td>28 (39.4)</td>
<td>6 (31.6)</td>
<td>4 (30.8)</td>
<td>8 (42.1)</td>
<td>10 (50)</td>
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<tr>
<td><strong>Preferred Film Seg:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Not at all aroused</td>
<td>5 (7)</td>
<td>0 (0)</td>
<td>1 (7.7)</td>
<td>1 (5.3)</td>
<td>3 (15)</td>
</tr>
<tr>
<td>First 5 mins</td>
<td>30 (42.3)</td>
<td>8 (42.1)</td>
<td>6 (46.1)</td>
<td>9 (47.4)</td>
<td>7 (35)</td>
</tr>
<tr>
<td>Mid 5 mins</td>
<td>22 (31)</td>
<td>6 (31.6)</td>
<td>5 (38.5)</td>
<td>5 (26.3)</td>
<td>6 (30)</td>
</tr>
<tr>
<td>Last 5 mins</td>
<td>4 (5.6)</td>
<td>0 (0)</td>
<td>1 (7.7)</td>
<td>2 (10.5)</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Varied throughout</td>
<td>10 (14.1)</td>
<td>5 (26.3)</td>
<td>0 (0)</td>
<td>2 (10.5)</td>
<td>3 (15)</td>
</tr>
<tr>
<td><strong>Arousal compared to with partner:</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>More aroused</td>
<td>8 (11.3)</td>
<td>1 (5.3)</td>
<td>2 (15.4)</td>
<td>3 (15.8)</td>
<td>2 (10)</td>
</tr>
<tr>
<td>Less aroused</td>
<td>52 (73.2)</td>
<td>18 (94.7)</td>
<td>10 (76.9)</td>
<td>12 (63.2)</td>
<td>12 (60)</td>
</tr>
<tr>
<td>No difference</td>
<td>11 (15.5)</td>
<td>0 (0)</td>
<td>1 (7.7)</td>
<td>4 (21.1)</td>
<td>6 (30)</td>
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<table>
<thead>
<tr>
<th>Film effects:</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
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<tr>
<td>Relaxation (/10)</td>
<td>5.32 (2.54)</td>
<td>5 (2.08)</td>
<td>5.62 (3.02)</td>
<td>5.42 (2.74)</td>
<td>5.35 (2.58)</td>
</tr>
<tr>
<td>Anxiety (/10)</td>
<td>2.34 (2.08)</td>
<td>2.16 (2.06)</td>
<td>2.15 (1.68)</td>
<td>2.68 (2.52)</td>
<td>2.30 (1.98)</td>
</tr>
<tr>
<td>Distraction (/10)</td>
<td>3.11 (2.21)</td>
<td>3.79 (1.99)</td>
<td>2.92 (1.94)</td>
<td>2.84 (2.43)</td>
<td>2.85 (2.37)</td>
</tr>
<tr>
<td>Enjoyment (/10)</td>
<td>4.21 (2.41)</td>
<td>4.68 (2.24)</td>
<td>3.77 (3.06)</td>
<td>4.79 (2.51)</td>
<td>3.5 (1.88)</td>
</tr>
<tr>
<td>Desire Subscale (/60)</td>
<td>29.24 (15.4)</td>
<td>39.05 (9.4)</td>
<td>26.92 (18.21)</td>
<td>34.89 (14.46)</td>
<td>16.05 (9.8)</td>
</tr>
<tr>
<td>Physical Arousal Subscale (/60)</td>
<td>19.06 (13.6)</td>
<td>28 (12.42)</td>
<td>16.77 (15.83)</td>
<td>19.26 (12.09)</td>
<td>11.85 (9.83)</td>
</tr>
<tr>
<td>Subjective Arousal Subscale (/30)</td>
<td>11.28 (7.3)</td>
<td>15.05 (6.3)</td>
<td>10.46 (9.32)</td>
<td>13.79 (6.23)</td>
<td>5.85 (3.82)</td>
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Note: a, b, c: Groups that share an alphabetical superscript do not significantly differ according to Tukey’s post hoc tests. Preferred film seg = preferred segment of the erotic film; Camera effects = the effects of the presence of the camera on participants’ self-reported levels of arousal
<table>
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<th></th>
<th>Controls (n = 19)</th>
<th>HSDD (n = 13)</th>
<th>ED (n = 19)</th>
<th>HSDD/ED (n = 20)</th>
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<td><strong>Mean (SD)</strong></td>
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<td><strong>Sexual Functioning:</strong></td>
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<td>IIEF</td>
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<td>ED (/30)</td>
<td>27.47 (3.61) a</td>
<td>17.75 (8.32) b</td>
<td>12.78 (3.77) c</td>
<td>11 (5.94) c</td>
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<tr>
<td>Int.Sat (/15)</td>
<td>12.32 (3.5) a</td>
<td>5.92 (4.03) b</td>
<td>7.28 (2.59) b</td>
<td>4.94 (3.72) b</td>
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<tr>
<td>Orgasm (/10)</td>
<td>9.47 (.90) a</td>
<td>5.67 (2.81) b</td>
<td>5.95 (3.26) b</td>
<td>4.58 (2.43) b</td>
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<tr>
<td>Desire (/10)</td>
<td>9.11 (1.15) a</td>
<td>3.83 (1.03) b</td>
<td>6.69 (1.7) c</td>
<td>3.75 (.97) b</td>
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<tr>
<td>Overall Sat (/10)</td>
<td>8 (2.0) a</td>
<td>4.67 (2.64) b</td>
<td>3.89 (1.49) b</td>
<td>3.63 (1.54) b</td>
</tr>
<tr>
<td>Total (/75)</td>
<td>66.37 (9.23) a</td>
<td>38.25 (16.38) b</td>
<td>36.17 (8.97) b c</td>
<td>27.71 (9.91) c</td>
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<td><strong>MSHQ</strong></td>
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<td>Erectile Scale (/20)</td>
<td>18.68 (1.45) a</td>
<td>16.54 (3.33) a</td>
<td>10 (2.65) b</td>
<td>9.35 (4.27) b</td>
</tr>
<tr>
<td>Ejaculation Scale (/40)</td>
<td>37.26 (1.49) a</td>
<td>30.15 (5.4) b</td>
<td>27.26 (7.64) b</td>
<td>25.6 (7.93) b</td>
</tr>
<tr>
<td>Sat Scale (/30)</td>
<td>26 (3.56) a</td>
<td>18.55 (6.02) b</td>
<td>17.53 (6.3) b</td>
<td>15.67 (4.92) b</td>
</tr>
<tr>
<td>Desire Scale (/35)</td>
<td>28.56 (2.73) a</td>
<td>18.85 (4.69) b</td>
<td>22.62 (4.87) b</td>
<td>13.82 (5.04) c</td>
</tr>
<tr>
<td>Total Score (/125)</td>
<td>111.18 (6.23) a</td>
<td>83.09 (14.18) b</td>
<td>76.33 (14.82) b</td>
<td>60.69 (14.02) c</td>
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<tr>
<td><strong>Body Image:</strong></td>
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<td>BISC (/75)</td>
<td>7.58 (8.26) a</td>
<td>15.54 (12.5) a</td>
<td>11 (9.96) a</td>
<td>16.65 (12.12) b</td>
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<td>BSQ (/204)</td>
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<td>67.69 (30.28)</td>
<td>65.58 (26.99)</td>
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<td><strong>Emotion Regulation:</strong></td>
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<td>DERS (/180)</td>
<td>73.74 (18.37)</td>
<td>88.08 (19.35)</td>
<td>80 (22.7)</td>
<td>77.5 (25.88)</td>
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<tr>
<td>TAS (/100)</td>
<td>40.32 (8.36) a</td>
<td>54.08 (12.58) b</td>
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<td><strong>SIS-SES</strong></td>
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<tr>
<td>SIS1 (/56)</td>
<td>39.95 (5.28) a</td>
<td>35.15 (4.36) b</td>
<td>30.68 (3.22) c</td>
<td>32 (5.97) b c</td>
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<td>SIS2 (/44)</td>
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<td>24.15 (5.34)</td>
<td>24.37 (4.49)</td>
<td>23.65 (4.32)</td>
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<td>SES (/80)</td>
<td>41.58 (8.1) a</td>
<td>56.62 (10.32) b</td>
<td>43.16 (7.91) a</td>
<td>60.7 (6.11) b</td>
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<td><strong>Sexual Attitudes:</strong></td>
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<td>SOS (/126)</td>
<td>94.26 (13.88) a</td>
<td>74.62 (22.73) b c</td>
<td>84.89 (17.43) a b</td>
<td>68.65 (15.06) c</td>
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<td><strong>Mood:</strong></td>
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<tr>
<td>T1PANAS – PA (/50)</td>
<td>30.47 (6.9) a</td>
<td>26.92 (6.45) a b</td>
<td>30.36 (6.68) a</td>
<td>25.4 (7.13) b</td>
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<td></td>
<td>T1PANAS – NA (/50)</td>
<td>T1PANAS – PA (/50)</td>
<td>T2PANAS – NA (/50)</td>
<td>T2PANAS – PA (/50)</td>
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<td>14.74 (4.2)</td>
<td>14.77 (4.07)</td>
<td>15.42 (6.35)</td>
<td>14.8 (5.48)</td>
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<td>BDI-II (/63)</td>
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<td>2.84 (3.39)</td>
<td>10.76 (9.5)</td>
<td>9.47 (8.95)</td>
<td>10.05 (8.02)</td>
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<td>STAI-T (/80)</td>
<td>33.37 (9.21)</td>
<td>39.62 (12.22)</td>
<td>39.37 (12.9)</td>
<td>39.1 (10.18)</td>
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**Trauma:**

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<th>CTQ (/125)</th>
<th>SLESQ (/12)</th>
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<tr>
<td></td>
<td>37.47 (13.01)</td>
<td>1.58 (1.9)</td>
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<td></td>
<td>39.33 (7.57)</td>
<td>2 (2.38)</td>
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<tr>
<td></td>
<td>37.21 (11.17)</td>
<td>1.84 (1.8)</td>
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<tr>
<td></td>
<td>37.9 (10.28)</td>
<td>1.8 (1.58)</td>
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</tbody>
</table>

Note: a, b, c: Groups that share an alphabetical superscript do not significantly differ according to Tukey's post hoc tests. ED = Erectile Dysfunction; Int.Sat = Intercourse Satisfaction; Overall Sat = Overall Satisfaction; Sat.Scale = Satisfaction Scale; PA = Positive affect; NA = Negative affect; T1PANAS = Time 1 (Pre-film) Positive and Negative Affect Scale; T2PANAS = Time 2 (Post film) Positive and Negative Affect Scale
**Figure 1.** Group differences in average genital temperature for the first 5, middle 5 and last 5 minutes of the baseline (dotted line) and erotic (solid line) conditions.
Figure 2. Group difference in average subjective arousal levels for the first 5, middle 5 and last 5 minutes of the baseline (dotted line) and erotic (solid line) conditions.
The previous study provided the first comprehensive psychophysiological and psychosocial comparison of desire (HSDD) and arousal disorders (ED) in men, using clearly defined diagnostic criteria, and standardized measures. Results of this study indicated that men with disorders of desire versus arousal did indeed have unique psychophysiological patterns: men with ED had lower genital arousal (as revealed by thermographic imaging of genital temperature), men with low desire had lower subjective arousal, and men with both disorders showed impairment in both genital arousal and subjective arousal. Men with erectile difficulties also showed lower genital-subjective arousal agreement than other groups. Finally, low desire versus arousal sufferers showed somewhat unique psychosocial patterns, particularly as compared to healthy controls, with men with combined difficulties showing the greatest impairment on nearly all psychosocial vulnerability factors. These results have key implications for the classification and conceptualization of sexual difficulties in men, and suggest that in addition to independent diagnoses of HSDD and ED, a diagnostic category of combined desire and arousal difficulties (resembling what was proposed for women in the DSM-5) may be relevant for men as well. Results also support the relative independence of genital and subjective arousal, particularly for men with sexual difficulties, and the interrelatedness of desire and subjective arousal. Finally, these findings support the use of thermography as a diagnostic tool for male erectile dysfunction.

The previous study represents a first step towards differentiating and profiling desire and arousal disorders; however, our study findings are specific to men. To date, there has been no parallel empirical examination of the desire-arousal distinction in women, on the basis of either psychophysiological or psychosocial patterns, and yet, gender differences in the desire-arousal distinction are commonly assumed (e.g., Chivers, Seto, Lalumiere, Laan & Grimbos, 2010). In fact, sexual desire and arousal difficulties have typically been presumed to have different profiles in men as compared to women, and as such, theories on these sexual responses have become highly gender-specific, and even the DSM has diverged by gender in its classification of these dysfunctions (Brotto, 2010a, 2010b; Graham, 2010; Segraves, 2010). Thus, to see if we could extend the previous findings with men to a comparable sample of women, a parallel study on the psychophysiology of desire and arousal was conducted. Specifically, we selected the women from study one who met strict inclusion criteria for the low desire, low arousal, combined low
desire and arousal or healthy control group, and compared them on their psychophysiological and psychosocial profiles to verify whether similar distinguishing patterns could be found. An additional objective was to assess the implications of these patterns for recent classification amendments to the DSM-5 diagnostic criteria for sexual desire and arousal disorders in women.
References


A STREETCAR NAMED ‘DEROUSAL’? A PSYCHOPHYSIOLOGICAL EXAMINATION OF THE DESIRE-AROUSAL DISTINCTION IN SEXUALLY FUNCTIONAL AND DYSFUNCTIONAL WOMEN

Under Review in the *Journal of Sex Research*

Reference:
Abstract

Evidence indicates that desire and arousal problems are highly interrelated in women, yet no research has tried to empirically distinguish them on the basis of psychosocial, psychophysiological or concordance (genital-subjective agreement) patterns. The current study compared psychophysiological, psychosocial and concordance patterns in a community sample of women meeting DSM-IV-TR criteria for hypoactive sexual desire disorder (HSDD), female sexual arousal disorder (FSA), both FSAD and HSDD (FSAD/HSDD), and healthy controls. Eighty-four women (19 controls, 22 HSDD, 18 FSAD, 25 FSAD/HSDD) completed self-report measures and watched neutral and erotic films while genital (GA) and subjective arousal (SA) were measured continuously and discretely. Results indicated that GA increased equally for all groups during the erotic condition. While SA also increased for all groups, HSDD and FSAD/HSDD women reported less SA than controls or FSAD women. Results also revealed different concordance patterns using within- versus between-subject correlations. Last, groups differed on psychosocial variables, with FSAD/HSDD women showing greatest impairment. Overall, low desire and arousal sufferers demonstrated significant overlap on psychosocial variables, yet distinct psychophysiological patterns. Results have important implications for the classification and treatment of these difficulties.

Keywords: Female Sexual Arousal Disorder (FSAD), Hypoactive sexual desire disorder (HSDD), Sexual Interest and Arousal Disorder (SIAD), Concordance, Psychophysiology, Thermography, Classification
Introduction

Since the inclusion of desire disorders in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III; American Psychiatric Association, 1980), conceptualizations of sexual desire and arousal have remained relatively distinct. Sexual desire has typically been defined as an interest in engaging in sexual activity, while arousal has been viewed as a physiological (genital) response to a sexual stimulus. However, the validity of these definitions have recently been called into question by a growing body of empirical evidence that has highlighted the complex and interrelated nature of these sexual responses, and currently, the demarcation line between these constructs remains fuzzy at best.

Specifically, the quest to differentiate desire and arousal has been complicated by the following four lines of evidence: 1) quantitative data indicating the high comorbidity of desire and arousal disorders (Basson et al., 2003) 2) qualitative data pointing to the difficulties experienced by women in differentiating these constructs (Brotto, Heiman, & Tolman, 2009; Graham, Sanders, Milhausen, & McBride, 2004; Mitchell, Wellings & Graham, 2014) and 3) findings indicating the non-linear sequence of sexual response stages for women, with desire occasionally preceding arousal, sometimes following it, and occasionally being indistinguishable from it (Graham et al., 2004); and 4) psychophysiological data (e.g., on genital-subjective arousal concordance) pointing to the questionable validity of a DSM definition of an arousal disorder that focuses on genital impairment (Chivers, Seto, Lalumière, Laan, & Grimbos, 2010). With respect to the latter, psychophysiological studies with women have generally shown low correlations between indices of subjective and genital arousal, and no differences in levels of genital arousal have typically been found between healthy women and those reporting genital arousal difficulties (Chivers et al., 2010).

Overall, experts have interpreted the abovementioned findings to indicate the equivalence of desire and arousal for women, and consequently, a radical change has occurred in the DSM-5: after 34 years of being distinguished, disorders of desire and arousal have now been collapsed under one diagnostic category – Sexual Interest and Arousal Disorder (SIAD; APA, 2013). According to the revised DSM-5 criteria, a diagnosis of SIAD requires at least three out of the following six symptoms, occurring for a minimum of 6 months: 1) absent/ reduced interest in sexual activity 2) absent/ reduced sexual/ erotic thoughts or fantasies 3) no/ reduced initiation of sexual activity and typically unresponsive to a partner’s attempts to initiate 4) absent/ reduced
sexual excitement/ pleasure during sexual activity in almost all or all (75%-100%) sexual encounters. 5) absent/ reduced sexual interest/ arousal in response to any internal or external sexual/ erotic cues (e.g., written, verbal, visual) and 6) absent/ reduced genital or nongenital sensations during sexual activity in almost all or all (75%-100%) sexual encounters. In addition, symptoms must cause distress/ impairment, and may be further qualified with respect to various contextual specifiers. While the first two of these symptoms were carried forward from the DSM-IV-TR definition for Hypoactive Sexual Desire Disorder (HSDD), the remaining four are new diagnostic symptoms, and have not yet been empirically validated.

While the emergence of SIAD undoubtedly represents a step forward with respect to resolving many of the aforementioned research findings on the interrelatedness of desire and arousal, many new concerns emerge, four of which will be addressed here. First, as far as we know, there has not yet been a systematic attempt to empirically distinguish desire and arousal disorders in women by recruiting separate groups of sufferers, meeting explicitly defined operational criteria, and comparing them on psychosocial or physiological indices (e.g., genital arousal). Until now, the few empirical studies that have purported to compare these disorders have typically recruited a clinical group with heterogeneous sexual difficulties, from which they have tried to roughly partial out for comparison desire versus arousal sufferers. However, in the end, it has not been clear that members of the low desire group were in fact free of arousal symptoms and vice versa, and psychophysiological comparisons between groups were not made (for a review, see Sarin, Amsel & Binik, 2013). Recently, in a first attempt to test the feasibility of differentiating desire and arousal through the recruitment of distinct groups of sufferers, our lab found preliminary evidence suggesting that desire and arousal difficulties may indeed be separable in both men and women (Sarin et al., 2013; Sarin, Amsel & Binik, in press).

Second, and on a related note, the polythetic criteria for SIAD now groups all women into the same diagnostic category, regardless of their conglomeration of symptoms. Hence, a woman presenting exclusively with the first three symptoms of low sexual interest, thoughts, and receptivity/ initiation becomes diagnostically indistinguishable from another woman presenting with all six symptoms, when in fact important differences (e.g., in etiology or psychological profile) may exist based on these different symptom clusters. Indeed, in a recent study by Brotto and colleagues (2011), the authors compared women meeting diagnostic criteria for HSDD to those meeting criteria for Sexual Desire/ Interest Disorder (SDID; defined by lack of sexual
thoughts, interest and responsive desire) on hormonal and nonhormonal variables, and found that while hormonal variables did not discriminate groups, nonhormonal variables (developmental, psychosexual and psychiatric history) were strong predictors of SDID alone (Brotto, Petkæ, Labrie & Basson, 2011). In addition, in a recent study from our lab, results from cluster analyses on desire and arousal symptoms in women revealed not one, but three clinical groups: the first presented exclusively with low desire symptoms, the second with desire and arousal symptoms exclusively in their current relationships, and the third with generalized desire and arousal symptoms (Sarin et al., 2013). These results suggest that while some women may present with combined difficulties with desire and arousal, others may have trouble exclusively in one of these domains, and such differences in symptom profiles may in fact be associated with meaningful psychosocial differences (e.g., in developmental or psychiatric history).

Third, due to the lack of physiological evidence to support an impaired genital arousal response (i.e., vasocongestion) in medically healthy women with female sexual arousal disorder (FSAD), and the lack of concordance between subjective and genital arousal in healthy and clinical groups of women, it was argued that impaired vaginal lubrication-swelling alone was insufficient to diagnose arousal problems in women (Graham, 2010). Hence, in the DSM-5 criteria for SIAD, “lubrication-swelling” was deleted as the hallmark feature of arousal difficulties and replaced with the broader symptom of “reduced genital or non genital physical changes.” It is noteworthy, however, that prior psychophysiological studies investigating the genital arousal response in women have primarily used vaginal photoplethysmography to measure vaginal pulse amplitude or blood volume (as indicators of the arousal response). Less invasive measures of sexual arousal, such as thermography, which measures temperature change due to arousal-induced fluctuations in blood flow, may be a promising new measure of the vasocongestive (genital swelling) response. Indeed, in two recent studies validating the use of thermography as a measure of arousal in healthy women, Kukkonen and colleagues (2007, 2010) found significantly higher correlations between subjective and genital arousal than has been seen in previous studies (for a review, see Chivers et al., 2010). To date, however, thermography has not been used to compare genital arousal responses between women with and without FSAD and so its diagnostic utility remains unknown. In addition, while the FSAD feature of “genital swelling” has been expanded in SIAD to include genital and non-genital physical changes, it remains unclear whether this dampened physiological response is to be diagnosed strictly on the
basis of subjective awareness/detection of physical changes (e.g. breast engorgement, genital tingling), or whether objective evidence is required of such impairment. If the latter, the question of how to best assess these physical changes will be of paramount importance.

Finally, the common finding of low genital-subjective arousal agreement in women (average $r = .26$) has often been contrasted with men, for whom correlations have been much higher (average $r = .66$) (Chivers et al., 2010), and has been taken to indicate the centrality of women’s subjective arousal to their arousal experience. Indeed, it has been noted that discordance is most often the result of an increase in genital sexual response that is not accompanied by an increase in self-reported sexual arousal (Prause, Barela, Roberts & Graham, 2013). This has been true regardless of whether subjective arousal has been defined as an overall feeling of sexual arousal, or a perception of genital response (Prause et al., 2013). However, several extraneous factors have recently been identified that might account for the low correlations in women, including stimulus duration, measure of genital arousal, and type of correlation (Chivers et al., 2010). Specifically, higher concordance levels have been found in women when stimuli were presented for a longer period of time (yet the majority of researchers have used stimuli under 10 minutes in duration), when using thermography as compared to VPP (i.e., gender differences in concordance disappeared when using thermography), and when within-subject correlations were presented, as compared to between-subject correlations (yet most researchers typically do not present both, or are not explicit in their method of calculation). In addition, there has been some indication that sexually dysfunctional women show even lower concordance than sexually functional women, but the evidence here has been mixed, in part due to the use of clinical groups that have had heterogeneous sexual difficulties (for a review, see Chivers et al., 2010). Ideally, as noted by Chivers and colleagues (2010), analyses should be restricted to homogeneous dysfunction groups as the relationship between concordance and dysfunction may depend on the type of disorder. To date, while there has been some indication that women with FSAD may have lower concordance than women with HSDD or controls, there has been no study directly comparing concordance levels across distinct clinical groups. In addition, no research on sexual functioning has examined concordance as a study outcome to ascertain whether those with better sexual functioning show higher subjective-genital agreement, and vice versa.
Hence, given these empirical gaps, the goal of the current study was to determine whether women with desire versus arousal disorders could be differentiated from each other and from controls based on their psychophysiological and psychosocial patterns of arousal. In particular, we wanted to compare patterns of subjective arousal (SA) and genital arousal (GA) in a community sample of women meeting clearly operationalized DSM-IV-TR criteria for hypoactive sexual desire disorder (HSDD), female sexual arousal disorder (FSAD), both HSDD and FSAD, and an age-matched group of healthy controls. Physiological arousal was measured using thermography, which measures changes in genital temperature as an indicator of arousal, while participants watched 15-minute film clips and continuously reported on their levels of subjective arousal. Discrete post-film measures of arousal and desire were also administered.

We also examined whether groups differed on psychosocial variables established to be relevant to sexual functioning, in order to derive clearer profiles of these groups. Specifically, researchers studying female sexual dysfunction have found significant associations with a wide array of psychosocial factors, including negative mood (Leiblum et al., 2006; Laan, van Driel & van Lunsen, 2008), depression (Schreiner-Engel & Schiavi, 1986), diminished body image (Meston, 2006; Schiavi, Karstaedt, Schreiner-Engel & Mandeli, 1992; Seal & Meston, 2007), negative sexual attitudes/beliefs (Nobre, & Pinto-Gouveia, 2009), alexithymia (Madioni & Mammana, 2001), sexual excitation and inhibition (Sanders, Graham & Milhausen, 2008), and childhood trauma (Laumann, Paik & Rosen, 1999; Kinzl et al., 1995; Sarwer, & Durlak, 1996). However, very few of these studies have attempted to compare women with distinct sexual difficulties (e.g., FSAD vs. HSDD) to identify whether they are characterized by unique psychosocial profiles (for exceptions, see Brotto et al., 2011; Hayes et al., 2008; McCabe & Cobain, 1998; for a review see Sarin et al., 2013). Moreover, the few studies that have included both desire and arousal groups have typically selected only a few variables on which to make comparisons (e.g., Hayes et al., 2008). Hence, in the current study, groups were compared on a wide array of standardized and validated measures assessing sexual functioning, body image, sexual excitation and inhibition, sexual attitudes, mood/distress, emotion regulation, depression, anxiety, and traumatic experiences.

We had four main hypotheses: 1) We predicted that women with FSAD and with FSAD/HSDD would show less genital arousal in response to the erotic film than women with HSDD or healthy controls. 2) We expected that women with HSDD and FSAD/HSDD would show less
continuous and discrete SA in response to the erotic film than those with FSAD or healthy controls. 3) We predicted that all groups would show positive correlations between GA and SA but expected that these correlations would be higher for sexually functional rather than dysfunctional women, with FSAD/HSDD women showing the lowest correlations. 4) We hypothesized that women with FSAD/HSDD would show greater impairment on psychosocial and psychophysiological variables than all other groups.

**Method**

**Participants**

Participants were ninety-three women (20 controls, 73 clinical), who were recruited from clinics and the community in response to two sets of advertisements, the first recruiting healthy controls, and the second recruiting individuals with low desire and arousal. Clinical participants were also recruited via information distributed to local sexologists, urologists, psychologists, psychological and sexual health clinics, and local hospitals. Inclusion criteria were assessed via a detailed telephone-screening interview as well as through scores on a standardized sexual functioning questionnaire (Female Sexual Functioning Index; FSFI) sent to those who qualified for participation after the phone screening (for details on the phone screening interview and cutoff scores on the FSFI, see Sarin et al., 2013). Participants were excluded if they reported any of the following: being outside the specified age range (18-50); non-heterosexual orientation; untreated sexually transmitted infection or disease; diagnosis or treatment within the past 6 months of any psychopathology known to affect sexual functioning (e.g., depression, eating disorders); having no prior sexual experience; discomfort or objections to watching sexually explicit videos; avoidance of gynecological exams due to feared genital pain; use of medications with sexual side effects (e.g., antidepressants); a history of genital/pelvic surgeries or injuries (e.g., oophorectomy); hormonal therapy/treatment (e.g., cancer treatment); pregnancy/breastfeeding; being menopausal/perimenopausal; marked menstrual irregularities (e.g., due to contraceptives such as Depo Provera); or any chronic medical conditions with possible sexual side effects (e.g., diabetes).

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1 In order to minimize the risk of arousal interference due to age-related hormonal changes (e.g., menopause) or physiological conditions with sexual side effects, we restricted our sample to those under the age of 50, for whom such conditions are less common.
Control participants were required to be free of any sexual difficulties, as indicated by responses on the phone interview and in line with established cutoff scores on the FSFI (Wiegel, Meston & Rosen, 2005). Assignment to clinical groups required freely reporting low desire or low arousal in addition to follow-up endorsement of the symptom being present at least 50% of the time over the past 6 months, in the majority of sexual situations, and the cause of significant distress or interpersonal interference (See Sarin et al., 2013 for a detailed breakdown of operational criteria). Given the highly intertwined nature of most sexual difficulties, it was not realistic to exclude participants with mild comorbid sexual difficulties from our low desire and/or arousal groups (e.g., severe arousal difficulties would inevitably present some difficulties reaching orgasm). However, the extent of comorbid sexual symptoms was tightly regulated such that they were permitted only if they were determined to be secondary to desire or arousal difficulties. That is, participants were required to describe comorbid sexual symptoms as being less chronic, less severe and of more recent onset than the arousal and desire difficulties; they were also required to identify these comorbid symptoms as being secondary in concern. Efforts were made to keep HSDD and FSAD groups homogeneous with respect to comorbid arousal and desire difficulties, respectively, by excluding anyone with more than mild, transient and situational symptoms of the other disorder.

Of the 345 women recruited, 93 were eligible (73% exclusion rate) and were tested between July 2009 and July 2013 (For details on ineligible participants, and implications of high exclusion rates, see Sarin et al., 2013). Of these 93 women, the data for 5 women were excluded from all analyses (1 control, 2 HSDD, 2 FSAD/HSDD) due to equipment failure or technical difficulties that led to missing data for an entire film condition (e.g., missing temperature data for the erotic condition), and two women dropped out (both in the FSAD/HSDD group) after completing questionnaires (due to scheduling complications). Of the remaining 86 women who completed the study, the data from two women (1 HSDD, 1 FSAD/HSDD) were ultimately excluded due to significant amounts of missing questionnaire data. The results presented are for

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2 The frequency criterion was ultimately reduced from 75% to 50% after three years of testing due to recruitment difficulties. The mean frequency of sexual difficulties reported at screening was approximately 50%; however even those who initially reported sexual difficulties 75% of the time showed frequency fluctuations, such that at testing, the majority reported difficulties 50-75% of the time.
the remaining 84 women who participated in the study (19 controls, 22 HSDD, 18 FSAD, 25 FSAD/ HSDD).

**Procedure**

This study was reviewed and approved by the University’s Institutional Review Board, and written informed consent was obtained from each participant. Eligible participants were scheduled to come into our university-based psychophysiological laboratory for a 3.5-hour testing session. Prior to psychophysiological testing, participants were emailed (or mailed) questionnaires to complete (see Measures for list of questionnaires). On the day of testing, participants completed two semi-structured interviews: the first assessed basic demographic, health and relationship information; the second assessed the diagnostic criteria for the sexual disorders. Following this, they completed questionnaires about their mood, and trauma histories.

Participants were then instructed to undress from the waist down and to make themselves comfortable in the testing chair to watch the films. Participants watched two neutral films and one erotic video, each 15 minutes in duration, during which the camera recorded genital temperature. Between films, participants completed questionnaires assessing their desire and arousal levels in response to the films, by calling their answers out loud into the intercom beside them. After the third film, participants completed a paper-based version of the questionnaire and a mood measure. Participants were then debriefed and compensated with CAD$75. All clinical subjects were provided with educational feedback about their results, as well as treatment recommendations and referrals, if relevant.

**Measures**

**Equipment**

*Thermography.* A TSA ImagIR thermal imaging system provided by Seahorse Bioscience (North Billerica, MA) was used to monitor genital temperature. In line with procedures used by Kukkonen and colleagues (2007), the sampling interval was set at eight frames per second for this experiment. The sensitivity of this camera was 0.07°C and it had an operating range from 15°C to 40°C. For women, the camera was placed directly facing the examination chair at a distance of 0.5 m, at a height of 1.09 m and angled at approximately 20 degrees. Two regions of temperature measurement were selected for all analyses: one on the genitalia (on the left labia majora, midway between the clitoris and the vaginal entrance) and a control spot was chosen on the inner right thigh to determine the specificity of temperature
change during sexual arousal. Ambient room temperature was also monitored for each participant and was maintained so that there was less than 1.5°C variation within each testing session (Average baseline room temperature = 24.37°C, SD = 1.41; average erotic room temperature = 24.49°C; SD = 1.48).

**DVD Goggles.** I-O display systems i-theater goggles (Sacramento, CA), connected to a DVD player and laptop computer through a switchbox, were used to display the videos and subjective questionnaires privately to each participant.

**Intercom.** A standard intercom was used for communication between the participant and female investigator, who was in the adjoining room.

**Stimulus Materials.** The first neutral film clip consisted of still images of nature, accompanied by calming music to allow for body temperature to stabilize (LaBarge, 2002). The second baseline video segment consisted of a Canadian Film Board travelogue of the Yukon and Alaska (Glusic, 1994). The erotic film clip was selected from a list of films validated by the Kinsey Institute to reliably elicit arousal (Janssen, Carpenter & Graham, 2003), and consisted of a variety of sexual activities (in order of increasing intensity) including kissing/foreplay and mutual masturbation (5 minutes), mutual oral sex (5 minutes) and vaginal intercourse (5 minutes). The films were presented privately to participants through the DVD goggles and earphones.

**Self-Report Measures: Time 1 (screening)**

**Female Sexual Functioning Index (FSFI; Rosen et al., 2000).** Women completed the FSFI at screening, and again at testing, to assess levels of sexual functioning. The FSFI is a widely used and well-validated 19-item self-report instrument, divided into 6 factor-analytically derived subscales (desire, arousal, lubrication, orgasm, satisfaction, and pain). The FSFI yields both individual domain scores as well as a total score (Chronbach’s alpha = .95), with lower scores indicative of greater sexual dysfunction (for information on reliability and validity, see Wiegel, Meston & Rosen, 2005; for information on the cutoff scores adopted in this study, see Sarin et al., 2013). For those women who had not engaged in any partnered sexual activity within the past month (n = 22; 13 of whom had engaged in masturbation), we followed recommendations outlined by Meyer-Bahlburg and Dolezal (2007) for handling “zero scores”.

**Time 2 (Pre-testing) Measures:**

**Body Image Measures**
**Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper & Fairburn, 1987).** The BSQ is a 34-item measure assessing the frequency of preoccupation with, and distress about body shape and size. Items are rated on a 6 point Likert scale, with options ranging from 1 (never) to 6 (always), with higher scores indicating more body shape dissatisfaction (Chronbach’s alpha = .97). The BSQ has demonstrated good test-retest reliability, concurrent and discriminant validity (Cooper et al., 1987; Rosen et al., 1996).

**Body Image Self-Consciousness Scale (BISC; Wieder, 2000).** The BISC is a 15-item self-report measure assessing self-consciousness or concern about body image during physical intimacy with a partner. Items are rated on a 6-point Likert scale, with scores ranging from 0 to 75, with higher scores indicating greater body image self consciousness (Chronbach’s alpha = 95). The BISC has demonstrated good internal reliability, test-retest reliability, and convergent validity (Wiederman, 2000).

**Body Esteem Scale (BES; Franzoi & Shields, 1984).** The BES is a 35-item measure that gathers self-evaluations of physical attractiveness, weight, musculature, and physical condition. Items are rated on a 5 point scale, ranging from 1 (have strong negative feelings) to 5 (have strong positive feelings), with higher scores indicating better body self esteem (Chronbach’s alpha = .89). This commonly used measure has been well validated and demonstrates good reliability. It was included in the current study at a later stage in testing, and hence we were unable to obtain data from eight of our control participants.

**Emotion Regulation Measures**

**Toronto Alexithymia Scale (TAS; Bagby, Parker, & Taylor, 1994).** The TAS is a 20-item self-report measure comprised of 3 subscales including (1) difficulty identifying feelings (2) difficulty describing feelings, and (3) externally oriented thinking. Items are scored on a 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater alexithymia (Chronbach’s alpha = .84). The TAS-20 has exhibited good discriminant validity, construct validity, test-retest reliability, and acceptable internal consistency (i.e., alphas ranging from 0.66 to 0.78; Bagby et al., 1994).

**Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004).** The DERS is a 36-item self-report measure of a wide range of difficulties in emotion regulation. Items are rated on a 5-point Likert-type scale, ranging from 1 (almost never: 0-10%) to 5 (almost always: 91-100%), with higher scores indicate greater emotion dysregulation (Chronbach’s alpha = .94).
The DERS is comprised of six subscales: 1) nonacceptance of emotional responses; 2) difficulties engaging in goal-directed behavior when experiencing negative emotions; 3) impulse control difficulties when experiencing negative emotions; 4) lack of emotional awareness; 5) limited access to effective emotion regulation strategies; and 6) lack of emotional clarity. The DERS has demonstrated high internal consistency (alpha – 0.93), good test-retest reliability, and adequate construct and predictive validity (Gratz & Roemer, 2004).

Sexual Attitudes and Inhibition/Excitation

Sexual Excitation / Sexual Inhibition Inventory for Women (SESII-W; Graham, Sanders & Milhausen, 2006) is a 36-item measure that was used in the current study to assess avoidance and approach indicators of sexual arousal. We also used a 14-item short form that allows for direct comparison with the male version of this measure (Janssen, Vorst, Finn, & Bancroft, 2002). Items on the SESII-W are rated on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree); this scale is reversed for the 14 item shortform (1 = strongly agree; 4 = strongly disagree). The SESII-W is comprised of five excitation subscales and three inhibition subscales, generating one overall sexual inhibition subscale (Chronbach’s alpha = .81), and one sexual excitation subscale (Chronbach’s alpha = .77), where higher SIS and SES scores indicate greater inhibition and excitation, respectively. Parallel to the male version, the 14-item short form of the SIS-SES contains two inhibition subscales (Chronbach’s alphas = .8 for SIS1, and .73 for SIS2) and one excitation subscale (Chronbach’s alpha = .81), wherein higher SES scores indicate less excitation potential, and lower SES scores indicate less inhibition. These measures have been well validated in both healthy and clinical populations.

Sexual Opinion Survey (SOS; Fisher, Byrne, White, & Kelley, 1988) was used to measure sexual attitudes of negative-to-positive evaluation of sexual stimuli, also called the erotophobia-erotophilia personality dimension. The SOS consists of 21 items using a Likert response format of strongly agree (1) to strongly disagree (7), with higher scores indicating more erotophilia. The SOS has shown good test-retest reliability as well as good construct and discriminant validity.

Sexual Functioning Measures

Sexual Desire Inventory (SDI-2; Spector, Carey & Steinberg, 1996). The SDI-2 is a 14-item inventory assessing levels of sexual desire in the following domains: interest in dyadic sexual behaviour, interest in individual sexual behaviour, cognitions, and importance of sexual
needs. Items are rated on a 8 point scale, with higher scores indicating higher levels of desire (Chronbach’s alpha = .95). This brief questionnaire is a well-validated self-report measure for assessing sexual desire in adult populations. Unfortunately, it was included in this study after approximately two years of testing; hence we are missing data from approximately 50% of participants (n = 45).

Female Sexual Distress Scale- Revised (FSDS-R; Derogatis et al., 2008). The FSDS is a 13- item self- report inventory assessing sexually related distress. Items are rated on a 5-point Likert scale ranging from “never” to “always”, with higher scores indicating higher levels of distress (Chronbach’s alpha = .95). It is currently the most accepted and validated measure of distress in women with sexual dysfunction. Again, the use of this scale in this study commenced later into the testing process; hence we are missing data from approximately 50% of participants (n = 47).

Time 3 (Testing) Measures

Demographic and Diagnostic Information. A demographic interview (i.e., assessing age, ethnicity, education, medical/ psychological/ sexual history, relationship satisfaction/ concerns) was administered by the primary investigator at the outset of the testing session. Sexual disorder diagnoses were obtained via the administration of a 63-item Sexual Arousal and Desire Interview (SADI), developed by the authors, that assesses the DSM-IV-TR and DSM-5 diagnostic criteria for sexual disorders (e.g., frequency, duration, severity, generalizability, distress). Remaining items assess other facets of desire and arousal, and were derived from the available empirical literature.3 Items are scored on three different 6-point scales (assessing frequency, amount, proportion of time), with response options ranging from “almost never/ not at all” to “almost always/ the most ever”.

Mood Measures

Positive and Negative Affect Schedule (PANAS-X; Watson, Clark, & Tellegen, 1988). The PANAS consists of 20 items, which assess current positive and negative affect. Affect items are rated on a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely), with subscales for positive affect and negative affect. Higher scores on these subscales indicate greater levels of positive and negative affect, respectively. The measure shows high internal consistency, with coefficients ranging from 0.83 – 0.90 for positive affect items and 0.85 – 0.93

3 Copies of these interviews are available upon request.
for negative affect items. The PANAS was completed as a measure of mood state before and after viewing of the films to assess and control for changes in mood due to the stimuli.

*Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988)* is a 21-item well-validated self-report measure of depressive symptomatology that was used in the current study to screen for levels of depression. Higher scores on this measure indicate more severe depressive symptoms.

*State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970).* The STAI is a 20-item scale used to measure state and trait based levels of anxiety. Affective descriptors are rated on a 4-point Likert scale ranging from 1 (not at all) to 4 (very much so) with respect to how one generally feels, with higher scores indicating more anxious symptomatology. Only the trait (T) subscale of this measure was administered in the current study.

*Trauma Measures*

*Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994).* The CTQ is a 28-item retrospective self-report measure that assesses a range of traumatic childhood or adolescent experiences. It contains 5 subscales, three assessing abuse (i.e., physical, sexual and emotional), and two assessing neglect (i.e., emotional and physical). Abuse items are scored on a 5-point Likert-type scale assessing frequency of occurrence (i.e., 1= “Never true” to 5 = “Very often true”), with higher scores indicating more severe histories of abuse. The CTQ has shown good validity, test-retest reliability and satisfactory internal consistency.

*Stressful Life Events Screening Questionnaire (SLESQ; Goodman et al., 1998).* The SLESQ is a 13-item self-report measure that assesses lifetime exposure to a variety of traumatic events, including life threatening illness, robbery/ muggings, physical assault or unwanted sexual contact. Questions assess the frequency and duration of occurrence of each traumatic event, the relationship to the perpetrator, nature of force involved, whether there was a perceived life threat, and the extent of injuries, with higher scores indicating more severe trauma histories. The SLESQ has demonstrated good test-retest reliability, good discriminant validity and adequate convergent validity (Goodman et al., 1998).

*Continuous Measure of Sexual Arousal*

In order to continuously record subjective sexual arousal, a Windows-based computer program was developed in our laboratory (Kukkonen et al., 2007), which requires participants to use a standard two-button PC mouse to indicate subjective ratings of sexual arousal. To note
increases or decreases in SA, participants clicked on the right or left button, respectively.
Arousal was rated on a 10-point scale with 0 equaling no sexual arousal whatsoever and 10
denoting the most sexually aroused a participant could feel. The numeric level of arousal was
indicated to participants using auditory stimuli presented through a speaker located next to the
examination table; each click on the mouse was followed by an announcement of the number
that participants had indicated. An auditory reminder occurred if there was inactivity (no
clicking) for a 60s interval.

*Discrete Subjective Measures of Desire and Arousal*

Discrete, Likert-style questions concerning mood, desire, and subjective appraisals of
physical and mental arousal were asked at the outset of the experiment (a brief 9-item version)
and then following the baseline video (28 item measure), via the DVD goggles. For each
question, participants were instructed to provide their answer by speaking into the intercom
system beside them. Following the erotic film, a paper-based version of the 28-item
questionnaire was completed (to minimize discomfort in responding, and to accommodate the
open-nature of three additional open-ended questions soliciting feedback about the films). Items
on the post-film questionnaires assessed perceptions of physiological sexual arousal, mental
arousal, solitary and relational desire, mood, distraction, and participant reactions to the camera
and to the film. All Likert-scale items were rated on a 7-point scale, ranging from “not at all” to
“the most ever”, with subscales for desire, physical arousal, mental arousal, and overall sexual
functioning.

*Data Analysis*

To assess differences in genital temperature between film conditions and group status,
genital temperature was averaged into three time intervals: the first 5 minutes, the mid 5 minutes
and the last 5 minutes. Means for temperature are reported in degrees Centigrade for all analyses.
Effect sizes are represented using eta squared ($\eta^2$) or partial eta squared ($\eta^2_p$). A three-way,
mixed design ANOVA with two repeated factors (time and condition) was first conducted.
Independent variables were film condition (baseline/ erotic), group status (HSDD, FSAD,
FSAD/HSDD, Control), and time of temperature recording (first 5 minutes, second 5 minutes,
third 5 minutes) as the repeated factor. The same analysis was applied to test for group and
condition differences in continuous SA across time. All significant interactions were further
assessed using tests of simple main effects and Tukey HSD post-hoc tests. To control for
violations of sphericity, the Greenhouse-Geisser conservative degrees of freedom (df) were applied, but results are reported with full df. To assess whether groups also showed an increase in discrete levels of SA after the erotic film, as compared to the neutral film, a two-way repeated measure ANOVA was conducted, with group as the between subject factor and condition as the within subjects factor. To assess whether there was an interaction between condition and the measure of SA, a three-way repeated measures ANOVA was conducted, with measure (discrete/continuous) and condition (baseline/erotic) as the within subjects factors, and group as the between subject factor.

To assess the relationship between SA and GA, we conducted within and between-subjects analyses using Pearson correlations. With respect to the former, a correlation was obtained for each subject for the relation between continuous subjective and genital ratings of arousal across 15 minutes of the erotic condition. The mean of the within-subjects correlation was then calculated for each group, and group differences in mean correlation values were compared using a one-way ANOVA (using group membership as the independent variable, and mean concordance value as the outcome variable). For between-subject analyses, the correlation of average GA and average SA was calculated for each of the three five minute segments of the erotic condition, and correlations for each of the three time segments were compared across groups. The relationship between discrete and continuous measures of subjective arousal was examined using Pearson product moment correlations between the average continuous subjective arousal rating and the discrete self-report rating of overall sexual arousal for each group.

Finally, in order to assess group differences in mood, body image, emotion regulation, trauma histories, sexual attitudes, sexual functioning, film effects on mood and overall levels of sexual response, one-way ANOVAs were performed, with Tukey’s post hoc tests to follow up on significant differences. Psychosocial variables were also examined as potential covariates of any significant effects (e.g., for group differences in subjective arousal), using univariate ANCOVAs.

**Power**

Using analyses of variance with a three-way mixed design, a sample size of 84 is sufficient to detect a difference of 0.6 SDs between standardized means, with moderate to large effect sizes, and an alpha of 0.05 and a beta of 0.2 (Cohen, 1992). This sample size is also sufficient to detect moderate differences using chi square and correlational analyses.
**Results**

**Participant Demographics**

The data from eighty-four women were included in our final analyses: 19 in the control group, 22 in the HSDD group, 18 in the FSAD group, and 25 in the FSAD/HSDD group. There were no significant group differences with respect to age ($M = 27.40, SD = 7.18$, range of means = 26.22-27.86; $F (3, 80) = .212, p = .89$), relationship status (23.8% single, 8.3% dating, 67.9% married/committed; $\chi^2 (6) = 9.397, p = .15$), relationship duration ($M = 20.52$ mths, $SD = 4.29$; $F (3, 80) = .450, p = .72$), number of lifetime sexual partners ($M = 8.24, SD = 1.51$; $F (3, 80) = .425, p = .74$), cultural identity (59.5% Canadian, 10.7% American, 8.3% Western European, 4.8% Latin, with no other group exceeding 3%; $\chi^2 (12) = 8.58, p = .74$) religiosity (45.2% agnostic/spiritual, 17.9% Catholic, 13.1% atheist, 11.9% Christian, with no other group exceeding 5%); $\chi^2 (12) = 7.811, p = .80$), education (9.5% completed highschool, 21.4% completed some college, 56% completed a college degree, 13.1% completed an advanced degree; $\chi^2 (12) = 13.049, p = .37$), language (69% English, 19% French, 3.6% Spanish (with no other group exceeding 3%); $\chi^2 (9) = 9.979, p = .35$) income (65% earned under $40000; $\chi^2 (18) = 8.09, p = .98$), medical history, (18.3% had a noninterfering medical condition; $\lambda (3) = 4.186, p = .24$), hormonal contraceptive use ($\chi^2 (3) = 2.945, p = .40$), history of psychological treatment (44% had received psychological treatment; $\chi^2 (3) = 2.18, p = .54$), or degree of relationship satisfaction (86% were satisfied in their relationships; $\chi^2 (6) = 3.457, p = .75$). However, significant group differences emerged for degree of sexual satisfaction (35.4% dissatisfied, 20% neutral, 44.6% satisfied; $\chi^2 (6) = 29.245, p < .001$), frequency of watching pornography ($M = .71, SD = .92$; $F (3, 79) = 6.37, p = .001, \eta^2 = .2$), time since last partnered sexual activity ($M = 25.10, SD = 5.33$; $F (3, 80) = 3.974, p = .01, \eta^2 = .13$), time since last masturbation experience ($M = 25.20, SD = 5.5$; $F(3, 73) = 3.847, p = .01, \eta^2 = .14$) and age of sexual debut ($M = 17.31, SD = .33$; $F (3, 80) = 4.3, p < .01, \eta^2 = .14$). In general, women with desire disorders had gone longer without partnered and solo sexual activity, watched pornography less frequently, and were less sexually satisfied than women without desire difficulties. Women with FSAD/HSDD also had an older age of sexual debut. Results of post hoc tests on these group differences, as well as detailed psychosexual information for this sample are presented in Table 1.

**Stimulus Effects**
To ensure that the erotic stimulus was successful in increasing arousal in our controls, we conducted paired $t$ tests comparing average genital temperature ($°C$) at baseline (B) versus erotic (E), and found significant differences in the predicted direction ($M_B = 32.72, M_E = 33.18, t(18) = -3.595, p < .001, \eta^2_p = .42$). Paired $t$ tests comparing average thigh temperature ($°C$) at baseline versus erotic also showed a significant difference between conditions ($M_B = 30.16, M_E = 29.71, t(18) = 5.921, p < .001, \eta^2_p = .66$), however the change was in the opposite direction, confirming that the arousal-related temperature increase was specific to the genitals. Significant differences were also found for average SA levels at baseline versus erotic for controls ($M_B = .44, M_E = 5.39, t(18) = -13.388, p < .001, \eta^2_p = .91$), indicating that our erotic film had its intended effect.

**Genital Arousal Patterns**

A three-way mixed design ANOVA with two repeated measures revealed significant main effects for condition ($M_B = 32.666, M_E = 33.097; F(1, 80) = 46.898, p < .001, \eta^2_p = .42$), and time ($F(2, 160) = 75.702, p < .001, \eta^2_p = .70$) on genital temperature ($°C$), both of which were in the predicted directions. A significant interaction was also found for time x condition ($F(2, 160) = 111.691, p < .001, \eta^2_p = .77$), but not for condition x group ($F(3, 80) = .084, p = .97$).

Following up on significant time x condition interactions for genital temperature revealed a significant linear decrease in temperature across time at baseline ($F(1, 83) = 15.630, p < .001, \eta^2_p = .16$). At erotic, there was a significant linear ($F(1, 83) = 125.450, p < .001, \eta^2_p = .60$), and a significant quadratic trend ($F(1,83) = 43.252, p < .001, \eta^2_p = .34$) for temperature over time. Temperature linearly increased from the first 5 minutes to the middle 5-10 minutes in the erotic condition, and then began to taper off (see Figure 1). Planned group comparisons revealed no significant group differences in these trends.

**Subjective Arousal Patterns**

A three-way ANOVA with two repeated measures factors revealed significant main effects for condition ($M_B = .4, M_E = 4.03; F(1, 80) = 313.195, p < .001, \eta^2_p = .80$) and for time ($F(2, 160) = 81.558, p < .001, \eta^2_p = .51$), in the predicted directions. We also found significant time x condition ($F(2, 160) = 75.661, p < .001, \eta^2_p = .49$), time x group ($F(6, 160) = 2.606, p < .05, \eta^2_p = .09$) condition x group ($F(3, 80) = 5.818, p = .001, \eta^2_p = .18$) and condition x time x group ($F(6, 160) = 2.588, p < .05, \eta^2_p = .09$) interactions (see Figure 2).

Tests of simple interactions were conducted on the significant three-way interaction to examine group x condition effects for each time segment. The two-way interaction was
significant for each time segment ($p < .001$). Simple simple main effects were conducted to compare groups for each condition at each time segment. In all cases, there were no significant group differences at baseline (all $p$’s > .05), and there were significant group differences for all time segments at erotic ($p$’s < .001). Significant group differences at erotic were followed up with Tukey’s post hoc tests. Pairwise comparisons revealed that at time 1, controls and women with FSAD had significantly higher average SA levels than women with HSDD ($p$’s < .01) and FSAD/HSDD ($p$’s < .01). Women with HSDD and FSAD/HSDD, and controls and women with FSAD, did not significantly differ from one another at Time 1. However, at times 2 and 3, all pairwise comparisons were significant (all $p$’s < .01), indicating that all groups significantly differed from one another in average SA levels, with controls showing the highest average SA levels, followed by women with FSAD, women with FSAD/HSDD and finally women with HSDD. To further explore the effect of time, simple simple main effects of time were conducted separately for each group at each condition. Results indicated no significant differences of time during baseline for any of the groups, but revealed significant differences of time at erotic ($p$’s < .001). Trend analyses revealed significant linear and quadratic trends across time in the erotic condition (all $p$’s < .01) for controls and women with FSAD/HSDD. In contrast, women with HSDD and FSAD showed only significant linear ($p$’s < .001) but not quadratic trends over time during the erotic condition (see Figure 2).

In addition, simple main effects for the change in SA from baseline to erotic revealed that SA significantly increased for all groups ($p$’s < .001). However, planned comparisons indicated that overall the change in SA from baseline to erotic was significantly greater for controls (mean change of 4.95 units) than for women with HSDD (mean change of 2.61 units) ($p < .001$) and women with FSAD/HSDD (mean change of 3.22 units) ($p < .01$). The change in SA was also significantly greater for women with FSAD (mean change of 4.05 units) than for women with HSDD ($p < .05$). HSDD and FSAD groups did not significantly differ from women with FSAD/HSDD.

Finally, psychosocial variables were examined as possible covariates of average subjective arousal levels during the erotic condition. Significant effects were found for anxiety levels ($p = .05$), pre-film positive affect ($p = .05$), sexual attitudes ($p = .06$), and number of days since last partnered sexual activity ($p = .06$); however, in all cases, group remained a significant predictor of average SA.
Group Differences in Discrete Levels of Subjective Arousal and Post-Erotic Film Responses

A two-way repeated measures ANOVA revealed a significant main effect for condition ($M_B = .58$ $M_E = 5.23$; $F (1, 79) = 427.797, p < .001, \eta^2_p = .84$) in the predicted direction, and for group ($F (3, 79) = 2.81, p < .05, \eta^2_p = .1$) but no significant group x condition interaction.

Post-film reports of film segment preferences, film effects on mood and overall levels of sexual response (i.e., desire, physical and subjective arousal), arousal levels as compared to typical experience, and the impact of the camera (i.e., camera effects) on arousal levels during the erotic film, are presented in Table 2 (separated by group status). Overall, there were no significant group differences in camera effects ($\chi^2 (6) = 8.694, p = .19$), film clip preference ($\chi^2 (9) = 7.543, p = .58$), arousal as compared to partnered sex ($\chi^2 (6) = 10.107, p = .12$), the effects of the film on distraction ($F (3, 80) = .53, p = .66$), or anxiety ($F (3, 80) = .21, p = .89$).

However, groups did significantly differ on their capacity to imagine themselves as a film participant ($F (3, 80) = 5.182, p = .003, \eta^2 = .16$) levels of film enjoyment ($F (3, 80) = 3.04, p = .03, \eta^2 = .10$), post-film/ responsive desire ($F (3, 80) = 5.574, p = .002, \eta^2 = .17$), physical arousal ($F (3, 80) = 4.758, p = .004, \eta^2 = .15$), and subjective arousal ($F (3, 80) = 5.633, p = .001, \eta^2 = .17$). There was also a trend toward significance for group differences in relaxation levels during the erotic film ($F (3, 80) = 2.576, p = .06, \eta^2 = .09$). In general, women with HSDD reported less enjoyment, less desire, less physical arousal, less subjective arousal, and less of a capacity to imagine themselves as a participant in the erotic film, as compared to controls and women with FSAD. Results of post hoc tests on these group differences are presented in Table 2.

Analyses of covariance indicated that levels of sexual inhibition due to threat of performance failure (SIS1) ($p < .01$), reported levels of distraction during the film ($p < .05$) and post-film levels of positive affect ($p < .001$) were significant covariates of discrete levels of subjective arousal. In addition, age ($p = .06$), number of days since last partnered sexual activity ($p = .06$), levels of relaxation ($p = .07$), and frequency of watching pornography ($p = .07$) approached significance as covariates of discrete subjective arousal. However in all of the above cases, group remained a significant predictor after accounting for the covariate.

Discrete and Continuous SA Across Conditions

To assess whether there was an interaction between condition and the measure of SA, we conducted a three-way repeated measures ANOVA, with measure (discrete/ continuous) and condition (baseline/ erotic) as the within subjects factors, and group as the between subject factor.
Data from one subject was missing from analyses. Results revealed a significant main effect for measure ($M_{cont} = 2.22, M_{discrete} = 2.90, F(1, 79) = 65.093, p < .001, \eta^2_p = .45$), with SA ratings on the discrete measure being significantly higher than on the continuous measure. We also found a significant condition x measure interaction ($F(1, 79) = 37.979, p < .001, \eta^2_p = .33$) but no measure x group interaction. A follow up simple main effects test on the condition x measure interaction indicated no differences between measures at baseline ($p = .12$), but found a significant difference at erotic ($p < .001$), with continuous SA ratings being lower ($M = 5.23, SD = 2.20$) than discrete SA ratings ($M = 4.04, SD = 2.22$). However, in general, both discrete and continuous SA measures showed a significant increase in SA ratings from baseline to erotic (both $p$’s < .001).

The relationship between mean continuous SA and discrete SA during the erotic condition was also examined for each group. All correlations were positive and significant, ranging from .53 for controls ($p = .02$), to .77 for women with FSAD ($p < .001$), .92 for FSAD/HSDD women ($p < .001$), and .94 for HSDD women ($p < .001$).

*Correlation between Subjective and Physiological Measures*

Results of between-subject correlational analyses examining the overall level of agreement between average GA and SA revealed non-significant correlations for the each of the five-minute segments of the erotic condition for controls ($r_1 = -.21, r_2 = -.12, r_3 = -.17$), women with HSDD ($r_1 = -.16, r_2 = .06, r_3 = .09$) and women with FSAD/HSDD ($r_1 = .07, r_2 = .09, r_3 = .1$). In contrast, correlations for women with FSAD were positive and nonsignificant for the first and last five-minute segments ($r_1 = .07, r_3 = .40$) of the erotic film, and positive and significant for the middle 5-10 minutes of the erotic film ($r = .52, p < .05$). Tests of differences between correlation coefficients, using Fisher’s $z$ transformation, showed that only controls and FSAD women significantly differed during the middle 5-10 minutes of the film ($p < .05$).

We also calculated within-subjects correlations across the 900 seconds of the erotic condition, and for the first 5 minutes, second 5 minutes and last 5 minutes, to examine if there were individual differences in women’s capacity to track the concordance between their SA and GA, and whether this differed by group status. Results indicated positive, modest correlations for each group, with strongest correlations during the first five minutes of the film (during which genital temperature showed minimal change). In addition, the mean correlation value was significantly higher for controls ($r_x = .66; r_{x1} = .51, r_{x2} = .19, r_{x3} = .22$) than for women with
FSAD/HSDD ($r_x = .41; r_{x1} = .45, r_{x2} = -.1 r_{x3} = .05$). There were no other significant differences between groups (HSDD: $r_x = .44; r_{x1} = .31, r_{x2} = .23, r_{x3} = .18$); FSAD ($r_x = .57; r_{x1} = .53, r_{x2} = .11, r_{x3} = .16$). Psychosocial variables were also examined as possible covariates of within subject correlations, and while age and number of sexual partners approached significance as covariates of within subject correlations ($p = .07$), group remained a significant predictor.

**Psychosocial Differences**

Results of one-way ANOVAs indicated that groups significantly differed on sexual excitation ($F(3, 75) = 10.71, p < .001, \eta^2 = .30$) inhibition due to threat of performance failure ($F(3, 75) = 16.86, p < .001, \eta^2 = .40$), sexual inhibition due to threat of performance consequences ($F(3, 75) = 3.72, p < .05, \eta^2 = .13$), depressive symptoms ($F(3, 80) = 2.74, p = .05, \eta^2 = .09$), pre-film negative affect ($F(3, 80) = 3.43, p < 0.05, \eta^2 = .11$), negative sexual attitudes ($F(3, 80) = 11.09, p < .001, \eta^2 = .29$), overall sexual functioning on the FSFI ($F(3, 63) = 76.97, p < .001, \eta^2 = .79$), sexual desire ($F(3, 41) = 17.823, p < .001, \eta^2 = .57$), alexithymia ($F(3, 79) = 4.57, p < .01, \eta^2 = .15$), sexual distress ($F(3, 43) = 10.929, p < .001, \eta^2 = .43$). There were also trends towards significance for body image self-consciousness ($F(3, 80) = 2.63, p = .056, \eta^2 = .09$), post film positive affect ($F(3, 80) = 2.53, p = .06, \eta^2 = .09$), pre film positive affect ($F(3, 80) = 2.23, p = .09, \eta^2 = .08$), emotion regulation strategies ($F(3, 79) = 2.54, p = .06, \eta^2 = .09$), body esteem ($F(3, 71) = 2.4, p = .075, \eta^2 = .09$) and histories of emotional neglect ($F(3, 79) = 2.37, p = .077, \eta^2 = .09$). Groups did not significantly differ with respect to trait-based anxiety ($F(3, 80) = .45, p = .72$), body image satisfaction ($F(3, 78) = .26, p = .86$), post film negative affect ($F(3, 80) = 1.87, p = .14$), overall emotion regulation skills ($F(3, 79) = 1.32, p = .28$), or lifetime trauma histories ($F(3, 77) = .345, p = .79$). Means, standard deviations, and results of post hoc tests are shown in Table 3.

**Discussion**

The current study was the first to examine whether women meeting explicitly defined criteria for disorders of desire versus arousal could be differentiated on the basis of psychophysiological and psychosocial patterns. In contrast to previously published findings with men (Sarin et al., in press), we found that this distinction was not one that was so easily made in women. Specifically, on a psychophysiological level, all groups showed equivalent levels of genital arousal in response to the erotic film, with women with FSAD appearing indistinguishable from those reporting normal levels of arousal. In contrast, significant group
differences emerged at the level of subjective arousal: as predicted, women with desire
difficulties (particularly women with HSDD) showed less continuous subjective arousal in
response to the erotic film, and reported less desire, physical arousal and overall SA on discrete
post-film measures, as compared to controls or women with FSAD. Finally, with respect to
concordance between GA and SA, we found different patterns using within- versus between-
subject correlations, with higher correlations found for the former. Using within-subject
correlations, as predicted, we found modest, positive correlations for all groups, with women
with FSAD/HSDD showing significantly lower average SA-GA agreement than healthy controls;
in contrast, between-subject analyses revealed negligible SA-GA agreement for all groups of
women, with the exception of women with FSAD, who showed significantly higher levels of
SA-GA agreement than healthy controls during the last ten minutes of the erotic film.

In contrast to our somewhat distinct psychophysiological patterns, we found a substantial
degree of overlap between groups on psychosocial variables. That is, while women with sexual
difficulties were generally found to have lower levels of sexual excitation, higher inhibition,
more conservative sexual attitudes, greater body image self-consciousness, higher sexual
distress/worse sexual satisfaction, worse mood, more alexithymia, and worse emotion regulation
skills as compared to our healthy controls, our clinical groups did not significantly differ from
each other on the majority of these variables. Specifically, women with HSDD significantly
differed from women with FSAD only on levels of sexual satisfaction, sexual functioning
variables (i.e., SDI and FSFI scores on desire versus lubrication), frequency of sexual behaviours
(e.g., partnered sex, masturbation), and enjoyment of the erotic film. In other words, women with
HSDD and FSAD were distinguishable only on the basis of variables relevant to the nature of
their reported disturbance. In addition, while women with FSAD/HSDD reported greater
impairment on almost all psychosocial variables as compared to other groups, they significantly
differed from women with HSDD and FSAD only on levels of sexual inhibition, sexual distress,
and overall sexual functioning.

Overall, the results of this study may have important implications for the
conceptualization of desire and arousal difficulties in women. First, results support past findings
on the interrelated nature of desire and subjective arousal and indicate that they may in fact be
“two sides of the same coin” for women (Laan & Both, 2008, p. 510). In the current study,
continuous and discrete subjective arousal levels generally mirrored reported levels of desire for
all groups of women. For example, women with low desire also reported lower levels of subjective arousal in response to the erotic film, indicating that a lack of reported interest in sexual activity is likely to coincide with a lack of pleasure or excitement during such activity, and thereby highlighting the importance of contextual cues (e.g., beliefs, evaluations, perceptions) in the female arousal experience. In contrast, the current findings also support the relative independence of genital and subjective arousal, particularly in women with sexual difficulties (Laan & Everaerd, 1995). Specifically, while these arousal pathways appeared to operate somewhat in parallel in healthy women (as evidenced by within subject correlations averaging around 0.66), they diverged in those with sexual difficulties, particularly women with low desire, who reported low levels of subjective arousal (and thus, low SA-GA agreement) despite having levels of genital arousal that were equivalent to other groups.

It is important to note here that despite their reports of lubrication problems, women with FSAD also appeared indistinguishable from healthy controls on indicators of genital arousal (and on measures of desire and subjective arousal). This surprising finding runs in contradiction to the nature of the reported deficit in FSAD. At the same time, it is consistent with a growing body of evidence indicating a lack of genital impairment in women with FSAD (Graham, 2010) and supports recent decisions to remove FSAD as a unique diagnostic category from the DSM-5. It also suggests that reports of “reduced genital or nongenital sensations” (a new symptom in the diagnostic criteria for SIAD) might be more of an indication of impairment in the perception of arousal than in actual physiological arousal. It may also be more typical of women with desire/subjective arousal difficulties than of women reporting lubrication problems. Indeed, in the current study, it was our women with HSDD, and not our women with FSAD that reported low physical arousal sensations in response to the erotic film, suggesting that the problem may be one of diminished awareness of physical sensations (or reduced pleasure accompanying sensations), rather than a lack of sensations per se. On the other hand, it is also possible that the lubrication difficulties reported by women with FSAD are specific to a relational context (e.g., to the duration or quality of sexual stimulation received by their partners) and hence did not come into play in this novel laboratory context (in which there was no demand to stay lubricated). It is possible that future research in more typical, relational or naturalistic settings (wherein sexual activity is anticipated), or even after repeated exposure to the lab context, using tools more specifically designed to measure lubrication levels, may more sufficiently activate the
performance-based anxiety of women reporting lubrication difficulties, and ultimately result in a diminished genital arousal response.

At the same time, it is also noteworthy that it was our women with FSAD that showed higher levels of genital-subjective arousal agreement than other groups, as indicated by between subject correlations. This finding is in contrast to some earlier work in which lower concordance levels were found amongst women reporting arousal problems (see Chivers et al., 2010), and may be accounted for, in part, by differences in our sample composition and correlational methods, as compared to past research. Nonetheless, it is not immediately clear how to account for the strong positive correlations amongst women with FSAD. It may be that their belief about having genital arousal difficulties fostered a heightened level of attention towards their genital sensations during the erotic film that served to augment not only their levels of genital arousal but also levels of agreement between genital and subjective arousal (due to increased accuracy in self monitoring). Indeed, recent research has found that intentionally directing attention to one’s genitals, or having increased genital awareness, may result in heightened levels of genital and subjective arousal (Prause et al., 2013), and potentially even higher levels of genital-subjective arousal agreement (Brotto, Basson & Luria, 2008). Future research should continue to examine the impact of varying one’s levels of genital attention, as well as manipulating beliefs about one’s sexual functioning, to identify whether this effect on genital-subjective arousal agreement is in fact replicable.

Overall, our results indicate a high degree of overlap between our clinical groups on sexual and psychosocial variables, and suggest that female sexual difficulties may indeed fall along a continuous spectrum of severity, rather than existing as distinct syndromes. As such, these findings lend support to the recent decision to collapse desire and arousal disorders in the DSM-5 under the merged diagnostic heading of Sexual Interest and Arousal Disorder (SIAD), particularly for women reporting desire difficulties. In the current study, women meeting diagnostic criteria for HSDD also reported low levels of sexual responsiveness, SA, and physical arousal sensations, and likely would have met diagnostic criteria for SIAD. They also reported lower levels of concordance, using both between and within subjects correlations. In fact, our women with HSDD significantly differed from women with FSAD/HSDD only in their lack of reported lubrication difficulties and in their less severe scores on most psychosocial variables. Hence, it may be that for women, symptoms typically commence in one domain (e.g., lack of
sexual interest) due to the presence of relevant risk factors (e.g., conservative sexual beliefs), and
then ultimately spread to other areas of sexual functioning (e.g., lack of pleasure, lack of genital
sensation) with increased symptom duration and/or catastrophizing. Indeed, although it did not
reach significance, we saw a trend for women with FSAD/HSDD to have longer symptom
duration (average of 54 months) than women with HSDD (average of 39 months) or FSAD
(average of 38 months) alone.

At the same time, however, it should be noted that while women with HSDD alone had
less severe scores than women with FSAD/HSDD on most psychosocial variables, their scores
on sexual functioning variables relevant to their pathology (e.g., subjective arousal, desire,
frequency of watching pornography, frequency of sexual activity) were more severe than those
with both disorders, indicating that there may indeed be something unique about the pathology of
those with both disorders as compared to those with HSDD alone. Future research should
continue to examine whether it is feasible to empirically derive distinct profiles of those with
HSDD versus those with combined difficulties using larger sample sizes and multidimensional
assessments, in order to identify whether SIAD should be considered to represent simply a more
severe version of HSDD, or whether it constitutes a distinct disorder in its own right.

Finally, these results have implications for the treatment of desire and arousal problems
in women. Specifically, findings support the use of psychoeducation and cognitive work to
restructure negative sexual attitudes/ beliefs in women with low desire, with the goal of replacing
them with more erotic imaginings both outside of and during a sexual situation. Mindfulness
work may also help to facilitate connection with one’s sexual feelings/ sensations (emotional and
physical), detachment from nonsexual thoughts or negative emotions, and may assist with being
“in the moment” (Brotto et al., 2008). In addition, women with comorbid arousal difficulties may
benefit from sexual education about ‘turn on’s’ and ‘turn off’s’, as well as relaxation exercises to
dampen the inhibitory impact of performance based anxiety on sexual pleasure and functioning.
Emotion regulation work may also be of benefit to help women connect with sexual feelings and
to better manage any conflicting negative emotions surrounding sexual relationships.

These results should also, however, be considered within the context of several important
limitations. First, we had a high exclusion rate in this study (73%), and our remaining sample
was relatively young (average age of 27), predominantly heterosexual, and in relationships of
shorter duration (average length of 20 months) than has typically been seen of the women that
have participated in major pharmacological studies (e.g., flibanserin trials) on desire and arousal, thus raising questions about the generalizability of our findings (Brotto, 2010; Clayton et al., 2012; Graham, 2010). In conjunction with this, the frequency criterion for sexual symptoms in the current study was ultimately reduced from 75% to 50% after three years of testing due to the high exclusion rate ensuing from our initially stringent cutoff value, and to accommodate the fluctuations in symptom frequency demonstrated by our participants from the time of screening until testing. While we believe this reduction in the frequency criterion still ensured sexual difficulties of significant severity and impairment, particularly given the otherwise stringent nature of our operational criteria for our clinical sample, it nonetheless is not consistent with the frequency cutoff recently established in the DSM-5. Unfortunately, however, our capacity to compare current findings and exclusion rates with the relevant literature is complicated by the fact that the majority of past researchers have not clearly operationalized (or reported) their inclusion criteria for the sexual disorders (e.g., with respect to frequency or duration cutoffs), nor have they explicitly reported their exclusion rates due to these diagnostic criteria (for a more detailed discussion of this issue, see Sarin et al., 2013). Second, although we chose a well validated, female-centered film to enhance arousal in women (Janssen et al., 2003), the majority of women in our study reported only moderate levels of enjoyment in response to the erotic film; it is possible that we would have found stronger genital arousal effects (and potentially stronger group differences) with a more preferred stimulus. Third, our psychophysiological results were based entirely on the use of thermography, which to date, remains a relatively new and uncommonly used measure of genital arousal. It is unclear whether the same pattern of results would have been obtained with more commonly used tools, such as vaginal photoplethysmography. Finally, our sample size was small which may have limited our power to find psychosocial and physiological differences between clinical groups. It also limited the kinds of analyses that we could do. For instance, it is likely that women who report difficulty attaining adequate lubrication levels differ substantially from those who exclusively have trouble maintaining it, both in their psychophysiological profiles and in underlying mechanisms, but we were unable to tease apart this heterogeneity in our analyses. Despite these challenges, strong psychosocial and physiological patterns nonetheless emerged that would likely have been only more pronounced with more amply powered analyses.
Conclusions

In sum, the current study marks an important advance in the attempt to empirically differentiate and profile desire and arousal disorders in women using clear criteria, standardized measures, and sophisticated psychophysiological tools (e.g., thermal imaging in conjunction with continuous and discrete measures of subjective arousal). Findings indicate a high degree of overlap between clinical groups on psychosocial and psychophysiological indices, and lend support to the emergence of SIAD as a combined desire-arousal syndrome in the DSM, as well as the removal of FSAD as a diagnostic category. They also have theoretical implications for the classification, measurement and treatment of desire and arousal difficulties in women. Future research, using more direct measures of the lubrication response (as well as other genital/ non genital sensations), multi-method techniques (e.g., brain imaging in conjunction with genital measurement), experimental manipulations (e.g., performance anxiety or body self consciousness inductions) and direct cross gender comparisons may help us better disentangle the complex relationship between these enigmatic mind-body concepts.
References


Cooper, P. J., Taylor, Cooper, M. J. Z., & Fairburn, C. G. (1987). The development and


Sarin, S., Amsel, R. M., & Binik, Y. M. (2013). Disentangling desire and arousal: A


Table 1. Group Differences in means, standard deviations and sample proportions (%) for psychosexual variables

<table>
<thead>
<tr>
<th></th>
<th>Total (N = 84)</th>
<th>Controls (n = 19)</th>
<th>HSDD (n = 22)</th>
<th>FSAD (n = 18)</th>
<th>FSAD/HSDD (n = 25)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Sexual history:</td>
<td></td>
<td></td>
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<tr>
<td>Reln duration</td>
<td>20.52 (4.29)</td>
<td>12.96 (3.73)</td>
<td>22.9 (4.57)</td>
<td>19.45 (4.72)</td>
<td>25.81 (4.26)</td>
</tr>
<tr>
<td># of partners*</td>
<td>8.24 (1.51)</td>
<td>9.06 (1.29)</td>
<td>8.07 (1.36)</td>
<td>9.61 (1.47)</td>
<td>6.81 (1.84)</td>
</tr>
<tr>
<td>age of sex debut*</td>
<td>17.31 (.33)</td>
<td>16.08 (.21)a</td>
<td>16.73 (.25)a</td>
<td>17.22 (.39)ab</td>
<td>18.75 (.37)b</td>
</tr>
<tr>
<td>last had sex (days)*</td>
<td>25.10 (5.33)</td>
<td>9.43 (2.07)a</td>
<td>60.68 (6.75)b</td>
<td>9.92 (2.53)a</td>
<td>28.73 (6.16)ab</td>
</tr>
<tr>
<td>last mast. (days)*</td>
<td>25.2 (5.5)</td>
<td>5.52 (1.75)a</td>
<td>50.8 (5.97)b</td>
<td>12.11 (2.17)a</td>
<td>44.76 (7.46)b</td>
</tr>
<tr>
<td>porn freq (#/ mth)</td>
<td>.71 (.92)</td>
<td>2.05 (1.14)a</td>
<td>.09 (.5)c</td>
<td>.53 (.63)bc</td>
<td>.71 (.92)ab</td>
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<tr>
<td>Psych history:</td>
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<td></td>
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<td></td>
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<td>Past treatment</td>
<td>37 (44)</td>
<td>6 (31.6)</td>
<td>12 (54.5)</td>
<td>8 (44.4)</td>
<td>11 (44)</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Satisfied</td>
<td>56 (86.1)</td>
<td>13 (92.9)</td>
<td>14 (87.5)</td>
<td>11 (84.6)</td>
<td>18 (81.8)</td>
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<td>3 (4.6)</td>
<td>1 (7.1)</td>
<td>1 (6.3)</td>
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<td>1 (4.5)</td>
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<tr>
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<td>6 (9.2)</td>
<td>0</td>
<td>1 (6.3)</td>
<td>2 (15.4)</td>
<td>3 (13.6)</td>
</tr>
<tr>
<td>Sexual sat:</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>29 (44.6)</td>
<td>13 (92.9)</td>
<td>2 (12.5)</td>
<td>9 (69.2)</td>
<td>5 (22.7)</td>
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<tr>
<td>Dissatisfied</td>
<td>23 (35.4)</td>
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<td>8 (50)</td>
<td>4 (30.8)</td>
<td>11 (50)</td>
</tr>
<tr>
<td>Neither</td>
<td>13 (20)</td>
<td>1 (8.3)</td>
<td>6 (37.5)</td>
<td>0</td>
<td>6 (27.3)</td>
</tr>
</tbody>
</table>

Note: a, b, c: Groups that share an alphabetical superscript do not significantly differ according to Tukey’s (or chi square, where appropriate) post hoc tests. * = Square root transformations were done on these variables to correct for positive skewness that resulted in violations of homogeneity of variance (p’s = .001). Means presented derive from squaring the means of the transformed data. N = Sample sizes may sum to less than the stated group sample sizes, given that these variable did not pertain to those subjects that were not currently in relationships. Reln Duration = relationship duration; Last mast = days since last masturbation; Porn Freq =
frequency of porn watching per month (# of times/ month); Relationship sat = relationship satisfaction; Sexual sat = sexual satisfaction
Table 2. Group differences in means, standard deviations and sample proportions (%) for post film subjective ratings of camera and film effects

<table>
<thead>
<tr>
<th>Question</th>
<th>Total (N = 84)</th>
<th>Controls (n = 19)</th>
<th>HSDD (n = 22)</th>
<th>FSAD (n = 18)</th>
<th>FSAD/ HSDD (n = 25)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Camera effects:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased arousal</td>
<td>9 (10.7)</td>
<td>2 (10.5)</td>
<td>2 (9.1)</td>
<td>2 (11.1)</td>
<td>3 (12)</td>
</tr>
<tr>
<td>Decreased arousal</td>
<td>39 (46.4)</td>
<td>12 (63.2)</td>
<td>9 (40.9)</td>
<td>4 (22.2)</td>
<td>14 (56)</td>
</tr>
<tr>
<td>No effect</td>
<td>36 (42.9)</td>
<td>5 (26.3)</td>
<td>11 (50)</td>
<td>12 (66.7)</td>
<td>8 (32)</td>
</tr>
<tr>
<td>Preferred Film Segment:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First 5 mins</td>
<td>23 (27.4)</td>
<td>5 (26.3)</td>
<td>5 (22.7)</td>
<td>5 (27.8)</td>
<td>8 (32)</td>
</tr>
<tr>
<td>Mid 5 mins</td>
<td>19 (22.6)</td>
<td>7 (36.8)</td>
<td>6 (27.3)</td>
<td>2 (16.7)</td>
<td>4 (16)</td>
</tr>
<tr>
<td>Last 5 mins</td>
<td>13 (15.5)</td>
<td>3 (15.8)</td>
<td>5 (22.7)</td>
<td>3 (16.7)</td>
<td>2 (8)</td>
</tr>
<tr>
<td>Varied throughout</td>
<td>26 (31)</td>
<td>4 (21.1)</td>
<td>5 (22.7)</td>
<td>7 (38.9)</td>
<td>10 (40)</td>
</tr>
<tr>
<td>Arousal compared to with partner:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More aroused</td>
<td>30 (35.7)</td>
<td>3 (15.8)</td>
<td>9 (40.9)</td>
<td>7 (38.9)</td>
<td>11 (44)</td>
</tr>
<tr>
<td>Less aroused</td>
<td>48 (57.1)</td>
<td>12 (63.2)</td>
<td>12 (54.5)</td>
<td>11 (61.1)</td>
<td>13 (52)</td>
</tr>
<tr>
<td>No difference</td>
<td>6 (7.1)</td>
<td>4 (12.1)</td>
<td>1 (4.5)</td>
<td>0</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Film effects:</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Relaxation (/10)</td>
<td>5.38 (2.06)</td>
<td>5.26 (1.88)</td>
<td>5.18 (2.28)</td>
<td>6.5 (1.65)</td>
<td>4.84 (2.06)</td>
</tr>
<tr>
<td>Anxiety (/10)</td>
<td>2.42 (2.11)</td>
<td>2.32 (2.06)</td>
<td>2.68 (2.38)</td>
<td>2.17 (2.09)</td>
<td>2.44 (2.04)</td>
</tr>
<tr>
<td>Distraction (/10)</td>
<td>2.64 (1.89)</td>
<td>2.32 (1.53)</td>
<td>3.05 (2.46)</td>
<td>2.56 (1.69)</td>
<td>2.56 (1.69)</td>
</tr>
<tr>
<td>Enjoyment (/10)</td>
<td>4.31 (2.11)</td>
<td>4.84 (1.64)</td>
<td>3.5 (2.52)</td>
<td>5.22 (1.52)</td>
<td>3.96 (2.15)</td>
</tr>
<tr>
<td>Imagine self as participant (/10)</td>
<td>3.77 (2.91)</td>
<td>5.58 (2.29)</td>
<td>2.23 (2.91)</td>
<td>3.78 (2.84)</td>
<td>3.75 (2.74)</td>
</tr>
<tr>
<td>Desire Subscale (/60)</td>
<td>34.02 (13.59)</td>
<td>41.42 (7.35)</td>
<td>26.14</td>
<td>37.44</td>
<td>32.88</td>
</tr>
<tr>
<td>Physical Arousal Subscale (/60)</td>
<td>22.63 (12.09)</td>
<td>29.21 (8.81)</td>
<td>16.36</td>
<td>25.11</td>
<td>21.36</td>
</tr>
<tr>
<td>Subjective Arousal Subscale (/30)</td>
<td>12.11 (6.79)</td>
<td>15.74 (5.23) $^a$</td>
<td>8.14 (6.25) $^b$</td>
<td>13.94 (6.48) $^a$</td>
<td>11.52 (6.83) $^{ab}$</td>
</tr>
</tbody>
</table>

Note: a, b, c: Groups that share an alphabetical superscript do not significantly differ according to Tukey’s post hoc tests. Preferred film segment = preferred segment of the erotic film; Camera effects = the effects of the presence of the camera on participants’ self-reported levels of arousal.
Table 3. Group comparisons on psychosocial variables

<table>
<thead>
<tr>
<th></th>
<th>Controls (n = 19)</th>
<th>HSDD (n = 22)</th>
<th>FSAD (n = 18)</th>
<th>FSAD/HSDD (n = 25)</th>
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<tbody>
<tr>
<td><strong>Mean (SD)</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Sexual Functioning:</strong></td>
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<tr>
<td>FSFI</td>
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<tr>
<td>Desire (/6)</td>
<td>4.61 (.83) a</td>
<td>1.63 (.56) b</td>
<td>3.47 (1.29) c</td>
<td>1.88 (.6) b</td>
</tr>
<tr>
<td>Arousal (/6)</td>
<td>5.31 (.66) a</td>
<td>2.56 (.78) bc</td>
<td>3.05 (.86) b</td>
<td>2.03 (.57) c</td>
</tr>
<tr>
<td>Lubrication (/6)</td>
<td>5.67 (.62) a</td>
<td>4.48 (1.2) b</td>
<td>2.47 (.92) c</td>
<td>2.84 (.73) c</td>
</tr>
<tr>
<td>Orgasm (/6)</td>
<td>5.54 (.75) a</td>
<td>3.5 (1.62) b</td>
<td>3.59 (1.12) b</td>
<td>2.33 (1.27) c</td>
</tr>
<tr>
<td>Satisfaction (/6)</td>
<td>5.37 (.59) a</td>
<td>2.51 (.94) b</td>
<td>4.03 (1.34) c</td>
<td>2.67 (1.01) b</td>
</tr>
<tr>
<td>Pain (/6)</td>
<td>5.68 (.92) a</td>
<td>5.2 (1.41) ab</td>
<td>4.11 (1.25) b</td>
<td>4.38 (1.42) b</td>
</tr>
<tr>
<td>Total (/36)</td>
<td>32.17 (2.62) a</td>
<td>20.58 (2.95) b</td>
<td>20.75 (4.17) b</td>
<td>16.29 (3.38) c</td>
</tr>
<tr>
<td><strong>Sexual Desire:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SDI (/109)</td>
<td>79.43 (10.72) a</td>
<td>28.79 (8.06)c</td>
<td>60.23 (16.45) b</td>
<td>37.93 (21.12) c</td>
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<td><strong>Sexual Distress:</strong></td>
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</tr>
<tr>
<td>FSDS (/52)</td>
<td>8.29 (6.13) a</td>
<td>24.64 (12.89) b</td>
<td>25.57 (10.87) b</td>
<td>35.16 (9.00) c</td>
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<tr>
<td><strong>Body Image:</strong></td>
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<tr>
<td>BISC (/75)</td>
<td>8.53 (1.83) a</td>
<td>17.81 (1.81) ab</td>
<td>15.76 (1.58) ab</td>
<td>18.92 (1.84) b</td>
</tr>
<tr>
<td>BSQ (/204)</td>
<td>75.86 (1.65)</td>
<td>80.8 (1.77)</td>
<td>84.82 (1.89)</td>
<td>80.28 (1.6)</td>
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<td>BES (/175)</td>
<td>111.45 (18.94) ab</td>
<td>113.33 (15.88) ab</td>
<td>121.94 (12.65) a</td>
<td>108.24 (18.94) b</td>
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<tr>
<td><strong>Emotion Regulation:</strong></td>
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<tr>
<td>DERS (/180)</td>
<td>75.66 (20.60)</td>
<td>86.58 (27.12)</td>
<td>87.34 (23.21)</td>
<td>89.06 (23.15)</td>
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<td>DERS: Strategies (/40)</td>
<td>14.21 (4.87) a</td>
<td>18.47 (7.72) ab</td>
<td>18.17 (6.56) ab</td>
<td>19.78 (7.45) b</td>
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<tr>
<td>TAS (/100)</td>
<td>41.32 (9.77) a</td>
<td>48.29 (12.37) ab</td>
<td>43.17 (11.46) a</td>
<td>52.52 (10.49) b</td>
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<td><strong>SIS-SES:</strong></td>
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<tr>
<td>Total Inhibition (/52)</td>
<td>32.95 (5.95) a</td>
<td>36.91 (6.27) ab</td>
<td>39.44 (6.32) bc</td>
<td>41.4 (5.20) c</td>
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<tr>
<td>Total Excitation (/92)</td>
<td>69.81 (6.05) a</td>
<td>59.82 (6.67) bc</td>
<td>64.83 (5.31) ab</td>
<td>57.66 (8.37) c</td>
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<td>SIS1-SF (/16)</td>
<td>12.42 (1.71) a</td>
<td>9.71 (2.0) b</td>
<td>9.33 (2.95) b</td>
<td>7.48 (2.06) c</td>
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<td>SIS2-SF (/16)</td>
<td>8.79 (2.68) a</td>
<td>7.48 (2.99) ab</td>
<td>7.89 (2.32) ab</td>
<td>6.23 (1.64) b</td>
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<tr>
<td>SES-SF (/24)</td>
<td>13.32 (2.31) a</td>
<td>16.81 (2.96) bc</td>
<td>14.89 (3.29) ab</td>
<td>18.33 (3.28) c</td>
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<td><strong>Sexual Attitudes:</strong></td>
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<tr>
<td>SOS (/126)</td>
<td>99.32 (18.14) a</td>
<td>75.7 (17.09) bc</td>
<td>86.56 (13.35) ab</td>
<td>70.92 (19.37) c</td>
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### Mood:

<table>
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<tr>
<th>Measure</th>
<th>T1PANAS – PA (/50)</th>
<th>T1PANAS – NA (/50)</th>
<th>T2PANAS – PA (/50)</th>
<th>T2PANAS – NA (/50)</th>
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</thead>
<tbody>
<tr>
<td>T1PANAS – PA (/50)</td>
<td>30.21 (8.23)</td>
<td>25.09 (7.98)</td>
<td>29.5 (7.57)</td>
<td>25.8 (7.09)</td>
</tr>
<tr>
<td>T1PANAS – NA (/50)</td>
<td>12.68 (2.54)</td>
<td>13.32 (3.39)</td>
<td>13.67 (4.19)</td>
<td>16.42 (5.85)</td>
</tr>
<tr>
<td>T2PANAS – PA (/50)</td>
<td>28.74 (7.99)</td>
<td>22.83 (7.27)</td>
<td>27.94 (8.40)</td>
<td>25.32 (7.11)</td>
</tr>
<tr>
<td>T2PANAS – NA (/50)</td>
<td>11.94 (2.32)</td>
<td>12.37 (3.62)</td>
<td>11.22 (1.7)</td>
<td>13.68 (4.93)</td>
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<tr>
<td>BDI-II (/63)</td>
<td>4.47 (3.42)</td>
<td>8.62 (6.21)</td>
<td>8.94 (5.94)</td>
<td>9.88 (8.57)</td>
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<td>STAI-T (/80)</td>
<td>41.65 (6.5)</td>
<td>41.98 (10.12)</td>
<td>40.39 (9.04)</td>
<td>43.36 (7.36)</td>
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### Trauma:

<table>
<thead>
<tr>
<th>Measure</th>
<th>CTQ: EN (/25)</th>
<th>SLESQ (/12)</th>
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<tbody>
<tr>
<td>CTQ: EN (/25)</td>
<td>9.05 (4.18)</td>
<td>1.42 (1.68)</td>
</tr>
<tr>
<td>SLESQ (/12)</td>
<td>9.82 (4.81)</td>
<td>1.86 (2.94)</td>
</tr>
</tbody>
</table>

Note: a, b, c: Groups that share an alphabetical superscript do not significantly differ according to Tukey's post hoc tests. SIS1-SF = Sexual Inhibition Scale 1, Short Form; SIS2-SF = Sexual Inhibition Scale 2, Short Form; SES-SF = Sexual Excitation Scale, Short Form; PA = Positive affect; NA = Negative affect; T1PANAS = Time 1 (Pre-film) Positive and Negative Affect Scale; T2PANAS = Time 2 (Post film); CTQ-EN = Childhood Trauma Questionnaire, Emotional Neglect Scale.
Figure 1. Group differences in average genital temperature for the first 5, middle 5 and last 5 minutes of the baseline (dotted line) and erotic (solid line) conditions
Figure 2. Group difference in average subjective arousal levels for the first 5, middle 5 and last 5 minutes of the baseline (dotted line) and erotic (solid line) conditions.
GENERAL CONCLUSIONS AND FUTURE DIRECTIONS

The three empirical investigations comprising this dissertation aimed to assess the feasibility of empirically differentiating and profiling sexual desire and arousal in men and women, using clearly operationalized criteria, and standardized self-report and psychophysiological measures. The recruitment of distinct groups of desire and arousal sufferers using clearly defined operational criteria proved, however, to be more complicated than expected, and led to the exclusion of 75% of those believing they had sexual difficulties (many of whom would likely have been included in prior research). Results from study one indicated that the majority of subjects were excluded due to failure to meet a central diagnostic criterion for a sexual disorder (e.g., insufficient frequency or duration of sexual difficulties), with the primary reason being the presence of ongoing sexual thoughts, despite a reported lack of interest in sexual activity. This latter finding highlights an important difference between ‘thinking’ about sex and ‘wanting’ sex, which is not accounted for in the diagnostic criteria as they stand, and speaks to the importance of distinguishing between solitary and relational sexual difficulties in research and in practice (Spector, Carey, & Steinberg, 1996; vanAnders, 2012). The high exclusion rate may also speak to how frequently mild or temporary sexual fluctuations are misinterpreted as pathologies warranting treatment, and thus highlights the importance of clearly defining constructs within public education as well as in empirical research, as these definitions determine not only the demographic that is studied, but also what is learned.

Preliminary findings from study one also indicated, however, that desire and genital arousal difficulties are differentiable, as revealed through the recruitment of distinct groups of low desire versus low arousal sufferers, as well as through cluster analyses. In addition, a group with combined desire and arousal difficulties emerged for both sexes, providing preliminary evidence of the relevance of SIAD as a diagnostic category for men and well as women. On the other hand, the recruitment of men with exclusively low desire and the recruitment of women experiencing exclusively lubrication difficulties proved to be quite challenging, and neither of these categories emerged as a distinct group in our cluster analyses. These findings may speak not only to gender differences in the typical chronology of symptom development (e.g., low arousal leading to low desire in men, and the opposite for women), but also to the questionable utility of retaining independent diagnoses of HSDD in men (Meana & Steiner, 2014) and FSAD in women (Graham, 2010).
These preliminary findings regarding the classification of sexual difficulties were supported by results from the second and third studies in this dissertation, which examined whether desire and arousal disorders were differentiable in men and women respectively, on the basis of psychophysiological and psychosocial patterns. Results from the second study indicated that men with desire versus arousal disorders had unique psychophysiological and psychosocial patterns, with those with combined desire and arousal difficulties showing the greatest level of impairment. Consistent with past findings, subjective arousal levels mirrored levels of genital arousal for sexually healthy men (Chivers, Seto, Lalumiere, Laan & Grimbos, 2010), however they diverged in those with sexual difficulties, particularly those with erectile dysfunction. This finding suggests that contrary to popular assumptions, subjective and genital arousal pathways may in fact operate relatively independently for men with sexual difficulties. On the other hand, in line with past qualitative findings on the interrelatedness of desire and subjective arousal, results indicated that these mental processes went largely hand-in-hand for men with and without sexual difficulties. Overall, in line with preliminary findings from study one, these results support the existence of four distinct groups in men: 1) an erectile dysfunction group (with no difficulties with subjective arousal or desire) 2) a sexually healthy group (in which desire, subjective arousal and genital arousal levels are highly interrelated) 3) a low sexual interest group with healthy levels of genital arousal, but lower levels of subjective arousal (although not necessarily during solitary sexual activity) and 4) a combined sexual arousal and desire group with difficulties across the spectrum. These results also thereby provide additional support for the relevance of SIAD as a unique diagnostic category for men, but it remains unclear whether this combined group should be considered a more severe version of either a desire or arousal disorder on its own, or whether it constitutes a new syndrome in its own right.

Finally, results from our parallel study with women also provided support for the differentiation of desire and genital arousal difficulties. Although equivalent levels of genital arousal were found for all groups of women, those with low desire reported less continuous and discrete subjective arousal in response to the erotic stimulus, as compared to controls or women with FSAD (who were indistinguishable from one another). Similar psychosocial patterns to those found in study two (with men) also emerged, with women with both disorders showing greatest psychosocial impairment. Overall, consistent with past findings, results indicate low correlations between genital and subjective arousal particularly for women with combined
difficulties, and provide further support for the speculated independence of these pathways in women (Chivers et al., 2010). On the other hand, in line with our findings with men, desire and subjective arousal levels went hand-in-hand for all groups of women, and suggest that contextual cues/ mental appraisals of stimuli may indeed weigh heavier than bodily events (e.g., genital arousal) in women’s experience of arousal. These results provide additional evidence for the recent merging of desire and arousal disorders for women, and support the removal of female sexual arousal disorder as a diagnostic category in the DSM-5.

In sum, this program of research marks a first step towards empirically differentiating and profiling sexual desire and arousal disorders in men and women, using clear criteria and standardized measures. At the same time, several limitations of this work should be highlighted: overall, participants in the three studies were young, educated, non-religious, heterosexual, in young relationships, and self-selected for participation in these studies, thus limiting the generalizability of our findings. The studies were also cross-sectional, ruling out the possibility of establishing causal links, and our sample sizes were small which prevented us from conducting finer analyses (e.g., regarding whether women who report difficulties attaining versus maintaining adequate lubrication levels differ in their psychophysiological profiles). Third, our psychophysiological results were based entirely on the use of thermography, which to date, remains a relatively new and uncommonly used measure of genital arousal. It is unclear whether the same pattern of results would have been obtained with more commonly used tools, such as vaginal photoplethysmography (for women)/ penile plethysmography (for men), or tools that assess other facets of arousal (e.g., brain activation, the lubrication response, sympathetic nervous system activity). In view of these limitations, future research should employ samples more representative of typical desire/ arousal sufferers (e.g. parents in long-term relationships, individuals over 50, participants of varied sexual orientations and more conservative cultural/ religious backgrounds), larger sample sizes, and multi-method techniques (e.g., brain imaging or information processing tasks such as eye-tracking, in conjunction with genital arousal measurement). Future research should also strive to find creative ways to examine these questions in more naturalistic settings (e.g., using ‘real-life’ scenarios, partner assessment, and daily diary/ direct observation methods).

In addition, although this work provided the first empirical examination of the differentiability of desire and arousal disorders in both men and women, we did not in fact
directly compare the sexes on either psychophysiological or psychosocial factors. As such, while we were able to note gender differences and similarities across our studies in psychophysiological and psychosocial patterns, these commentaries are speculative. The results of the current program of research indicate that theorized gender differences in the expression of desire and arousal may not be as large as typically presumed; however, plans to directly compare men and women within the same study, in order to address this question, are underway.

Moreover, while results of our three studies provide support for a merged category of desire and arousal difficulties in men and women, it should be noted that this dissertation did not directly assess the impact of using the DSM-5 diagnostic criteria for SIAD in comparison to the DSM-IV-TR criteria for disorders of desire or arousal alone. However, DSM-5 diagnostic criteria for SIAD were comprehensively assessed in the second and third studies via a semi-structured diagnostic interview on arousal and desire (see Appendix E), and we are currently in the process of assessing the extent to which these criteria are able to capture the range of sexual difficulties in our sample. This work will provide the first direct examination of the validity of SIAD as a diagnostic category for men and women.

Finally, future researchers should continue to explore the relationship between desire and arousal in diverse populations known to have heightened levels of awareness of their bodies or sexuality (e.g., athletes, advanced yoga practitioners, erotic dancers), and who may frequently present with the psychosocial factors identified in this dissertation to be of relevance to desire and arousal difficulties (e.g., body image self-consciousness, low mood, emotion dysregulation). Female sex workers represent one such unstudied population, and we are currently pursuing the first empirical investigation of their sexual functioning, using a similar psychophysiological paradigm to that used in this dissertation. To date, data from 12 female sex workers (e.g., escorts, prostitutes, and independents) have been collected, and although preliminary analyses indicate similar psychophysiological patterns (e.g., genital arousal, subjective arousal, concordance) to non-sex workers, unique psychosocial vulnerability factors are emerging (e.g., body image dissatisfaction, emotion dysregulation, childhood and adult trauma). In addition, consistent with past findings on the highly dynamic and relational nature of female sexual functioning (Baumeister, 2000), preliminary analyses have also revealed discrepant levels of sexual function/dysfunction across sexual domains (e.g., with intimate partners versus clients or solitary
activity), thus reinforcing the importance of context in the experience of desire and subjective arousal in women.

An additional population in whom it may be particularly informative to study the distinction between sexual desire and arousal are those with eating disorders, in whom sexual difficulties are commonly reported (Pinheiro et al., 2010). However, no psychophysiological research on desire or arousal currently exists in this population, despite their high vulnerability for sexual dysfunction (e.g., due to body image self consciousness, trauma histories, emotion dysregulation, depression, sexual inhibition etc.). One of my upcoming goals is therefore to examine whether women struggling with anorexia versus bulimia nervosa differ in their psychophysiological responses to erotic material (using thermal imaging), and in the manner in which they attend to or process sexual information (using eye tracking and MRI). This research may not only help to understand and ultimately improve the sexual functioning of these distinct groups, but may also shed additional light on the complicated mechanics and interrelations of sexual desire and arousal.

In sum, the quest to define and disentangle sexual desire and arousal is age-old, and it does not end here. It is our belief that the research laid out in this dissertation has however served to better define the challenges that arise in this conceptual pursuit, offers new perspectives on methods of tackling these obstacles, and simultaneously brings the field one step closer to a clearer understanding of nature of these constructs and their interconnections. It is our hope that armed with this knowledge, future researchers will be better equipped to take the next step of doing the necessary work with diverse populations, sophisticated tools and novel methodology, that will ultimately result in a deepened understanding of these fundamental, yet nebulous human sexual responses.
References


Are You Experiencing Low Sexual Desire?

Difficulty Attaining or Maintaining an Erection?

Our research team in the Department of Psychology at McGill University is seeking healthy, heterosexual men between the ages of 18-50, with low sexual desire and/or arousal, to participate in a study examining how ‘what you want’ and ‘what turns you on’ impacts how your body responds.

Participation involves a single testing session and takes place in our laboratory at McGill University. Participants will receive a comprehensive assessment of their sexual difficulties. Participants will also complete questionnaires/ interviews, and view neutral and sexually explicit film clips while having genital temperature measured remotely by a thermal imaging camera.

Participation involves NO health risks and your confidentiality and anonymity are assured. Following participation, participants will receive educational feedback, including treatment referrals and self-help resources (if desired). Financial compensation will also be provided.

For more information, please contact
Sabina Sarin at (514) 398-5323
or via email at mcgillsdastudy@gmail.com

This research is directed by Dr. Irv Binik, Department of Psychology,
McGill University, and Director of the Sex and Couple Therapy Service, Royal Victoria Hospital,
www.sexandcoupletherapy.com
Are You Experiencing Low Sexual Desire?

Difficulty Becoming Lubricated?

Our research team in the Department of Psychology at McGill University is seeking healthy, heterosexual women between the ages of 18-50, with low sexual desire and/or arousal, to participate in a study examining how ‘what you want’ and ‘what turns you on’ impacts how your body responds.

Participation involves a single testing session and takes place in our laboratory at McGill University. Participants will receive a comprehensive assessment of their sexual difficulties. Participants will also complete questionnaires/ interviews, and view neutral and sexually explicit film clips while having genital temperature measured remotely by a thermal imaging camera.

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This research is directed by Dr. Irv Binik, Department of Psychology, McGill University, and Director of the Sex and Couple Therapy Service, Royal Victoria Hospital, www.sexandcoupletherapy.com
TELEPHONE SCREENING INTERVIEW

Name (first only) ________________________________             Date of call: _____________

Interviewer: ________________________________________             Language (circle): English  French

Scheduled for: ________________________________ at ___ : ___ am / pm

(Items with a * indicate exclusion criteria)

“Hi. This is [name] calling from McGill University about the Sexual Arousal and Desire study. Is now a good time to speak?” [If not, ask when a better time would be to reach them. Schedule it].

1. Are you calling about a specific research study? YES NO

   If YES, which one?
   
   ☐ Sexual arousal and desire
   ☐ Other *

   [IF YES]: I’d like to tell you a little bit about this study, and then will ask you some questions to assess whether you are eligible to participate at this time. This will take approximately 15-20 minutes. Is that ok?

   [IF YES:]

2. How did you hear about this study?

   ☐ Newspaper ad (which one: ________________________)
   ☐ Flier/ ad (where: ________________________________)
   ☐ Word of mouth
   ☐ Other (how: ________________________________)

(If NO, schedule a more appropriate time for the interview… )

We’re interested in testing the validity of current theories about sexual arousal and desire in heterosexual men and women. In particular, we are hoping to better understand how our experiences of desire impact our experience of arousal, and how this relationship is affected by things like our mood, emotional coping styles, sexual attitudes and other personal history variables. Participation will require completing this 15-20 minute phone interview about your medical and sexual health, as well as a short standardized questionnaire about your sexual experiences and any related sexual difficulties you might be experiencing. This questionnaire will be emailed to you after this phone interview in order to assess your eligibility, and will take approximately 5-10 minutes to complete. If you are eligible, your participation will involve one 3.5 hour visit to our laboratory at McGill University. During this testing session, you will complete:

1) Two brief interviews assessing your sexual experiences and history and other relevant demographic information, as well as a package of questionnaires inquiring about your sexual behavior, sexual attitudes, mood, emotional coping style, body satisfaction, and negative life experiences. For your convenience, you’ll have the option of completing these questionnaires ahead of time, as a way of cutting down on the amount of time you need to spend in the lab. So what will happen is these will be emailed to you, and you can email them back or return them at
your testing session. It is estimated that these questionnaires will take approximately 1 hour to complete.

2) During your testing session, aside from completing the interviews, you will also be required to watch 15 minutes of a neutral film and 15 minutes of a sexually explicit film showing consenting heterosexual adults engaging in a variety of sexual activities, including kissing, masturbation, mutual oral sex and penetration. There will be no talking or storyline in the video and the scenes are quite explicit. These film clips will be displayed on personal and private DVD goggles. So there is no TV in the room – you will have the privacy of being behind the goggles while you watch the videos.

3) As you watch the neutral and sexually explicit films, your genital arousal will be measured using a thermal imaging camera. The camera relies on infrared technology, and picks up heat that’s emitted from the body, but requires no actual physical contact with the participant. This device will be used to measure changes in genital temperature as an indicator of arousal. Participants typically report that they do not notice the camera once the testing session has begun. There will be no one else in the room with you during this procedure.

4) During and after you view the films, you will be asked to rate your feelings about what you have seen.

You will receive $75 for participating in the testing session, and should you withdraw from the study, compensation will be pro-rated to the time you have spent in the study, not including this initial screening portion. Any information you give us will of course remain strictly confidential. A female researcher will guide you through the study, and you are free to stop at any point.

Do you have any questions about this study so far? (Screener addresses questions.)

3. Are you interested in continuing with this interview to assess your eligibility to participate in this study?  
   YES  NO*

(IF YES, continue. IF NO, thank caller for their time.)

4. To assess whether you are eligible to participate in this study, I will need to ask you some questions about your general medical, gynecological/urological and sexual history. If any question makes you feel uncomfortable, just let me know and we can stop the interview.

5. How old are you? ________________ (Must be between the ages of 18-50)

6. What is your first language?  ENGLISH  FRENCH  OTHER*

   (Must be able to complete questionnaires in English or French.)

THE NEXT THREE QUESTIONS ARE FOR WOMEN ONLY. FOR MEN, CONTINUE WITH QUESTION #10

7. (Females only) Are you currently pregnant or breastfeeding?  YES*  NO

8. (Females only) How often do you get your menstrual period? ________________

   ➢ 8a) Have you noticed any irregularities with your menstrual cycle?  YES*  NO

   ➢ 8b) If YES: explain and when did you notice a change in your cycles?
9. (Females only) Have you had a gynecological exam in the past year, by a GP or gynecologist?  
   ➢ IF YES, was everything okay?  
   ➢ IF NO, specify problem______________________________  
   ➢ IF NO exam, have you ever had a gynecological exam?  
   ➢ IF NO, why not?______________________________  

(Must not be due to avoidance of chronic genital pain)  

9b) (MEN AND WOMEN) Have you ever been diagnosed with an STI/STD, serious genital infection, (vaginal atrophy) or pelvic inflammatory disease?  
   ➢ Specify diagnosis, treatment, date of onset and current status: ________________________________  

(exclude those still struggling with STI symptoms)  

10. Are you currently taking any medications, including vitamins or natural supplements, on a regular basis?  
   ➢ IF YES, which one(s), what dosage and for how long? (clarify purpose/effects, if unknown)  

(exclude those taking medications with known sexual side effects, such as antidepressants, antihypertensives, beta blockers, antipsychotics, H2-receptor antagonists)  

11. Have you ever had any major surgeries or injuries (e.g., to your pelvic area) that may have affected your sexual functioning?  
   ➢ IF YES, specify:______________________________  

12. Are you currently receiving any hormone therapy or treatment?  
   ➢ IF YES, which one(s)?______________________________  

(do NOT exclude those on oral contraceptives)  

13. Do you have any chronic medical conditions?  
   ➢ IF YES, which one(s)?______________________________  

(exclude those with medical conditions known to affect sexual functioning, such as diabetes, thyroid disorder, stroke, cardiovascular or neurological disease)  

14. Have you ever been diagnosed with a psychological or psychiatric condition?  
   ➢ If YES, what was your diagnosis? ________________________________  
   ➢ Did you receive treatment? Type:______________________________  
   ➢ If YES, are you still receiving treatment for this problem?  

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Are you still struggling with these difficulties? YES* NO

IF NO, when was the last time you had symptoms? ______________________________
(exclude those currently in treatment or with psychological difficulties within the past 6 months)

If NO, have you ever received treatment (e.g., counseling) for a psychological or emotional difficulty? YES NO

If YES, what type and what for? ____________________________________________

Are you still receiving treatment for this problem? YES* NO

Are you still struggling with these difficulties? YES* NO

IF NO, when was the last time you had symptoms? ______________________________

15. Are you currently engaging in sexual activity with one or multiple partners? YES NO

If NO: Have you ever engaged in sexual activity with a partner? YES NO*

When was the last time you engaged in sexual activity with a partner? ______________________________

When was the last time you engaged in sexual activity by yourself? ______________________________

16. Are you currently in a committed sexual relationship? YES NO

16b. [IF YES]: How long have you been with your partner ______________________________

17a. Have you ever watched sexually explicit material? (e.g., movie/ porn video) YES NO*

If YES, how often have you watched sexually explicit material? ______________________________

What types of sexually explicit material do you prefer? ______________________________
(e.g. Online videos? Magazines? Erotic clubs? Lesbian/group/hetero? Fetishes? Preferred activity?)

18. Do you feel uncomfortable about or object to the idea of watching a sexually explicit video or movie in a laboratory? YES* NO

19. As far as you know, do you have difficulty getting sexually aroused by sexually explicit movies or videos? YES NO

If YES, why? ____________________________________________

[I’d now like to ask you a few questions about some sexual difficulties that people commonly experience. But before I get into the specifics…]

20. Do you believe you are currently experiencing any sexual difficulties? YES NO

If YES, please describe your problem: ____________________________________________

(Are there any other difficulties you think you might be experiencing? When did this begin? Ask for triggers or causal factors at relevant point in the interview)

Circle the relevant categories:

a) low desire  b) low physical arousal  c) anorgasmia or delayed ejaculation
d) low mental arousal  e) sexual/ genital pain  f) premature ejaculation  g) sexual aversion

21. (MEN ONLY) Over the past 6 months, have you experienced difficulty attaining or maintaining an erection (circle if attaining/ maintaining) until completion of sexual activity with a partner?

YES  NO

➢ 21a) Has this occurred while masturbating?
YES  NO

➢ 21b) Are you still experiencing morning erections?
YES  NO*

➢ 21c) Has this caused you concern or interfered in your relationships?
YES  NO*

➢ 21d) When did this difficulty begin?

➢ 21e) How often has this difficulty occurred?

➢ If clarification is needed, Has this occurred at least 50% of the times that you’ve attempted to engage in sexual activity, either by yourself or with a partner?

YES  NO*

➢ 21f) Has this occurred with other partners or in multiple sexual situations?
YES  NO*

➢ 21g) How much of a change (reduction) have you experienced in the rigidity of your erections as compared to how they were before?

22. (MEN ONLY) Over the past 6 months, have you experienced difficulties with premature ejaculation, following minimal stimulation before, on, or shortly after penetration?

YES  NO

➢ 22a) If YES, specify if ejaculation occurs before, on or during penetration:

➢ 22b) How long has it typically been taking you to ejaculate?

➢ 22c) If < 2 mins, has this caused you concern or interfered in your relationships?
YES  NO*

➢ 22d) When did this begin?

➢ 22e) How often has this difficulty occurred?

➢ If clarification is needed, has this occurred at least 50% of the times that you’ve attempted to engage in sexual activity, either by yourself or with a partner?

YES*  NO

➢ 22f) In what situations has this difficulty occurred?

23. (WOMEN ONLY) Over the past 6 months, have you experienced difficulty attaining or maintaining an adequate lubrication or blood flow response until completion of sexual activity with a partner? (e.g., includes getting wet, genital throbbing, pulsing or other sensations of genital arousal)

YES  NO  DON’T KNOW

➢ 23a) What about while masturbating?
YES  NO  DON’T KNOW

➢ 23b) If YES, has this caused you concern or interfered in your relationship?
YES  NO*

➢ 23c) When did this difficulty begin?
23d) How often has this difficulty occurred?  ____________________________________________

If clarification is needed, Has this occurred at least 50% of the times that you’ve attempted to engage in sexual activity, either by yourself or with a partner?  YES  NO*

23e) Has this difficulty occurred with other partners or in multiple sexual situations?  YES  NO*

23f) How much of a change (reduction) have you experienced in your lubrication levels as compared to how it was before?  ____________________________________________

All: This next set of questions pertains to your levels of sexual interest over the past 6 months.

24a) Over the past 6 months, how often have you experienced positive or pleasurable sexual thoughts or fantasies (per week/month etc.)?  ____________________________________________

24b) Over the past 6 months, would you say that you’ve experienced little or no interest in sexual activity?  YES  NO

24c) (If YES to 24b) Has this caused you concern or interfered in your relationship?  YES  NO*

24d) When did this pattern begin?  ____________________________________________

24e) Have you noticed this lack of interest with other partners/ in other sexual situations?  YES NO*

(What makes you think you have low desire? What's changed? In what areas do you notice a decrease in desire?)

Specify situations of disinterest (e.g., masturbating, initiating or seeking out sexual situations, attraction towards potential partners, when not stressed/fatigued).  ____________________________________________

24f) How much of a change (reduction) have you experienced in your level of sexual interest (as compared to how it was before) (%)?  ____________________________________________

25. Over the past 6 months, what percentage of the time have you experienced sexual interest in response to being in a sexual situation, such as when a partner initiates sexual activity or you see erotic material?  ____________________________________________

25a) Has your level of response caused you concern or interfered in your relationship?  YES  NO

25b) When did this pattern begin?  ____________________________________________

25c) Have you noticed this lack of responsiveness with other partners or in other sexual situations?  YES  NO

(Where do you notice this lack of responsiveness? Is this across the board or is it specific to certain situations?) (e.g., does it happen in response to sexually stimulating material or other sexual opportunities, and when the sexual stimulation is good or equivalent to what’s been arousing in the past) Specify:  ____________________________________________
25d) How much of a change (reduction) have you experienced in your level of sexual responsiveness (as compared to how it was before) (%)?

26. Over the past 6 months, have you experienced difficulty attaining or maintaining feelings of mental excitement (i.e., being “turned on”) until completion of sexual activity with a partner?

   26a) What about while masturbating?

   26b) Has this caused you concern or interfered in your relationship? YES NO DON’T KNOW

   26c) When did this difficulty begin?

   26d) How often has this occurred?

   If clarification is needed, Has this occurred at least 50% of the times that you’ve attempted to engage in sexual activity, either by yourself or with a partner? YES NO

   26e) Has this difficulty occurred with other partners or in other sexual situations? (i.e., when the stimulation is adequate) YES NO

   Specify: ____________________________________________

   26f) How much of a change (reduction) have you experienced in your level of mental excitement/pleasure (as compared to how it was before) %?

27. Over the past 6 months, have you experienced difficulty reaching orgasm during sexual activity with a partner?

   27a) What about while masturbating?

   27b) If YES, have you ever been able to reach orgasm? YES NO

   27c) Over the past 6 months, how often have you been unable to reach orgasm?

   If clarification is needed, has this occurred at least 50% of the times that you’ve attempted to engage in sexual activity, either by yourself or with a partner? YES NO

   27d) When did this difficulty begin?

   27e) Has this difficulty caused you concern or interfered in your relationship? YES NO

   27f) Has this difficulty occurred with other partners or in other sexual situations? (i.e., when the stimulation is adequate) YES NO

   Specify: ____________________________________________

28. Over the past 6 months, have you experienced difficulties with genital pain during intercourse or sexual activity?

   28a) When did this difficulty begin?

   28b) How often has this occurred?

   If clarification is needed, has this occurred at least 50% of the times that you’ve attempted to engage in sexual activity, either by yourself or with a partner? YES NO

   28c) Has the pain improved through the use of lubricants? YES NO

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28d) Where is the pain located? __________________________________________________________

28e) Has this difficulty caused you concern or interfered in your relationships?  YES  NO

28f) Has this difficulty occurred with other partners or in other sexual situations? YES  NO

(e.g., during tampon insertion, bike riding, friction, etc.) Specify pain triggers:_____________________

____________________________________________________________________________________

29. How would you describe your sexual orientation? (circle)
   a) heterosexual   b) homosexual*      c) bisexual*      d) asexual       e) undefined*

(The screener informs the participant that a self-report questionnaire will be emailed to them, which they are to complete and return by email as soon as possible. Pending appropriate scores, the participant is informed that they will be contacted to schedule a testing session.)

FOR WOMEN ONLY:

➢ We’re scheduling everyone in the same part of their menstrual cycle, between the end of your period and the 12th day of your cycle, with the first day being the first day of your period.

➢ When did your last period begin? ____________________________

➢ And your cycle is _____ days, so you should be getting your next period on _________?

➢ How long does your period typically last? _______ days

➢ Ok, so we’re looking at between __________________ and ___________________.

BOOKING SUBJECTS

➢ When are some good times for you to participate in this study?

M T W Th F S Su  Times:__________________________________

➢ You will receive the screening questionnaire by email later today. After receiving your completed questionnaire, I will contact you to let you know if you are eligible to participate. If you are eligible, we will schedule a time for you to come into the lab for your testing session.

➢ What are some good times for me to call you?

M T W Th F S Su  Times:__________________________________

• Phone # 1: __________________________ (Leave a message?  □ YES  □ NO)

• Phone # 2: __________________________ (Leave a message?  □ YES  □ NO)

• Email: ________________________________

➢ Would you be interested in being contacted by our lab for participation in future studies that come up that may be suitable for you? (If YES, get contact info for preferred method of contact).

□ YES  □ NO

• Phone #: ____________________________ (Leave a message?  □ YES  □ NO)

• Email: ________________________________
CONSENT FORM

Project title: Sexual Arousal: Is it in your mind or body?

Principal Investigators: Irv Binik, Ph.D.; Sabina Sarin, Ph.D. Candidate; Serge Carrier, M.D.

Introduction

This study is designed and conducted by a group in the McGill University Psychology Department, and the Department of Urology at the McGill University Health Center (Royal Victoria Hospital). The principal psychologist is Dr. Irv Binik, a Professor in the Department of Psychology at McGill (514-398-6094), and the Director of the Sex and Couple Therapy Service at the Royal Victoria Hospital. This research is funded by the Canadian Institute of Health Research under the grant, “Dyspareunia: Is it a women’s problem?”, and by the Pfizer Corporation and the Canadian Male Sexual Health Council under the grant, “Thermography as a measure of female sexual arousal.”

Purpose of the study

This study aims to investigate the relationship between mental experiences of sexual desire and arousal, and physical sexual arousal, in heterosexual men and women between the ages of 18 and 50.

Procedures

You have been determined to be eligible for participation in this study, as assessed by your previous responses during a brief phone interview (~15-20 mins) and your scores on a standardized diagnostic questionnaire examining your sexual experiences and related difficulties (~5-10 mins). In choosing to participate in this study, you also completed a study package consisting of 6 questionnaires assessing your sexual attitudes and beliefs, body satisfaction, and emotional experiences (~ 60-75 mins), which you have returned before or at the time of your testing session. Your additional participation in this study will involve attending a single laboratory session, which will last approximately 2.5 to 3 hours. This session will include the following components:

1) QUESTIONNAIRES/INTERVIEWS (~1.5-2 hrs)
   In order to better understand your subjective sexual experience, you will be asked to complete two brief interviews assessing your sexual experiences and history and other relevant demographic, as well as complete 6 short questionnaires assessing your mood, and negative life experiences. Some of these questionnaires inquire about information of a very personal and sensitive nature.

2) PRESENTATION OF NEUTRAL AND SEXUALLY EXPLICIT FILM CLIPS
   Using personal DVD goggles, you will view a nonsexual film clip (~15 mins) and excerpts of sexually explicit material depicting consenting adults engaging in various types of sexual activity (~15 mins). The researcher will not be in the testing room during the film, and the room door will be securely locked so that you may exit at any time, but no one else can enter. During the films, you will be asked to continuously report how aroused you feel by clicking on the buttons of a
computer mouse. After each film, you will complete a questionnaire inquiring about your mood, and your emotional and physical experience watching the film (~10 mins).

3) MEASUREMENT OF GENITAL TEMPERATURE (30 mins + 15 mins instruction)

Physical sexual arousal will be measured via a non-intrusive heat-sensing camera that will be focused on the genitalia while you watch the film clips. This camera measures temperature change in the genitalia as an indicator of blood flow. For women, the camera will be focused on the area of the outer lips/ labia, including an area of the inner thigh of the right leg. For men, the camera will be focused on the penis and will include an area of the inner thigh of the right leg. Women will be instructed to sit back in a reclining chair with knees bent and thighs apart, and men will be asked to sit upright with legs apart. A researcher will instruct you on how to sit during the 15 minute practice and temperature stabilization period. If you have any questions about this device or the procedure, please ask the researcher. If you feel discomfort or distress at any point, you may choose to end your participation.

Risks
The primary risks involved in this study are that you may potentially be uncomfortable answering questions of a personal nature and/ or having a thermographic imaging camera monitoring your genital temperature. Your participation is completely voluntary and you may stop at any time should you feel discomfort.

Benefits
There is no direct benefit to you by participating in this study. However, some individuals may find it helpful to answer questions about their thoughts, feelings, behaviours and experiences as a way of gaining greater insight into their own patterns and experiences. Moreover, the results of this study may contribute to a better understanding of the meaning and experience of sexual desire and arousal for many men and women. These findings may ultimately help us to improve the sexual lives of healthy and dissatisfied men and women through redefining norms about sexual experiences, and through improved assessments and treatments for those struggling with sexual problems.

Compensation
You will receive a total of $75 as reimbursement for expenses incurred by participating in this study (e.g., transport, parking, loss of work, babysitting etc.). Should you decide to withdraw from the study, compensation will be pro-rated to the time spent in the study.

Voluntary Participation/ Withdrawal
Participation is completely voluntary, and you may choose to pause or stop the study at any time without any need for explanation. You may refuse to answer any question that makes you uncomfortable or distressed. Your refusal to participate will not influence access to services or future relationships with McGill University. We encourage you to ask questions about the study at any point.

Contacts
If you have any questions or concerns about any aspect of this study, please feel free to relay these concerns to Sabina Sarin, Ph.D. Candidate, at (514)-398-5323, or via email at sabina.sarin@mail.mcgill.ca. You may also contact the supervisor and principal psychologist, Dr. Irv Binik, at 514-398-6094 or via email at binik@ego.psych.mcgill.ca. If you experience distress, you may contact Sabina Sarin, and she will help you with a referral to a mental health professional, however, no treatment will be provided. Alternatively, in the event of distress, please contact your general practitioner for counseling and referrals. For questions regarding your rights as a research participant, please contact Ms. Ilde Lepore, Senior Ethics Administrator, Institutional Review Board, at (514) 398-8302, or via email at ilde.lepore@mcgill.ca.

Injury
There are no known risks of injury as a result of participation in these study procedures.

Confidentiality
Every effort will be made to protect the identity of our participants. To ensure confidentiality, identification numbers will be assigned to information to prevent the association of any individual with specific data. A record of identification numbers and accompanying names will be kept in a locked filing cabinet accessible only to the principal investigators. Signed consent forms will be kept in a separate secure location from all other participant information. If a participant chooses to stop participation, their information will immediately be shredded. All digital data will be kept on zip disks in a locked filing cabinet, accessible only by members of the research team. Data will be stored for a period of 5 years following study completion and data publication, after which time it will be destroyed.

While confidentiality will be maintained for all participants, the disclosure of information may be ethically or legally mandated in the following situations: risk of intended harm to the self or others, subpoenas/ court order demanding disclosure of file information, and reports of abuse or risk of abuse to a child, elderly person or otherwise vulnerable adult. In such circumstances, the research team may be obliged to report this information to the appropriate authorities or protective persons.

The Institutional Review Board may also access study data to ensure the sound management of this study.

Participant’s Signature
This study has been thoroughly explained to me and all of my questions have been addressed to my satisfaction. I agree to participate in this study and will keep one copy of this form. I do not waive my legal rights by signing this consent form.

Signature: ________________________________

Name (please print): ________________________________ Date: ___________

Investigator signature: ________________________________ Date: ___________

Person who obtained consent: ________________________________ Date: ___________
APPENDIX D

DEMOGRAPHIC INFORMATION QUESTIONNAIRE

Date:___________________
Interviewer:__________________
Group:__________________

1. Date of birth _____/_____/_____ Age: ________ Gender:_______________
   Height:_________________________ Weight:________________________

2. What is your primary language?
   a) English
   b) French
   c) Other (specify):_________________________________

3. Place of birth:____________________________________________________________________

4. With what culture do you most identify yourself (circle one)?
   a) Canadian
   b) Quebecoise
   c) Aboriginal
   d) American
   e) Western European
   f) Eastern European
   g) Asian/ Pacific Islander
   h) UK
   i) East Indian/ Pakistani
   j) West Indian
   k) African
   l) Middle Eastern
   m) Latin
   n) Caribbean
   o) Other:________________

5. With what religion do you most identify (circle one)?
   a) Catholic
   b) Muslim
   c) Jewish
   d) Protestant
   e) Buddhist
   f) Christian
   g) Hindu
   h) Agnostic/ Spiritual
   g) Atheist

   h) Other:________________

6. What is the highest level of education you have attained?
   a) Some high school or less
   b) High school graduate/GED
   c) Some college
   d) 2-year degree
   e) 4-year degree
   f) Advanced degree (Ph.D., M.S., J.D., etc.)

7. Are you currently employed? (circle one)
   a) Part-time
   b) Full-time
   c) Unemployed

8. What is your present occupation?________________________________________
9. I will now show you a list of income ranges. If you feel comfortable, please indicate the letter to the left which best approximates your annual household income.
   a) under $20,000
   b) $20,000 - $39,999
   c) $40,000 - $59,999
   d) $60,000 - $80,000
   e) over $80,000
   f) Does not wish to provide information

10. Are you currently studying?
    a) Part-time
    b) Full-time
    c) Not a student

11. Are you currently sexually active (circle one)?   YES   NO

12. At what age did you first become sexually active?

13. How many sexual partners have you had in your lifetime?

14. When did you last engage in sexual activity with a partner?
    ➢ Did you reach orgasm?   YES   NO

15. When did you last engage in sexual activity by yourself (i.e., masturbing)?
    ➢ Did you reach orgasm?   YES   NO

16. What is your current method(s) of contraception (please be specific, using brand names if possible)?

17. When was your last gynecological/urological exam?
    ➢ Was everything okay? (If no, specify)

➢ The next THREE questions are for WOMEN ONLY. For MEN, skip to question #20.

18. (If currently on an oral contraceptive/implant): How long have you been using this particular method of contraception?

19. (If currently on a contraceptive pill/implant): Have you noticed any differences in your sexual functioning since you started taking your contraceptive device?
    a) No
    b) Yes, (please specify):
    c) Not sure

20. Are you currently having regular periods?
    ➢ If NO, have you ever had a regular period?
    ➢ If YES, how long ago did your periods stop being regular?
21. What was the start day of your last menstrual period? ______________________________
➢ So today would be the _____________ day of your cycle?

➢ All participants

22. What is your current relationship status?
   a) Single
   b) Dating multiple partners
   c) Dating one partner regularly
   d) In a serious relationship
   e) Common law/ Cohabitating
   f) Married
   g) Divorced/ Separated

23. (IF SINGLE) How long has it been since you’ve been in a (sexual) relationship?_________

➢ The next TEN questions are for those in relationships only. If SINGLE, skip to #34.

24. How long have you been with your current partner?__________________________

25. Overall, how satisfied are you in your current relationship?
   0) Completely satisfied
   1) Very satisfied
   2) Moderately satisfied
   3) About equally satisfied and dissatisfied
   4) Moderately dissatisfied
   5) Very dissatisfied
   6) Completely dissatisfied

26. Overall, how satisfied are you with your sexual relationship with your partner?
   0) Completely satisfied
   1) Very satisfied
   2) Moderately satisfied
   3) About equally satisfied and dissatisfied
   4) Moderately dissatisfied
   5) Very dissatisfied
   6) Completely dissatisfied
   7) No sexual activity

27. Overall, how satisfied are you with your level of emotional closeness with your partner?
   0) Completely satisfied
   1) Very satisfied
   2) Moderately satisfied
   3) About equally satisfied and dissatisfied
   4) Moderately dissatisfied
   5) Very dissatisfied
   6) Completely dissatisfied
28. Overall, how satisfied are you with your level of emotional closeness during sexual activity with your partner?
   0) Completely satisfied
   1) Very satisfied
   2) Moderately satisfied
   3) About equally satisfied and dissatisfied
   4) Moderately dissatisfied
   5) Very dissatisfied
   6) Completely dissatisfied
   7) No sexual activity

29. Overall, how satisfied are you with your level of communication with your partner?
   0) Completely satisfied
   1) Very satisfied
   2) Moderately satisfied
   3) About equally satisfied and dissatisfied
   4) Moderately dissatisfied
   5) Very dissatisfied
   6) Completely dissatisfied

30. Overall, how satisfied are you with your level of communication during sexual activity with your partner?
   0) Completely satisfied
   1) Very satisfied
   2) Moderately satisfied
   3) About equally satisfied and dissatisfied
   4) Moderately dissatisfied
   5) Very dissatisfied
   6) Completely dissatisfied
   7) No sexual activity

31. What would you say are the major areas of concerns in your current relationship? (e.g., sexual, intimacy, emotional stability, financial, communication, security, political/social status etc.)

32. Is your partner currently struggling with any medical health problems or psychiatric conditions? Yes No
   ➢ If YES, please specify_____________________________________________________
   ➢ If YES, are they receiving treatment for this condition? YES NO
   ➢ If YES, please specify_____________________________________________________

33. Is your partner currently experiencing any sexual difficulties? YES NO
   ➢ If YES, please specify_____________________________________________________

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- **All participants**

34. Do you currently have any medical health conditions?  
   ➢ **YES**  ➢ **NO**
   ➢ **IF YES**, which one(s)? __________________________________________

35. Are you currently taking any medications on a regular basis, including vitamins or natural supplements?  
   ➢ **YES**  ➢ **NO**
   ➢ **IF YES**, which one(s)? (clarify purpose, if unknown) __________________

36. Have you ever had any major surgeries or injuries to your pelvic area, or that may have affected your sexual functioning?  
   ➢ **YES**  ➢ **NO**
   ➢ **IF YES**, which one(s)? ______________________________________

37. Do you have any children?  
   ➢ **YES**  ➢ **NO**
   ➢ **IF YES**, how many children do you have?________

38. Do you have any children currently living with you (incl. part-time)?  
   ➢ **YES**  ➢ **NO**
   ➢ **IF YES**, how many children live with you?________
   ➢ **If 2+**, how old is the youngest child living with you?________

39. What is your current level of alcohol intake (# of drinks per week)?____________
   ➢ **When was the last time you had a drink?_________________________**
   ➢ **How many did you have?________**

40. Do you smoke? (circle one)  
   ➢ **Yes**  ➢ **No**  ➢ **Occasionally**
   ➢ **IF YES or Occasionally** how much do you smoke per week? ______________
   ➢ **How many cigarettes have you had today?_________________________**

41. What is your current level of caffeine intake?________________________
   ➢ **How much caffeine have you had today?_________________________**

42. Do you use any recreational drugs? (circle one)  
   ➢ **Yes**  ➢ **No**  ➢ **Occasionally**
   ➢ **IF YES or Occasionally**, which ones do you use, how often and in what quantities?

43. Have you exercised or engaged in physical activity in the last 24 hours and if so, what did you do? __________________________________________
44. Have you ever received treatment for a psychological or psychiatric difficulty?

- **YES**
- **NO**

➢ **If YES**, what was the treatment for?___________________________

➢ Were you given a psychiatric diagnosis?___________________________

➢ **If YES**, when were you diagnosed?___________________________

➢ Are you still receiving treatment for this problem? **YES**

➢ Are you still struggling with these difficulties? **YES**

➢ **IF NO**, when was the last time you had symptoms?______________
SEXUAL AROUSAL AND DESIRE INTERVIEW (SADI)

[All of the following questions pertain to your sexual experiences over the past 6 months. To help you anchor this, today’s date is ______________, so 6 months ago would be ______________. So for these questions, please think about your experiences since ______________. Also, I will be asking you several questions, many of which may sound similar, but they are from slightly different angles. Please do not hesitate to ask me for clarification if you are unclear on what the question means. Also, you will be using scales to answer these questions, and I will tell you which scale to use by indicating its letter, which you will find noted at the top of each one. Feel free to take a minute now to go through each scale and familiarize yourself with what’s on it.]

[This first set of questions pertains to your levels of sexual interest or initiation of sexual activity.]

OVER THE PAST 6 MONTHS:

1. Over the past 6 months, would you say that you’ve experienced little or no interest in sexual activity?  
   YES  NO

   1a) **How much** sexual desire (or interest) have you experienced? (Scale A)
       0) None/Not at all
       1) Barely Any
       2) A little
       3) Some
       4) Moderate amounts
       5) A lot
       6) The most ever/ Extreme amounts
       7) Not applicable/ I don’t know

   1b) **How often** have you experienced desire (or interest) for sexual activity? (Scale B)
       0) Almost never
       1) Every few months
       2) A few times per month (1-3)
       3) About once a week (1-2)
       4) Several times per week (3-6)
       5) Daily
       6) Several times a day
       7) Not applicable/ I don’t know

   1c) **How often** have you had pleasurable sexual fantasies or daydreams? (Scale B)
       0) Almost never
       1) Every few months
       2) A few times per month (1-3)
       3) About once a week (1-2)
       4) Several times per week (3-6)
       5) Daily
6) Several times a day
7) Not applicable/ I don’t know

1d) **How long** has this been your pattern of sexual interest?

1e) Have you experienced this pattern in previous relationships?  

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
</tr>
</thead>
</table>

1f) **How much** concern have you experienced about your level of sexual interest/desire? *(Scale A)*

   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know

   → If at least “a little” concerned, indicate primary reason for concern:

1g) **How much** difficulty has your level of sexual interest caused in your relationships? *(Scale A)*

   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know

2a) **How often** have you been willing to engage in sexual activity or to attempt to become sexually aroused in response to being in a sexual situation (e.g., when your partner has initiated sexual activity, when you’ve seen sexually stimulating material)? *(Scale C)*

   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know
2b) **How much** motivation have you had to engage in sexual activity or to attempt to become sexually aroused in response to being in a sexual situation (e.g., when your partner has initiated sexual activity, when you’ve seen sexually stimulating material)? *(Scale A)*

- 0) None/ Not at all
- 1) Barely any
- 2) A little
- 3) Some
- 4) Moderate amounts
- 5) A lot
- 6) The most ever/ Extreme amounts
- 7) Not applicable/ I don’t know

2c) **How long** has this been your pattern of sexual response?

______________________________________________________________________________

2d) Have you experienced this pattern in previous relationships?   YES   NO   N/A

______________________________________________________________________________

2e) **How much** concern have you personally experienced about your level of motivation to behave sexually in response to sexual situations (e.g., when your partner has initiated sexual activity, when you’ve seen sexually stimulating material)? *(Scale A)*

- 0) None/ Not at all
- 1) Barely any
- 2) A little
- 3) Some
- 4) Moderate amounts
- 5) A lot
- 6) The most ever/ Extreme amounts
- 7) Not applicable/ I don’t know

→ If at least “a little” concerned, indicate primary reason for concern:

______________________________________________________________________________

______________________________________________________________________________

2f) Of the times that your partner has initiated sexual activity, **how often** have you accepted their approaches? *(Scale C)*

- 0) Almost never
- 1) About 25% of the time
- 2) Less than half of the time
- 3) About 50% of the time
- 4) More than half the time
- 5) About 75% of the time
- 6) Almost always
- 7) Not applicable/ I don’t know

→ If approaches are accepted at least 25% of the time, indicate primary reason for accepting:  

______________________________________________________________________________
2g) Of the times that your partner has initiated sexual activity, **how often** have you avoided or discouraged your partner’s sexual approaches? *(Scale C)*

0) Almost never  
1) About 25% of the time  
2) Less than half of the time  
3) About 50% of the time  
4) More than half the time  
5) About 75% of the time  
6) Almost always  
7) Not applicable/ I don’t know  

→ If approaches are avoided at least 25% of the time, indicate primary reason for avoidance: 

2h) **How much** difficulty has your level of willingness to behave sexually in response to sexual situations caused in your relationships? *(Scale A)*

0) None/ Not at all  
1) Barely any  
2) A little  
3) Some  
4) Moderate amounts  
5) A lot  
6) The most ever/ Extreme amounts  
7) Not applicable/ I don’t know  

3. **How often** have you felt sexually preoccupied (i.e., focused on sexual thoughts or attentive to sexual cues)? *(Scale B)*

0) Almost never  
1) Every few months  
2) A few times per month (1-3)  
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day  
7) Not applicable/ I don’t know

4a) **How often** have you wanted to engage in sexual activity with a partner? *(Scale B)*

0) Almost never  
1) Every few months  
2) A few times per month (1-3)  
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day  
7) Not applicable/ I don’t know
4b) **How often** have you wanted to engage in sexual activity by yourself (e.g., masturbation)? (Scale B)

0) Almost never  
1) Every few months  
2) A few times per month (1-3)  
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day  
7) Not applicable/ I don’t know

4c) **How often** have you had the opportunity for partnered sexual activity? (Scale B)

0) Almost never  
1) Every few months  
2) A few times per month (1-3)  
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day  
7) Not applicable/ I don’t know

5. **How often** have you wanted to feel sexually stimulated or “turned on”? (Scale B)

0) Almost never  
1) Every few months  
2) A few times per month (1-3)  
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day  
7) Not applicable/ I don’t know

6. **How often** have you wanted to behave sexually, or express yourself in a sexual way (e.g., flirt, dress provocatively)? (Scale B)

0) Almost never  
1) Every few months  
2) A few times per month (1-3)  
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day  
7) Not applicable/ I don’t know

7. **How often** have you felt a need for sexual activity? (Scale B)

0) Almost never  
1) Every few months  
2) A few times per month (1-3)
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day  
7) Not applicable/ I don’t know

8a) **How often** have you engaged in sexual activity by yourself (i.e., masturbated)? *(Scale B)*  
0) Almost never  
1) Every few months  
2) A few times per month (1-3)  
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day  
7) Not applicable/ I don’t know

8b) **How often** have you engaged in sexual activity with a partner? *(Scale B)*  
0) Almost never  
1) Every few months  
2) A few times per month (1-3)  
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day  
7) Not applicable/ I don’t know

9a) **How often** did you initiate sexual activity with a partner, regardless of whether it resulted in sexual activity? *(Scale B)*  
0) Almost never  
1) Every few months  
2) A few times per month (1-3)  
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day  
7) Not applicable/ I don’t know

9b) **How often** did your partner initiate sexual activity, regardless of whether it resulted in sexual activity? *(Scale B)*  
0) Almost never  
1) Every few months  
2) A few times per month (1-3)  
3) About once a week (1-2)  
4) Several times per week (3-6)  
5) Daily  
6) Several times a day
7) Not applicable/ I don’t know

10. **How often** have you sought out sexually stimulating material (e.g., pornographic or erotic literature, movies, magazines or online videos)? *(Scale B)*
   0) Almost never  
   1) Every few months  
   2) A few times per month (1-3)  
   3) About once a week (1-2)  
   4) Several times per week (3-6)  
   5) Daily  
   6) Several times a day  
   7) Not applicable/ I don’t know

11. **How often** have you wanted to experience sexual pleasure? *(Scale B)*
   0) Almost never  
   1) Every few months  
   2) A few times per month (1-3)  
   3) About once a week (1-2)  
   4) Several times per week (3-6)  
   5) Daily  
   6) Several times a day  
   7) Not applicable/ I don’t know

12. **How often** have you had pleasurable (arousing) thoughts about sexual situations or activity? *(Scale B)*
   0) Almost never  
   1) Every few months  
   2) A few times per month (1-3)  
   3) About once a week (1-2)  
   4) Several times per week (3-6)  
   5) Daily  
   6) Several times a day  
   7) Not applicable/ I don’t know

13. **How often** have you felt sexually attracted to another individual (who may or may not have been your partner)? *(Scale B)*
   0) Almost never  
   1) Every few months  
   2) A few times per month (1-3)  
   3) About once a week (1-2)  
   4) Several times per week (3-6)  
   5) Daily  
   6) Several times a day  
   7) Not applicable/ I don’t know
14a) Of the times that you’ve engaged in sexual activity with a partner, how often was it on your initiation? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

14b) Of the times that you’ve engaged in sexual activity with a partner, how often was it on their initiation? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

15. Of the times that you’ve engaged in sexual activity with a partner, how often was it because you wanted to experience physical affection or closeness (i.e., intimacy)? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

16a) Of the times that you’ve engaged in sexual activity on your own (e.g. masturbated), how often did you want to continue stimulating yourself once you started to become physically aroused? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know
16b) Of the times that you’ve engaged in sexual activity with a partner, how often did you want to continue being stimulated once you started to become physical aroused? (Scale C)

   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

17a) Of the times that you’ve wanted to engage in sexual activity with a partner, how much of the time was it because you felt sexy or desirable? (Scale C)

   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

17b) Of the times that you’ve wanted to engage in sexual activity by yourself, how much of the time was it because you felt sexy or desirable? (Scale C)

   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

18. How often have you been interested in sexually stimulating material (e.g., pornographic or erotic literature, movies, magazines or online videos)? (Scale C)

   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know
19. **How often** have you wanted to feel more sexual interest than you actually felt? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

20. **How much** need have you felt to be sexually desired or wanted? (Scale A)
   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know

21. **How much** pleasure have you gotten from your feelings of sexual interest, whether you acted on them or not? (Scale A)
   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know

22a) Of the times that you’ve engaged in sexual activity with a partner, **how often** was it because you wanted to feel mentally excited or “turned on”? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

22b) Of the times that you’ve engaged in sexual activity by yourself, **how often** was it because you wanted to feel mentally excited or “turned on”? (Scale C)
   0) Almost never
   1) About 25% of the time
2) Less than half of the time
3) About 50% of the time
4) More than half the time
5) About 75% of the time
6) Almost always
7) Not applicable/ I don’t know

23a) Of the times that you’ve engaged in sexual activity with a partner, **how often** was it because you wanted to experience physical or bodily pleasure? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

23b) Of the times that you’ve engaged in sexual activity by yourself, **how often** was it because you wanted to feel physical or bodily pleasure? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

24a) Of the times that you’ve wanted to engage in sexual activity with a partner, **what was the most common trigger for wanting to do so?** __________________________________________

24b) Of the times that you’ve wanted to engage in sexual activity by yourself, **what was the most common trigger for wanting to do so?** __________________________________________

24c) Of the times that you’ve actually engaged in sexual activity with a partner, **what was your most common reason for doing so?** __________________________________________

24d) Of the times that you’ve engaged in sexual activity by yourself, **what was your most common reason for doing so?** __________________________________________

**MEN ONLY (women continue to question 33):**
25. Over the past 6 months, have you experienced ANY difficulty attaining or maintaining an erection until completion of sexual activity by yourself or with a partner?  **YES**  **NO**
25a) **How** erect have you **usually** become during sexual activity or stimulation with a partner? (Scale D)
   0) Hardly or not at all erect (0-10%)
   1) Mildly erect (10-20%)
   2) Somewhat erect (20-40%)
   3) Moderately erect (40-60%)
   4) Quite erect (60-80%)
   5) Strongly erect (80-90%)
   6) Full or rigid erection (90-100%)
   7) Not applicable/ I don’t know

25b) **How** erect have you **usually** become during sexual activity or stimulation by yourself? (Scale D)
   0) Hardly or not at all erect (0-10%)
   1) Mildly erect (10-20%)
   2) Somewhat erect (20-40%)
   3) Moderately erect (40-60%)
   4) Quite erect (60-80%)
   5) Strongly erect (80-90%)
   6) Full or rigid erection (90-100%)
   7) Not applicable/ I don’t know

26a) **How often** have you experienced difficulty attaining and maintaining an erection until completion of sexual activity with a partner? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

26b) **How often** have you experienced difficulty attaining or maintaining an erection until completion of sexual activity by yourself? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

27a) **If 0-3 for Q #25a/b AND 3-6 for Q #26a/b**, when did this difficulty begin? ___________
   → Specify if difficulty is in “attaining” or “maintaining”: _______________________________
27b) Have you experienced this difficulty in previous relationships?  YES  NO  NA

27c) Do you typically experience this difficulty in casual relationships?  YES  NO  NA

27d) **How much** concern have you experienced about your erectile difficulties? *(Scale A)*

   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know

   → If at least “a little” concerned, indicate primary reason for concern:

27e) **How much** interference have your erectile difficulties caused in your relationships? *(Scale A)*

   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know

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28. Over the past 6 months, have you experienced difficulty attaining or maintaining feelings of mental excitement (i.e., being “turned on”) until completion of sexual activity by yourself or with a partner?  YES  NO

28a) **How much** mental or emotional excitement (i.e., feeling “turned on”) have you usually experienced during sexual activity or stimulation with a partner? *(Scale A)*

   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know
28b) **How much** mental or emotional excitement (i.e., feeling “turned on”) have you **usually** experienced during sexual activity or stimulation by yourself? *(Scale A)*

0) None/ Not at all  
1) Barely any  
2) A little  
3) Some  
4) Moderate amounts  
5) A lot  
6) The most ever/ Extreme amounts  
7) Not applicable/ I don’t know

29a) **How often** have you experienced difficulty attaining and maintaining mental excitement (i.e., feeling “turned on”) until completion of sexual activity with a partner? *(Scale C)*

0) Almost never  
1) About 25% of the time  
2) Less than half of the time  
3) About 50% of the time  
4) More than half the time  
5) About 75% of the time  
6) Almost always  
7) Not applicable/ I don’t know

29b) **How often** have you experienced difficulty attaining and maintaining mental excitement (i.e., feeling “turned on”) until completion of sexual activity by yourself? *(Scale C)*

0) Almost never  
1) About 25% of the time  
2) Less than half of the time  
3) About 50% of the time  
4) More than half the time  
5) About 75% of the time  
6) Almost always  
7) Not applicable/ I don’t know

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30a) *(if 0-3 for Q #28a/b AND 3-6 for Q #29a/b)*, when did this difficulty begin? ___________

→ Specify if difficulty is in “attaining” or “maintaining”: ________________________

30b) Have you experienced this difficulty in previous relationships? YES NO NA

30c) Do you typically experience this difficulty in casual relationships? YES NO NA

30d) **How much** concern have you experienced about your level of mental excitement? *(Scale A)*

0) None/ Not at all  
1) Barely any  
2) A little
3) Some
4) Moderate amounts
5) A lot
6) The most ever/ Extreme amounts
7) Not applicable/ I don’t know
→ If at least “a little” concerned, indicate primary reason for concern:

30e) **How much** difficulty has your level of mental excitement caused in your relationships?  
*(Scale A)*

- 0) None/ Not at all
- 1) Barely any
- 2) A little
- 3) Some
- 4) Moderate amounts
- 5) A lot
- 6) The most ever/ Extreme amounts
- 7) Not applicable/ I don’t know

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31. Over the past 6 months, have you experienced any difficulty with premature ejaculation following minimal stimulation before, on, or shortly after penetration?  
*YES*                  *NO*

31a) **How often** have you experienced difficulties with premature ejaculation (i.e., ejaculating following minimal stimulation) while attempting to engage in sexual activity with a partner?  
*(Scale C)*

- 0) Almost never
- 1) About 25% of the time
- 2) Less than half of the time
- 3) **About 50% of the time**
- 4) **More than half the time**
- 5) About 75% of the time
- 6) Almost always
- 7) Not applicable/ I don’t know

31b) **How often** have you experienced difficulties with premature ejaculation (i.e., ejaculating following minimal stimulation) while attempting to engage in sexual activity by yourself? *(Scale C)*

- 0) Almost never
- 1) About 25% of the time
- 2) Less than half of the time
- 3) **About 50% of the time**
- 4) **More than half the time**
- 5) About 75% of the time
- 6) Almost always
- 7) Not applicable/ I don’t know
32a) How long has it typically taken you to ejaculate? ________________________________

→ If <2 mins, when did this pattern begin? ________________________________

→ Specify if ejaculation occurs before, on or during penetration: __________________

---------

32b) Have you experienced this difficulty in previous relationships?   YES   NO   NA

---------------------------------------------

32c) Do you typically experience this difficulty in casual relationships?   YES   NO   NA

---------------------------------------------

32d) How much concern have you personally experienced about your difficulties with premature ejaculation? (Scale A)

0) None/ Not at all
1) Barely any
2) A little
3) Some
4) Moderate amounts
5) A lot
6) The most ever/ Extreme amounts
7) Not applicable/ I don’t know

→ If at least “a little” concerned, indicate primary reason for concern:

---------------------------------------------

32e) How much interference have your difficulties with premature ejaculation caused in your relationships? (Scale A)

0) None/ Not at all
1) Barely any
2) A little
3) Some
4) Moderate amounts
5) A lot
6) The most ever/ Extreme amounts
7) Not applicable/ I don’t know

---------------------------------------------

WOMEN ONLY (men continue to question 39):

33. Over the past 6 months, have you experienced any difficulty attaining or maintaining an adequate lubrication or blood flow response until completion of sexual activity by yourself or with a partner?   YES   NO

33a) How much lubrication or wetness did you usually experience during sexual activity or stimulation with a partner? (Scale A)

0) None/ Not at all
1) Barely any
2) A little
3) Some
4) Moderate amounts
5) A lot
6) The most ever/ Extreme amounts
7) Not applicable/ I don’t know

33b) **How much** lubrication or wetness did you usually experience during sexual activity or stimulation by **yourself**? *(Scale A)*
   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know

34a) **How often** have you experienced difficulty attaining and maintaining adequate levels of lubrication or blood flow until completion of sexual activity with a partner? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) **About 50% of the time**
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

34b) **How often** have you experienced difficulty attaining and maintaining adequate levels of lubrication or blood flow until completion of sexual activity by **yourself**? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) **About 50% of the time**
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

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35a) *(If 0-3 for Q #33a/b AND 3-6 for Q #34a/b)*, when did this difficulty begin? __________

⇒ Specify if difficulty is in “attaining” or “maintaining”: ________________________________

35b) Have you experienced this difficulty in previous relationships?   YES   NO   NA
35c) Do you typically experience this difficulty in casual relationships?  YES  NO  NA

35d) **How much** concern have you personally experienced about your levels of lubrication (i.e., physical arousal)? **(Scale A)**
   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know

→ If at least “a little” concerned, indicate primary reason for concern:

35e) **How much** difficulty has your level of lubrication (i.e., physical arousal) during sexual activity caused in your relationships? **(Scale A)**
   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know

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36. Over the past 6 months, have you experienced any difficulty attaining or maintaining feelings of mental excitement (i.e., feeling “turned on”) until completion of sexual activity by yourself or with a partner?  YES  NO

36a) **How much** mental or emotional excitement (i.e., feeling “turned on”) have you usually experienced during sexual activity or stimulation with a partner? **(Scale A)**
   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know
36b) **How much** mental or emotional excitement (i.e., feeling “turned on”) have you usually experienced during sexual activity or stimulation by yourself? *(Scale A)*

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37a) **How often** have you experienced difficulty attaining and maintaining mental excitement (i.e., feeling “turned on”) until completion of sexual activity with a partner? *(Scale C)*

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37b) Over the past 6 months, how often have you experienced difficulty attaining and maintaining mental excitement (i.e., feeling “turned on”) until completion of sexual activity by yourself? *(Scale C)*

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<td>Almost always</td>
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<td>7</td>
<td>Not applicable/ I don’t know</td>
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38a) *(If 0-3 for Q #36a/b AND 3-6 for Q #37a/b), when did this difficulty begin?* ___________

Specify if difficulty is in “attaining” or “maintaining”: _________________________________

38b) Have you experienced this difficulty in previous relationships?  YES  NO  NA

38c) Do you typically experience this difficulty in casual relationships?  YES  NO  NA

38d) **How much** concern have you experienced about your level of mental excitement during sexual activity? *(Scale A)*

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1) Barely any
2) A little
3) Some
4) Moderate amounts
5) A lot
6) The most ever/ Extreme amounts
7) Not applicable/ I don’t know

If at least “a little” concerned, indicate primary reason for concern:

38e) **How much** difficulty has your level of mental excitement caused in your relationships?
(Scale A)

0) None/ Not at all
1) Barely any
2) A little
3) Some
4) Moderate amounts
5) A lot
6) The most ever/ Extreme amounts
7) Not applicable/ I don’t know

**ALL PARTICIPANTS:**

39. **How often** have you felt sexually stimulated during sexual activity? (Scale C)

0) Almost never
1) About 25% of the time
2) Less than half of the time
3) About 50% of the time
4) More than half the time
5) About 75% of the time
6) Almost always
7) Not applicable/ I don’t know

40a) **How often** have you felt physical/bodily pleasure during sexual activity? (Scale C)

0) Almost never
1) About 25% of the time
2) Less than half of the time
3) About 50% of the time
4) More than half the time
5) About 75% of the time
6) Almost always
7) Not applicable/ I don’t know

40b) **How much** physical/bodily pleasure have you experienced during sexual activity? (Scale A)
0) None/ Not at all  
1) Barely any  
2) A little  
3) Some  
4) Moderate amounts  
5) A lot  
6) The most ever/ Extreme amounts  
7) Not applicable/ I don’t know  

41a) **How often** have you felt mental pleasure (or satisfaction) during sexual activity? *(Scale C)*  
0) Almost never  
1) About 25% of the time  
2) Less than half of the time  
3) About 50% of the time  
4) More than half the time  
5) About 75% of the time  
6) Almost always  
7) Not applicable/ I don’t know  

41b) **How much** mental pleasure (or satisfaction) have you experienced during sexual activity? *(Scale A)*  
0) None/ Not at all  
1) Barely any  
2) A little  
3) Some  
4) Moderate amounts  
5) A lot  
6) The most ever/ Extreme amounts  
7) Not applicable/ I don’t know  

42. **How often** have you felt mentally “swept-up” during sexual activity (e.g., focused on or attentive to sexual cues)? *(Scale C)*  
0) Almost never  
1) About 25% of the time  
2) Less than half of the time  
3) About 50% of the time  
4) More than half the time  
5) About 75% of the time  
6) Almost always  
7) Not applicable/ I don’t know  

43. **How often** have you felt passionate or energetic during sexual activity? *(Scale C)*  
0) Almost never  
1) About 25% of the time  
2) Less than half of the time  
3) About 50% of the time
44. **How often** have you felt blissful during sexual activity? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

45. **How often** have you felt sensations of genital arousal during sexual activity (e.g., throbbing, tingling, pulsing sensations)? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

46. **How often** have you felt your heart racing during sexual activity? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

47. **How often** have you had shortness of breath (e.g., panting) during sexual activity? (Scale C)
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know
48. **How often** have you experienced nipple erection/hardening during sexual activity? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

49. **How often** have you felt muscular tension during sexual activity? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

50. **How often** have you felt your senses heightened (e.g., skin sensitivity) during sexual activity? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

51. **How often** have you felt aware of your own sexuality (e.g., feeling sexy or sensual) during sexual activity? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

52. **How often** have you felt sexually uninhibited/unrestrained during sexual activity? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
53. **How often** have you felt warmth or heat sensations through your body during sexual activity? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

54. **How often** have you felt fluttering or “butterflies” during sexual activity? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

55. **How often** have you felt deep emotional sensations (e.g., intimacy, connectedness, love) during sexual activity? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

56. **How often** have you felt sexually powerful (e.g., in control) during sexual activity? *(Scale C)*
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
7) Not applicable/ I don’t know

57. **How often** have you felt sexually submissive (e.g., dominated) during sexual activity? *(Scale C)*
   
   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

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58. Over the past 6 months, have you experienced difficulty reaching orgasm during sexual activity by yourself or with a partner? *
   YES
   NO

58a) **How often** have you been able to reach orgasm during sexual activity with a partner? *(Scale C)*

   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

58b) **How often** have you ever been able to reach orgasm during sexual activity by yourself? *(Scale C)*

   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
   3) About 50% of the time
   4) More than half the time
   5) About 75% of the time
   6) Almost always
   7) Not applicable/ I don’t know

59a) **How often** have you experienced difficulty reaching orgasm during sexual activity with your partner? *(Scale C)*

   0) Almost never
   1) About 25% of the time
   2) Less than half of the time
3) About 50% of the time
4) More than half the time
5) About 75% of the time
6) Almost always
7) Not applicable/ I don’t know

59b) **How often** have you experienced difficulty reaching orgasm during sexual activity by yourself? \( \text{(Scale C)} \)

0) Almost never
1) About 25% of the time
2) Less than half of the time
3) About 50% of the time
4) More than half the time
5) About 75% of the time
6) Almost always
7) Not applicable/ I don’t know

------

60a) \( \text{If 0-3 for Q \#58a/b AND 3-6 for Q \#59a/b, when did this difficulty begin?} \) ___________

60b) Have you experienced this difficulty in previous relationships?  YES NO NA

60c) Do you typically experience this difficulty in casual relationships?  YES NO NA

60d) **How much** concern have you personally experienced about your ability to reach orgasm during sexual activity? \( \text{(Scale A)} \)

0) None/ Not at all
1) Barely any
2) A little
3) Some
4) Moderate amounts
5) A lot
6) The most ever/ Extreme amounts
7) Not applicable/ I don’t know

\[ \Rightarrow \text{If at least “a little” concerned, indicate primary reason for concern:} \]

60e) **How much** difficulty has your inability to reach orgasm during sexual activity caused in your relationships? \( \text{(Scale A)} \)

0) None/ Not at all
1) Barely any
2) A little
3) Some
4) Moderate amounts
5) A lot
6) The most ever/ Extreme amounts
7) Not applicable/ I don’t know

-------------

61. Over the past 6 months, have you experienced any difficulty with genital pain during intercourse or sexual activity?  

YES  

NO

(If YES:)

61a) How much genital pain have you experienced during sexual activity with a partner?  

(Scale A)

0) None/ Not at all  
1) Barely any  
2) A little  
3) Some  
4) Moderate amounts  
5) A lot  
6) The most ever/ Extreme amounts  
7) Not applicable/ I don’t know

61b) How much genital pain have you experienced during sexual activity by yourself?  

(Scale A)

0) None/ Not at all  
1) Barely any  
2) A little  
3) Some  
4) Moderate amounts  
5) A lot  
6) The most ever/ Extreme amounts  
7) Not applicable/ I don’t know

62a) How often have you experienced genital pain during sexual activity with a partner?  

(Scale C)

0) Almost never  
1) About 25% of the time  
2) Less than half of the time  
3) About 50% of the time  
4) More than half the time  
5) About 75% of the time  
6) Almost always  
7) Not applicable/ I don’t know

62b) How often have you experienced genital pain during sexual activity by yourself?  

(Scale C)

0) Almost never  
1) About 25% of the time  
2) Less than half of the time  
3) About 50% of the time  
4) More than half the time  
5) About 75% of the time
6) **Almost always**
   7) Not applicable/ I don’t know

63a) (If 3-6 for Q #61a/b AND Q #62a/b), when did this difficulty begin? _________________

   → Specify location and triggers of pain: ____________________________________________

63b) Have you experienced this difficulty in previous relationships?  **YES**  **NO**  **NA**

63c) Has the pain improved through the use of lubricants?  **YES**  **NO**  **NA**

63d) **How much** concern have you personally experienced about your level of genital pain during sexual activity? (**Scale A**)
   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know

63e) **How much** difficulty has your genital pain during sexual activity caused in your relationships? (**Scale A**)
   0) None/ Not at all
   1) Barely any
   2) A little
   3) Some
   4) Moderate amounts
   5) A lot
   6) The most ever/ Extreme amounts
   7) Not applicable/ I don’t know
APPENDIX F

Post-Erotic Film Questionnaire

Please circle the number that best describes your experience:

1. Overall, how relaxed did you feel during this film?

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<tbody>
<tr>
<td>not at all relaxed</td>
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<td></td>
<td>The most relaxed I’ve ever felt</td>
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</table>

2. Overall, how much did you enjoy the film?

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<tbody>
<tr>
<td>not at all</td>
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<td></td>
<td>The most enjoyable film I’ve ever seen</td>
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</table>

3. Overall, how anxious did you become during this film?

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<tr>
<td>not at all anxious</td>
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<td>The most anxious ever been</td>
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4. Overall, how funny did you find this film?

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<tr>
<td>not at all funny</td>
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<td></td>
<td>Funniest film I’ve ever seen</td>
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5. Overall, how distracted did you feel during this film?

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<tbody>
<tr>
<td>not at all distracted</td>
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<td></td>
<td></td>
<td>The most distracted I’ve ever been</td>
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</table>
6. Overall, how sexually aroused did you become during this film?

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</thead>
<tbody>
<tr>
<td>not at all sexually aroused</td>
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</table>

The most sexually aroused I’ve ever been

7. At what point during the film would you say that you were most sexually aroused?

- Was not at all sexually aroused
- Within the first 5 minutes
- Between 5-10 minutes (middle of film)
- During the last 5 minutes
- Varied throughout (up and down during the film)
- Other; explain

8. How would you rate your peak sexual arousal during the film?

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</thead>
<tbody>
<tr>
<td>not at all sexually aroused</td>
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The most sexually aroused I’ve ever been

Now you will be asked to consider your sexual experience specifically in terms of mental and physical parts:

9. Did watching the film make you want to engage in sexual activity with a partner?

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<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
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</table>

The most I’ve ever felt

10. Did watching the film make you want to engage in sexual activity by yourself (e.g., masturbate)?

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<tbody>
<tr>
<td>not at all</td>
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The most I’ve ever felt
11. Did watching the film make you want to be sexually stimulated?

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</thead>
<tbody>
<tr>
<td></td>
<td>not at all</td>
<td>The most I’ve ever felt</td>
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12. Did watching the film make you want to experience sexual pleasure?

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<tbody>
<tr>
<td></td>
<td>not at all</td>
<td>The most I’ve ever felt</td>
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13. Did watching the film make you want to behave in a sexual manner?

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<tbody>
<tr>
<td></td>
<td>not at all</td>
<td>The most I’ve ever done</td>
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14. Did watching the film make you imagine past or future sexual experiences?

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<tbody>
<tr>
<td></td>
<td>not at all</td>
<td>The most I’ve ever done</td>
<td></td>
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15a. How much lubrication (wetness) did you feel during the film?

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</thead>
<tbody>
<tr>
<td></td>
<td>No lubrication</td>
<td>The most I’ve ever felt</td>
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15b. (FOR MEN) How would you rate your erection in response to this film?

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<th>10</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>No erection</td>
<td>Hardest erection ever</td>
<td></td>
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16. How much sexual pleasure or satisfaction did you **physically** experience during the film?

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<th>7</th>
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</tr>
</thead>
<tbody>
<tr>
<td>No sexual pleasure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>The most I’ve ever felt</td>
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17. How much genital change did you feel during this film?

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<th>7</th>
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<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>No genital change</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>The most I’ve ever felt</td>
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</tbody>
</table>

18. How much genital tingling, throbbing or fullness (or similar sensations) did you feel during the film?

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<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>None at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The most I’ve ever felt</td>
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19. How much muscular tension/ contractions did you feel during the film?

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<tbody>
<tr>
<td>No muscle tension</td>
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<td></td>
<td></td>
<td>The most I’ve ever felt</td>
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</tbody>
</table>

20. How much mental pleasure or satisfaction did you experience during the film?

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</tr>
</thead>
<tbody>
<tr>
<td>No mental pleasure</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>The most I’ve ever felt</td>
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</tbody>
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21. How much were you aware of your own sexuality during the film (e.g., feeling sexy or sensual)?

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<tbody>
<tr>
<td>Not at all aware</td>
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<td></td>
<td></td>
<td>The most aware I’ve ever been</td>
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</table>
22. Overall, how mentally excited, “hot” or “turned on” did you feel during the film?

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</tr>
</thead>
<tbody>
<tr>
<td>Not at all mentally excited</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The most mentally excited I’ve ever been</td>
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</tbody>
</table>

23. Overall, how sexually excited were you **physically** during the film? (e.g., heart racing, sweating, shortness of breath, “butterflies”, skin sensitivity etc.)

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<tbody>
<tr>
<td>Not at all physically excited</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The most physically excited I’ve ever been</td>
</tr>
</tbody>
</table>

24. How sexually aroused did you feel during the film as compared to how sexually aroused you typically are with a partner?

<table>
<thead>
<tr>
<th>-5</th>
<th>-4</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much less sexually aroused</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No difference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much more sexually aroused</td>
</tr>
</tbody>
</table>

25. To what extent were you able to imagine yourself as a participant in the film?

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<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Completely</td>
</tr>
</tbody>
</table>

26. Did the process of having your genitals filmed or monitored affect you in any way?  
☐ Yes  ☐ No

27. To what extent did the camera or monitoring increase or decrease how relaxed you felt during the video?

<table>
<thead>
<tr>
<th>-5</th>
<th>-4</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much less relaxed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much more relaxed</td>
</tr>
</tbody>
</table>
28. To what extent did the camera or monitoring increase or decrease how sexually aroused you felt during the video?

<table>
<thead>
<tr>
<th>-5</th>
<th>-4</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much less aroused</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much more aroused</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

29. What did you find most arousing about the film? Please give specific examples.

______________________________________________________________________________
______________________________________________________________________________

30. What did you find least arousing about the film? Please give specific examples.

______________________________________________________________________________
______________________________________________________________________________

31. Is there anything else you would like to say about this film?

______________________________________________________________________________
______________________________________________________________________________