

Gender Differences in Liking and Wanting Sex: Examining the Role of Motivational Context
and Implicit versus Explicit Processing

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ABSTRACT

The present study investigated the specificity of sexual appraisal processes by making a distinction between implicit and explicit appraisals and between the affective (Liking) and motivational (Wanting) valence of sexual stimuli. These appraisals are assumed to diverge between men and women, depending on the context in which the sexual stimulus is encountered. Using an Implicit Association Test, explicit ratings, and film clips to prime a sexual, romantic or neutral motivational context, we investigated whether liking and wanting of sexual stimuli differed at the implicit and explicit level, differed between men and women, and were differentially sensitive to context manipulations. Results showed that, at the implicit level, women wanted more sex after being primed with romantic mood whereas men showed the least wanting of sex in the romantic condition. At the explicit level, men reported greater liking and wanting of sex than women, independently of context. We also found that women's (self-reported) sexual behavior was best predicted by the incentive salience of sexual stimuli whereas men's sexual behavior was more closely related to the hedonic qualities of sexual stimuli. Results were discussed in relation to an emotion-motivational account of sexual functioning.

KEY WORDS: Sexual appraisal; Information Processing; Gender Differences; Motivation; Liking-Wanting; Sexual Desire

INTRODUCTION

Since sex has been qualified as an emotion, sexual desire and arousal have been studied within the framework of emotion theory, which places great emphasis on the role of subjective meaning or appraisal of sexual stimuli (Everaerd, 1988; Everaerd, Both, & Laan, 2006; Laan & Janssen, 2007). According to this framework, emotional responses are largely determined by our evaluation of a situation, which is based on the affective meaning and motivational relevance of that situation (Frijda, 1993). That is, if one thinks of sex as a positive and rewarding event, one is more likely to experience sexual arousal in response to sexual stimuli. Knowing that men and women differ in their level of sexual desire, arousal, and behavior, appraisal processes may be a likely candidate for understanding the source of gender differences in sexuality. Appraisal is, however, not a unitary construct and consists of different processes that may have differential effects on sexual outcome variables. Hence, to fully understand gender differences in sexual responding, we must consider the specificity of appraisal processes by making a distinction between (1) implicit and explicit appraisals; (2) affective (liking) and motivational valence (wanting); and (3) by taking into account the context which may change the reward value of sexual stimuli that trigger sexual responding.

The Central Role of Sexual Appraisal

The idea that the subjective evaluation or appraisal of sexual stimuli plays a key role in the elicitation and unfolding of sexual (arousal) responses is at the core of information processing and incentive motivation models (Both, Everaerd, & Laan, 2007; Janssen, Everaerd, Spiering, & Janssen, 2000; Toates, 2009). According to these models, the sexual response starts with a relevant stimulus that is encoded in terms of valence and reward expectancies. Appraising the stimulus as sexually rewarding will automatically evoke genital arousal. When people become aware of being sexually aroused, they will cognitively elaborate on the sexual stimulus and maintain their attention to it. When this results in a

positive evaluation, a subjective sense of sexual desire and arousal is experienced, which further increases physical and subjective arousal. These ongoing sexual responses may then trigger the motivation to actually engage in sexual activities. Although several components of this model still need to be tested, it is commonly accepted that sexual responding depends on appraisal processes (e.g., Janssen et al., 2000).

Gender Differences in Sexual (Appraisal) Responses

According to incentive motivation theory, a sexual response results from an incentive energizing the sexual system (Both et al., 2007). Which stimuli acquire incentive value largely depends on past histories of reward, which may vary as a function of individual differences and, at a broader level, as a function of gender. Under the influence of hormones and socialization experiences, men and women are inclined to ascribe different meanings to sexual stimuli, which then generate different sexual responses (Petersen & Hyde, 2010). Research has shown that men desire more frequent sex, display more frequent sexual fantasies, want a higher number of sex partners, initiate sex more, like more various sexual practices, have more permissive attitudes towards sex, show less sexual inhibition, and so on (Baumeister, Catanese, & Vohs, 2001; Peplau, 2003). Hence, most evidence points towards the conclusion that men have a stronger sex drive than women. However, such gender differences are not uniform across all sexual variables. When it comes to enjoying sex, having sex for reasons other than sexual activity itself, or sexual behavior in broader terms than penile penetration (i.e., including kissing, cuddling, and touching), differences between men and women may disperse or even spin in the other direction (Baumeister et al., 2001; Peplau, 2003). In relation to this, it has been argued that the study of sex-related gender differences needs to consider the moderating impact of social and contextual influences instead of treating these differences as stable and immutable entities (Conley, Moors, Matsick, Ziegler, & Valentine, 2011).

Motivational Context

One such contextual influence that may moderate gender differences in sexual appraisal is the motivational context in which sexual stimuli are encountered (see Ferguson, & Bargh, 2004; Ferguson, Hassin, & Bargh, 2007). That is, sexual appraisal may vary depending on which motivation is triggered at a certain moment in time. These motivational triggers may be different for men and women (Carroll, Volk, & Hyde, 1985; Hill & Preston, 1996; Oliver & Hyde, 1993; Stephenson, Ahrold, & Meston, 2011). In men, sexual activity may be rewarding in itself whereas women often have sex to express intimacy or strengthen the emotional bond (Basson, 2000, 2001). This implies that women tend to place greater emphasis on relationships as a context for sexual feelings and behaviors than do men (Meana, 2010; Peplau, 2003), especially when focusing on subjective (i.e., self-reported) sexual arousal (Chivers & Timmers, 2012). Furthermore, women's sexual fantasies include more romantic themes, affection, and commitment whereas men's fantasies focus more on explicit sexual acts and physical gratification (Kimmel & Plante, 2002; Leitenberg & Henning, 1995; Zurbriggen & Yost, 2004). It has also been shown that women have a preference and better memory for romantic stimuli compared to men, who show enhanced processing of sexual stimuli. Based on this evidence, we suggest that the reward value of sexual stimuli depends on different factors in men and women. Whereas women's sexuality may be more easily triggered by romantic mood, men are probably more sensitive to the explicit sexual meaning of the stimuli. It is likely that these differences will be reflected in their sexual appraisals, which then govern later sexual responding. It is thus plausible to assume that, when presented with an adequate stimulus in a motivationally relevant context, women may be equally or even more interested in sex compared to men (Bancroft, 1989).

Liking-Wanting

When studying appraisal within the framework of incentive motivation, it is useful to make a distinction between the affective valence or hedonic qualities of a stimulus and the incentive value or willingness to approach that stimulus (Robinson & Berridge, 1993, 2001, 2003, 2008). Research has established that liking and wanting rewards can be dissociated, both psychologically and neurobiologically (Berridge & Kringelbach, 2008; Robinson & Berridge, 1993). In addiction research, dissociations between liking and wanting have clear heuristic and empirical value for understanding why some people crave certain stimuli or activities (i.e., drugs and alcohol) without enjoying or getting much satisfaction from them.

The difference between liking and wanting may also be relevant for the study of sexuality, especially for understanding gender differences in sexual activity (Meana, 2010; Toates, 2009). For example, women often display low desire for sexual activity and low sexual initiation, while reporting sexual enjoyment within a relationship (Baumeister et al., 2001). Given that sexual desire is driven by the motivational value of sexual stimuli rather than their hedonic quality, it is plausible to assume that gender differences will be more pronounced at the level of wanting rather than liking. Although these ideas have already been discussed in earlier work (Both et al., 2007; Meana, 2010; Toates, 2009), there is almost no empirical research that systematically investigates liking and wanting sex as a function of gender. There is, however, a recent study in which a scale was developed for measuring liking-wanting, allowing to differentiate between sexual liking and wanting within a relationship (Krishnamurti & Loewenstein, 2012). This study has provided first evidence that men and women differ in their level of sexual wanting, but not in levels of sexual liking.

Explicit-Implicit

Another important consideration is the fact that the cognitive evaluation of sexual stimuli depends on both automatic and controlled processes. It is important to study both types of appraisal in research on sexuality because they are assumed to generate different

responses and may thus have different effects on sexual outcome variables (Bush, 2001; Everaerd, Janssen, & Spiering, 2003). In relation to this, it has been argued that automatic appraisals lead to changes in genital arousal responses, which may or may not result in a subjective sense of arousal, depending on more controlled appraisal processes (Janssen et al., 2000). Hence, different levels of cognitive processing would differentially affect subjective and physiological components. It can thus be misleading to draw inferences about sexual outcomes based on a single level of responding. Given that self-report measures are limited to measuring processes that people can consciously introspect and articulate, it necessary to add implicit measures that can tap into the appraisal of sexual stimuli under conditions of automaticity (for a theoretical analysis of indirect measures, see De Houwer & Moors, 2010).

Furthermore, explicitly asking about one's appraisal of sexual stimuli may be confounded by self-presentation issues and response biases, inclining women to underreport their sexual behaviors (Alexander & Fisher, 2003). Hence, it is both theoretically and methodologically important to complement explicit reports with implicit measures. Recently, researchers have increasingly relied on reaction time methods for measuring the implicit features of sexual responding. When making a distinction between liking and wanting, it is even more warranted to use such implicit measures because people are likely to confuse pleasure and incentive salience, which could be problematic when relying only on self-report measures (Robinson & Berridge, 1993).

The Present Study

The present study resides on the assumption that appraisal is a central process in sexual responding and that research on gender differences in sexuality needs to specify appraisal processes by making a distinction between liking and wanting, implicit and explicit, and sexual versus romantic context. To measure implicit sexual appraisals, we used a variant of the Implicit Association Test (IAT) (Greenwald, McGhee, & Schwartz, 1998), which is

one of the most widely used measures of implicit evaluations and has proven to outperform other implicit measures in terms of reliability and effect size (e.g., De Houwer & De Bruycker, 2007). The IAT is a computer-based measurement technique that involves a dual classification task and assesses the strength of association between concepts in memory. The basic idea is that people will respond faster to concepts that are strongly associated in memory than concepts that are weakly associated. Note that variants of the IAT have already been used successfully in the context of sexuality (Geer & Robertson, 2005; Snowden & Gray, 2013; Snowden, Wichter, & Gray, 2008). In addition to the measurement of implicit appraisals, participants also completed explicit measures, reflecting their consciously reportable judgments of liking and wanting.

Because this was the first study using a personalized Single Category IAT (SC-IAT) (see Karpinski & Steinman, 2006) to assess implicit liking and wanting in the context of sexuality, we also wanted to establish its validity by examining the relative value of implicit and explicit liking-wanting scores in relation to self-reported sexual behavior. More concretely, we wanted to examine whether the different types of appraisal (i.e., implicit /explicit liking and implicit/explicit wanting) would differentially relate to sexual behavior responses (i.e., sexual activity with a partner and solitary sexual activity) in men and women. If we could demonstrate that the IAT measures are related to behavioral responses over and above explicit reports, this would demonstrate not only the validity of the IAT measures but also their added value in sex research.

To investigate whether implicit and explicit liking and wanting appraisals varied as a function of motivational context, we primed our participants with one of three film clips: an explicit sexual, a romantic, and a neutral one. These films functioned to induce a particular motivational state that may increase the salience of incentive sexual stimuli.

Hypotheses

Based on previously discussed gender differences, (1) we predicted that romantic mood would increase the salience of sexual incentives in women whereas explicit sexual scenarios would lower their motivation (i.e., wanting) for sex. Given that men are focused more on the physical aspects of sexuality, it is likely that men show the strongest wanting of sex when primed with an explicit sexual context. (2) We also predicted that context would have the strongest influence on the wanting component of sexual stimuli because motivational valence is more likely to depend on the attractiveness of possible rewards than general likeability. Given that liking reflects a more global evaluative response, it may well be that the affective valence of stimuli is more stable and thus less sensitive to contextual variables. (3) In addition, we predicted that context would have the strongest influence at the implicit level, because implicit wanting is mediated by subcortical neural systems that are focused more directly on the rewarding nature of sexual stimuli (which is determined by the context in which they are presented) without further elaboration of cognitive expectations (Robinson & Berridge, 2003). Furthermore, implicit processes have shown pronounced sensitivity to context manipulations (Lane, Banaji, Nosek, & Greenwald, 2007). (4) Finally, we expected to find manifest gender differences in liking and wanting at the explicit level, independently from context. Because women are socialized to inhibit expressions of sexual pleasure and desire, we assumed that men would explicitly report greater liking and wanting of sex than women.

METHOD

Participants

Ninety men ($M_{age} = 21.10$ years, $SD = 3.22$) and 78 women ($M_{age} = 20.79$ years, $SD = 2.68$) participated in this study in return for a monetary reward of 8 euros. Eight men and 18 women were psychology students from Maastricht University. The other participants were recruited from various campuses at Ghent University. Four men were deleted from analyses

because of high error rates on the implicit measure (more than 30%), reducing the total sample of men to 86. Due to a logistic error, we lost explicit liking and wanting scores for 10 women and 8 men. However, because the missing data were random and did not yield systematic differences, we included the total sample for the implicit analyses. Among the women, 66.3 % were in a relationship ($M = 25.33$ months, $SD = 23.7$). Of men, 60.7% were in a relationship ($M = 24.71$ months, $SD = 24.95$).

Measures

SCIAT

For the labels of the liking SCIAT, we used the Dutch words for *sex*, *I like* and *I don't like*. As stimulus material, we selected five positive (Dutch words for *gift*, *vacation*, *laugh*, *summer*, *entertain*) and five negative words (Dutch words for *pester*, *extort*, *loneliness*, *distress*, *war*) for the evaluative dimensions and five words that referred to sex for the object dimension (Dutch words for *fuck*, *make love*, *arousal*, *intercourse*, and *orgasm*). For the labels of the wanting SCIAT, we used the Dutch words for *sex*, *I want*, and *I don't want*. As stimulus material, we selected five verbs that refer to wanting (Dutch words for *desire*, *wish*, *approach*, *crave*, *long for*) and not wanting (Dutch words for *avoid*, *avert*, *ward off*, *stop*, *prevent*). For the sex category, we used the same stimuli as in the liking IAT to minimize differences in measure sensitivity. Word stimuli were presented in the center of a black screen using white lowercase letters in an Arial font with a font size of 32. The labels were presented in the upper left and right corner using white uppercase letters in a Courier font size of 40. The SCIAT was programmed and presented using the INQUISIT Milliseconds software package (INQUISIT 2.01, 2005) on a Pentium II computer with a 19-inch TFT-color monitor that had a refresh rate of 60 Hertz.

Prime

For the sex, romantic, and neutral prime induction, we selected a series of film clips. Within each condition, two film clips of the same valence were presented (one before the liking SCIAT and one before the wanting SCIAT). In the sex condition, participants watched two sexual scenes of about 7 minutes, showing a combination of oral sex (performed on the man) and penetration in a heterosexual couple. To ensure that the sex condition denoted an explicit sexual scene without emphasis on the relationship and expressions of affection, we selected two typical mainstream (i.e., man-made, male-centered) film clips. In the romantic condition, participants were presented with a 7-minute fragment of the famous Titanic boat-scene in which Leonardo DiCaprio and Kate Winslet have their first kiss on the deck. The other film-fragment was drawn from Indecent Proposal in which Demi Moore declares her love to her husband on the pier (end scene). For the neutral condition, we selected two fragments of a documentary on the history of Europe. Within each condition (i.e., sex, romantic and neutral), the two film clips were rated equally in terms of valence, arousal, and sexual arousal by five colleagues in a pilot study. Also note that the sexual and neutral film clips have already been used successfully in previous research on sexual arousal (Van Lankveld, Martin, Hubben, Creutz, & Verboon, 2013).

Questionnaires

For sexual experience and activity, participants (who were involved in a sexual relationship) reported on a 5 point-scale how many times they had had sexual activity with a partner during the past four weeks [ranging from no sex to very much (multiple times a day)] and when they last had sex [ranging from < 24h to > 1 month]. All participants (both with and without relationship) reported how many times they had masturbated during the past 4 weeks [ranging from no masturbation to very much (multiple times a day)], and how often they had watched pornography during the past 4 weeks [ranging from absolutely not to very much (multiple times a day)].

Procedure

Overview

After signing an informed consent form, participants were instructed to watch a film clip (a sexual, romantic or neutral film) that was followed by either the liking or wanting SCIAT. Thirty men watched the sex film, 29 watched the romantic film, and 27 watched the neutral film. This unequal distribution could be attributed to outlier analyses. Women were equally distributed across conditions, with 26 women in each prime condition. Before and after each film fragment, participants rated their level of subjective sexual arousal (i.e., feeling sexually aroused) and their level of genital arousal on a 7-point scale (ranging from *not at all aroused* to *very aroused* for the general measure and from *no feelings in my genitals* to *orgasm* for the genital measure). Then, participants completed the explicit liking-wanting measure which consisted of two statements (*I like sex* and *I want sex*) and participants had to indicate to which extent these applied to them by placing a mark on a 10 cm line. Next, a second film clip (of the same content as the first one) was shown, which was followed by the liking or wanting SCIAT (depending on which SCIAT was presented first). The two SCIATs were administered in a counterbalanced order to control for task order effects (i.e., half of the participants completed the liking SCIAT before the wanting SCIAT and vice versa). Also film clip 1 and 2 were counterbalanced within each prime condition. An overview of the procedure is shown in Fig. 1. Finally, participants completed the questions on sexual behavior.

SCIAT

In the present study, a few adaptations were made to the traditional format of the IAT that requires participants to categorize two target and two attribute concepts (e.g. “Positive” and “Negative” with “Black” and “White”). We did this because the traditional IAT may be more closely related to the concept of likeability than incentive value (Phelps et al., 2000),

and we were interested in measuring both the liking and wanting component of sexual appraisal. Furthermore, because the IAT may be contaminated by extra-personal associations reflecting cultural instead of personal representations, we adopted a personalized version of the IAT, which we created by changing the *positive* and *negative* labels of the traditional IAT into *I like* and *I don't like* and *I want* and *I don't want*, in combination with omitting the error feedback (see Olson & Fazio, 2004). Importantly, we created similar measures for examining liking and wanting to assure that data did not simply reflect a difference in measure sensitivity. Another adaptation to the traditional format was the omission of the contrast category of the target concept. The traditional IAT requires two complementary categories for the attitude object (e.g., “Black” and “White”) and responses to the contrast category may influence the IAT score, creating ambiguity in the interpretation of this score. Therefore, we eliminated the second contrast category such that we could measure evaluative associations with a single category object, namely sex (for more information on the validity of the single category IAT, see Bluemke & Friese, 2008; Karpinski & Steinman, 2006).

The SCIAT consisted of three stages in which participants were instructed to categorize words as quickly as possible into different categories by pressing a left (Q) or right (M) key on an AZERTY keyboard. The items were presented equally often in a random order. To minimize error variance, the order of the blocks within each IAT was kept constant for all participants (see Hofmann, Gawronski, Gschwender, Le, & Schmitt, 2005). In the first stage, which consisted of 15 trials, participants discriminated target items by pressing a right key for *I like (want)*-words and a left key for *I don't like (want)*-words. This functioned as a training block to help participants become familiar with the procedure. Next, *I like (want)* words and *sex* words were categorized on the right key whereas *I don't like (wants)* words were categorized on the left key. In the final stage, *I like (want)* words were categorized on the right key and *I don't like (want)* and *sex* words were categorized on the left key. The 30

trials in each combined condition were preceded by 15 training trials. The SCIAT-effect was computed by subtracting the mean latencies of the initial combined tasks from the mean latencies of the reversed combined tasks, so that a positive SCIAT score indicated a stronger association between *I like (want)* and *sex* than *I don't like (want)* and *sex*.

Each stage was preceded by a short instruction of the subsequent task, reminding the participants of the dimensions of the categorization task and the exact key-assignment. A stimulus remained on the screen until a response was registered. In each block, the labels of categories assigned to the left key were printed in the top left corner of the screen whereas the labels of the categories assigned to the right key were presented in the top right corner of the screen. Labels were presented continuously throughout each block. Once a response was given, the next stimulus appeared after an interval of 400 ms. In accordance with Olson and Fazio (2004), we personalized the IAT by omitting the error feedback for the liking words.

RESULTS

Arousal Ratings in Response to Film Clips

Table 1 shows the mean self-reported ratings of subjective and genital arousal as a function of participant's sex, prime, and order. A 2 (Gender) X 3 (Prime: sex, romantic, neutral) X 4 (Order: Film 1 [before and after] and Film 2 [before and after]) repeated measures ANOVA revealed a significant three-way interaction for the sexual arousal, $F(2, 158) = 8.22, p < .01$, and genital arousal ratings, $F(2, 158) = 8.64, p < .01$.

To interpret these interaction effects, we conducted a series of simple effects analyses, evaluated by gender, prime, and order (Film 1 and Film 2). Regarding the latter, we focused specifically on the arousal ratings in response to (and not before) the film clips because no significant group differences (i.e., gender and prime condition) were found at baseline. When analyzed by gender, the analyses on men yielded a significant effect of prime on sexual and genital arousal in response to Film 1 and 2, $22.52 < F < 28.59, p < .01$. Post-

hoc analyses revealed that men reported stronger sexual and genital arousal in the sex condition compared to the neutral, $.5.60 < t < 7.15$, all $ps < .01$, and romantic condition, $3.71 < t < 4.82$, all $ps < .01$. When comparing the neutral and romantic condition, men reported stronger sexual arousal in the romantic condition, $-2.95 < t < -1.95$, $p \leq .05$. The analyses on women yielded a significant effect of prime on the sexual and genital arousal ratings in response to Film 2, $F(2, 75) = 4.95$, $p < .05$ and $F(2, 75) = 7.18$, $p < .01$, respectively.¹ Surprisingly, post-hoc analyses revealed that women reported less sexual and genital arousal in the sex and romantic condition compared to the neutral condition, $-2.71 < t < 3.05$, all $ps < .01$. The romantic-sex contrast was not significant, $p > .10$. When analyzed by prime condition, a significant gender difference was found in the sex condition and in the neutral condition, $-3.96 < t < 5.62$, all $ps < .05$. In the sex condition, men reported stronger sexual and genital arousal than women whereas, in the neutral condition, men reported less arousal than women. No significant gender difference was found in the romantic prime condition.

Implicit and Explicit Liking and Wanting as a Function of Gender and Context

The SCIAT scores were computed using the D-score algorithm for IAT data (Greenwald, Nosek, & Banaji, 2003). The D600 measure includes RTs on (mixed) training blocks and an error penalty and, for each participant, latencies were corrected for individual variability. Participants with error rates higher than 30% were treated as invalid and excluded from analyses. An ANOVA did not reveal any main or interaction effect of SCIAT order, $F_s < 1$, and, therefore, data were collapsed across this variable.

Table 2 shows the means of the implicit and explicit liking-wanting scores as a function of gender and prime context. A 2 X 2 X 3 ANOVA with Gender (male, female) and Prime condition (sex, romantic, neutral) as between-subjects variables, and SCIAT type (liking, wanting) as a within-subjects variable yielded a significant main effect of SCIAT type, $F(1, 158) = 17.31$, $p < .01$, indicating that participants showed greater implicit wanting

of sex than liking. We also found a significant interaction effect between Gender and Prime, $F(2, 158) = 3.60, p < .05$, which will be decomposed below. None of the other main and interaction effects were significant, all $F_s < 1.9$. Next, we analyzed the subjective ratings in a 2 (liking, wanting) X 2 (gender) X 3 (prime) ANOVA, revealing a significant main effect of type of subjective rating, $F(1, 140) = 95.24, p < .01$. Table 2 shows that participants displayed greater explicit liking of sex than wanting. The main effect of gender was also significant, $F(1, 140) = 30.02, p < .01$, indicating that men reported greater liking and wanting of sex than women. None of the other effects were significant, all $F_s < 2.06$.

Because we had a priori hypotheses and to interpret the significant interaction effect between gender and prime on the implicit scores, we conducted a series of simple effects analyses. First, we analyzed the results as a function of prime context. In the sex condition, no significant gender differences were found in implicit liking and wanting scores, $t < 1.00$. The subjective ratings of liking and wanting, on the other hand, did differ between men and women, with men reporting greater liking, $t(49) = 3.06, p < .01$, and wanting, $t(49) = 4.28, p < .01$, of sex than women. In the romantic condition, a significant gender difference was found for the implicit wanting scores, with women reporting greater wanting of sex than men, $t(53) = 3.73, p < .01$. Implicit liking showed no significant gender difference, $t < 1$. When measured at the explicit level, men reported greater liking of sex than women, $t(50) = 2.78, p < .01$, but no significant gender difference was found for the subjective ratings of wanting, $t < 1.56$. In the neutral condition, only the explicit liking score showed a significant gender difference, $t(50) = 2.76, p < .01$, with men reporting greater liking of sex than women. None of the other gender differences were significant, $t < 1.32$.

When analyzed by gender, the analyses on men yielded a significant effect of prime on the wanting SCIAT, $F(2, 83) = 3.00, p < .05$, but not on the liking SCIAT, $F < 1$. Post-hoc analyses revealed that men implicitly wanted less sex in the romantic prime condition

compared to the neutral prime condition, $t(53) = 2.67, p < .01$. The sex-romantic and romantic-neutral contrasts were not significantly different, $t < 1.47$. Similar to men, the analyses on women yielded a significant effect of prime on the wanting SCIAT, $F(2, 75) = 3.20, p < .05$, but not on the liking SCIAT, $F < 1.8$. Post-hoc analyses revealed that women implicitly wanted more sex in the romantic prime condition compared to the sex prime condition, $t(53) = 2.47, p < .05$. The romantic-neutral and sex-neutral contrasts were not significant, $t < 1.68$. Finally, the analyses on the subjective ratings revealed no effect of prime context, for both men, $F_s < 1.26$, and women, all $F_s < 1.45$.^{2,3}

Analyses on Explicit and Implicit Scores and Sexual Outcome Variables

To analyze the relation between implicit and explicit liking-wanting scores, we calculated correlations between both scores. Because we wanted to explore whether the pattern of correlations would be different for men and women, we conducted separate analyses for men and women. For both men and women, implicit liking was significantly correlated with explicit wanting, $r = .29, p < .05$ for men and $r = .41, p < .01$ for women. The other correlations were not significant, $ps > .10$.

We also calculated the correlation between the implicit and explicit liking-wanting scores and the subjectively reported sexual and genital arousal ratings in response to the sexual, romantic, and neutral movie clips. To simplify the analyses, we averaged the sexual and genital arousal scores in response to Film 1 and 2. In men, level of genital arousal in response to the film clips was significantly related to the SCIAT wanting score, $r = .21, p = .05$, indicating that the more men reacted with (self-reported) genital arousal to the film, the higher their implicit wanting score. In women, both the sexual and genital arousal ratings were related to the liking SCIAT, $r = .24, p < .05$ for sexual arousal, and $r = .26, p < .05$ for genital arousal. It was found that the more sexual and genital arousal women reported in

response to the film clips, the higher their implicit liking scores. The correlations between the subjective arousal ratings and the explicit liking-wanting scores were not significant.

To examine the predictive validity of both the implicit and explicit liking-wanting scores in relation to self-reported behavioral indices, we conducted a series of regression analyses, entering the explicit liking-wanting scores, the liking-wanting SCIATs, and the interaction between explicit and implicit scores as predictor variables. The regression weights are shown in Table 3. Because the sexual outcome variables were measured independently from prime condition, we did not include prime condition as a predictor in the regression analyses. Also, because we wanted to know whether the sexual behavior of men and women was related to different patterns of liking and wanting, we conducted separate analyses for men and women.

Table 3 shows that, in men, frequency of sex during the past 4 weeks was best predicted by the SCIAT liking score and the interaction between implicit and explicit liking. Simple slope analyses revealed that the combination of high implicit and high explicit liking scores was related to having more frequent sex, $\beta = .53, p < .01$. The low explicit slope was not significant. Pornographic use was also predicted by the interaction between implicit and explicit liking. Specifically, high implicit liking scores in combination with low explicit liking scores predicted more frequent pornographic use, $\beta = .55, p < .05$. No significant relationship was found between the other sexual behavioral indices and the explicit or implicit liking-wanting scores.

In women, the implicit wanting SCIAT predicted both the frequency of sex and the last time they had sex. In both cases, higher implicit wanting was related to more frequent and more recent sex. Frequency of masturbation and pornographic use were related only to explicit wanting scores, showing that the more women masturbated, and watched

pornography, the more they reported to want sex. None of the other relationships were significant.

DISCUSSION

The present study aimed to investigate gender differences in implicit versus explicit appraisals of sexual stimuli as a function of motivational context. Our results showed that, at the implicit level, women want more sex after being primed with a romantic context whereas men showed the least wanting of sex in the romantic condition. At the explicit level, men reported greater liking and wanting of sex than women, independent of context. We also found that women's (self-reported) sexual behavior was best predicted by the motivational valence of sexual stimuli whereas men's sexual behavior was more closely related to the affective valence of sexual stimuli.

A first important finding is that men and women differed in their level of implicit wanting, but not in their level of implicit liking (see also Krishnamurti & Loewenstein, 2012). This corresponds with research showing that men and women are able to experience as much pleasure from having sex, but differ in their desire to engage in sexual activity (Baumeister et al., 2001). Importantly, these gender differences in implicit wanting varied as a function of context primes. When primed with a romantic context, women showed greater wanting of sex, even more than men who wanted significantly less sex in the romantic condition. This suggests that the reward value of sexual stimuli depends on which incentive is activated at the time and this incentive differs between men and women. It also suggests that women appraise sexual stimuli as even more desirable as men do when these are embedded in a rewarding context. Given the centrality of relationship themes in women's sexuality, they are especially responsive to contexts that entail emotional intimacy (Basson, 2000, 2001; Meana, 2010). This is important to consider because women are generally characterized as having less sexual desire than men (Baumeister et al., 2001; Peplau, 2003). However, our

results suggest that gender differences in sexual desire reflect differences in the type of incentives that trigger sexual responding rather than absolute differences in the appraisal of sexual stimuli.

In relation to this, we must acknowledge that men reported less wanting in response to romantic contexts, but did not show higher levels of wanting after being primed with an explicit sexual film, which we did expect to find. Also, women showed less wanting in the sex condition compared to the romantic condition, but men did not show higher wanting in the sex condition compared to the neutral or romantic condition. Furthermore, men and women did not differ significantly in their level of wanting in response to explicit sexual scenarios. The lack of gender difference in the sexual prime condition does not fit with previous research showing that men respond more strongly to explicit sexual stimuli than women (Geer & Manguno-Mire, 1996) and that no significant gender differences occur in response to romantic primes (Spiering, Everaerd, & Laan, 2004). On the other hand, there is also research showing that sexual primes do not elicit different effects on sexual responding in men and women as measured with an implicit procedure (i.e., a lexical decision task) (Gillath, Mikulincer, Birnbaum, & Shaver, 2008), which is in line with the present results. Also note that the self-reported sexual and genital arousal ratings in response to the sexual and romantic film clips did show the predicted pattern of results. Men reported the highest level of arousal in the sex prime condition whereas women reported less arousal than men in response to the explicit sexual movie. Unexpectedly, women also reported less arousal in the romantic prime condition compared to the neutral condition. Because there are no theoretical reasons to expect such finding, it is difficult to explain why women did not experience higher levels of sexual arousal while watching the sexual and romantic film clips. Note, however, that, for both genders, the arousal ratings were generally low.

At the explicit level, we found that men reported stronger liking and wanting of sex than women, which fits with other self-report research showing that men score higher on a number of sexual outcome variables (Baumeister et al., 2001). Although men and women are assumed to differ in their level of sexual motivation but not in their affective evaluation of sex, we did find that men valued sex more than women. Assuming that liking reflects a more global evaluative dimension, this gender difference may partly reflect socialization experiences. For men, it is socially more accepted to like sexual stimuli whereas women may feel too embarrassed and self-conscious to admit that they like sex a lot (Alexander & Fisher, 2003). Note that men and women did not differ in their liking of sex at the implicit level, which may suggest that implicit measures are less sensitive to self-presentation issues and societal views. Interestingly, gender differences in explicit reports of liking and wanting did not vary as a function of context. This may indicate that explicit appraisals involve more stable evaluative processes that are less dependent on momentary motivational states.

When comparing results on the liking and wanting component of sexual appraisal, several discrepancies can be observed. First, priming with different incentives had an effect only on implicit wanting of sex, but not on the level of liking. Second, combining implicit and explicit appraisals, gender differences were more pronounced at the level of wanting than at the level of liking. Third, liking and wanting scores each predicted a different pattern of (self-reported) sexual behavior as a function of gender. Overall, sexual behavior in women was best predicted by the motivational valence of sexual stimuli whereas men's sexual behavior was more closely related to the affective valence of sex. Given that sexual activity with a partner is predicted by women's level of implicit wanting and the latter depends on motivational context, it may well be that women are more motivated to seek for sexual stimulation when focusing on the romantic aspects of sexuality. In men, sexual behavior did not depend on the incentive salience of sexual stimuli, but was predicted by their level of

enjoyment of sexual activity. The latter is more stable across contexts, which may explain the common finding that men report consistently higher levels of sexual desire and arousal.

When comparing results at the implicit and explicit level, a different pattern was found across levels of responding, which indicates the relevance of distinguishing between automatic and more controlled processes when studying gender differences in sexual appraisal. First, men and women explicitly reported to like sex more than wanting it whereas the opposite pattern was found at the implicit level. Secondly, implicit wanting scores depended on motivational context whereas explicit appraisals did not vary across priming conditions. Third, self-reported arousal responses to the sexual and romantic film clips did not translate into parallel implicit wanting scores. That is, men reported higher arousal while watching the sexual film, but did not show stronger appetitive motivation towards sexual stimuli in the sex condition. Women, on the other hand, reported lower arousal in response to the romantic and sexual scenarios, but showed the highest implicit wanting of sex in the romantic condition. In a related vein, we found a disconnect in women's implicit wanting of sex in response to romantic mood and their explicit appraisals of sex, with the latter being lower than in men and not varying as a function of romantic context. Finally, implicit and explicit scores were uniquely and differently related to behavioral responses. The fact that implicit measures of liking and wanting were able to predict behavioral responses above and beyond what can be predicted on the basis of self-report measures supports the validity and added value of the SCIAT in research on sexuality.

The aforementioned divergences across components of sexual appraisal may help explain some of the mixed results with respect to sex drive differences between genders. Whereas some studies showed no significant gender differences in the arousability and processing of sexual information, other studies have found that men and women differ in their self-reported sexual arousal, implicit attitudes towards sex, and brain activation patterns

while viewing sexual stimuli (Geer & Robertson, 2005; Hamann, Herman, Nolan, & Wallen, 2004; Janssen, Carpenter, & Graham, 2003). In those studies, men generally showed greater arousability to sex than women. Other mixed evidence stems from research showing that gender differences merely exist in explicit sexual memory but not in implicit processing of sexual information (Spiering, Everaerd, Karsdorp, & Both, 2006) whereas other research revealed that men and women appraise sexual stimuli differently at the implicit level (Geer & Robertson, 2005). The present study cannot draw definitive conclusions in this regard, but does argue against the tendency to make overly general conclusions. Gender differences in sexual appraisal seem to depend on whether we measure the hedonic or motivational component of sex, implicit or explicit responding, and the context in which sexual stimuli are presented. It also depends on which outcome variable is focused on. Some sexual responses are more contingent on automatic processes (e.g., genital arousal) and other responses involve more conscious elaborative processes (e.g., subjective sexual arousal). Some are more likely driven by the affective significance of sexual stimuli whereas other responses are more closely related to the motivational value of sex.

This is the first study that systematically differentiated sexual appraisal into its component features, taking into account motivational context which may change the reward value of sexual stimuli. Because of its exploratory nature, we cannot regard the current data as conclusive, but we do believe that the present study makes a timely point concerning the role of different appraisal components, which paves the way for further investigation. There were, however, several limitations that need to be addressed in future research. First, we did not include direct measures of sexual desire or sexual functioning, which prevented us from testing whether gender differences across components of sexual appraisal relate to gender differences in sexual desire or whether (discrepancies between) different components of appraisal can predict variation in sexual (dys)functioning. Furthermore, because our

participants did not report on their momentary and past sexual desire, we cannot draw any conclusions on the role of sex drive differences based on the current data, neither can we control for the moderating influence of possible gender differences in (general) sexual desire.

Secondly, the use of a student sample may limit the generalizability of our findings because young people may hold more permissive appraisals of sexual stimuli. Furthermore, students that consent to participate in sex research may be more open to sex or sexually more arousable, which may influence the overall pattern of results, especially in women who are generally discouraged to express sexual interest. It would be interesting to replicate the current design in a community sample that shows more variation in age, sexual functioning, and relationship experiences (e.g., dating versus steady relationships). Thirdly, we demonstrated the validity of the explicit and implicit liking and wanting measures by means of its correlation with self-reported behavior. However, given that implicit and explicit processes tap into related, though independent, constructs (Hofmann et al., 2005), we may need to include additional criteria to evaluate the validity of the present study design.

According to information processing models of sexual response, genital arousal is mediated by automatic appraisals whereas subjective arousal depends on controlled processing (Janssen et al., 2000). It is thus worthwhile to include measures of genital arousal in response to the film clips and to test whether implicit appraisals outperform the prediction of genital arousal and whether explicit appraisals are uniquely related to subjective arousal responses.

A fourth possible shortcoming is that we did not include mood measures in response to the film clips and therefore we could not test whether the observed effects were mediated by gender differences in positive or negative mood. Fifth, in both men and women, implicit sexual appraisals in response to the neutral film did not significantly differ from responses to the sexual film, which may limit the interpretation of our findings. The fact that implicit appraisal scores were fairly high in the neutral condition could partially be explained by

reactivity to the experimental context. Given that participants were informed about the sexual content of the study at the start of the experiment, this may have induced anticipatory responses, even in the neutral condition. As a final remark, we have to be cautious not to overgeneralize the motivational dependence of appraisal processes in women. No significant differences were found in women's implicit wanting in response to the romantic versus neutral film, neither did women show significantly less wanting than men in the sex prime condition. This suggests that women's sexual desire is more diverse and thus not solely relationally determined. In relation to this, the present data clearly indicated that gender differences in sexuality need to be nuanced and studied in light of motivational context, level of responding, and the specific appraisal component at which they are directed.

On a more general note, we want to emphasize that making a distinction between liking-wanting and implicit-explicit is not only relevant for explaining gender differences in sexuality, it may also increase our understanding of sexual problems. That is, the dysfunctional nature of sexual responding may be confined to one level of appraisal or discrepancies between levels of appraisal. Furthermore, motivational context may increase or decrease the salience of sexual stimuli and we know that sexual motives differ between people with and without sexual problems (Cooper, Shapiro, & Powers, 1998; Impett, Peplau, & Gable, 2005). It is thus plausible to conclude that decomposing sexual appraisal into its component features will be of key relevance for understanding a range of sexual phenomena.

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FOOTNOTES

¹Note that the movie clips were counterbalanced across participants and order of presentation did not yield a significant effect on the subjective rating scores, $p > .10$.

²To control for the effect of sexual excitement scores in response to the movie clips, we included level of self-reported sexual and genital arousal as a covariate in our analyses, testing main effects as well as interaction effects between gender and self-reported arousal. This did not affect the pattern of results, neither for men or women, which indicates that the effect of prime condition on the liking-wanting scores did not depend on the extent to which participants were more or less aroused by the movie clips.

³To explore whether being in a relationship affected the pattern of results, we conducted a 2 (type of SCIAT) X 2 (gender) X 2 (relationship) X 3 (prime) Repeated Measures ANOVA. The three-way interaction between type of IAT, prime, and relationship yielded significance, $F(1, 163) = 3.59, p < .05$. Simple effects analyses revealed a significant effect of relationship in the romantic prime condition, indicating that participants in a relationship showed greater implicit liking of sex after watching a romantic film compared to those without relationship, $t(1, 50) = 2.53, p < .05$. None of the other effects were significant, all p 's $> .10$. The fact that priming with a romantic context has a stronger effect on the sexual outcome of participants that were in a relationship confirms the importance of considering context variables when studying sexual appraisal processes. Remarkably, no gender effects were found.

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FIGURE CAPTION

Figure 1. Overview of the experimental procedure for the sex condition. The same procedure applies to the romantic and neutral condition.

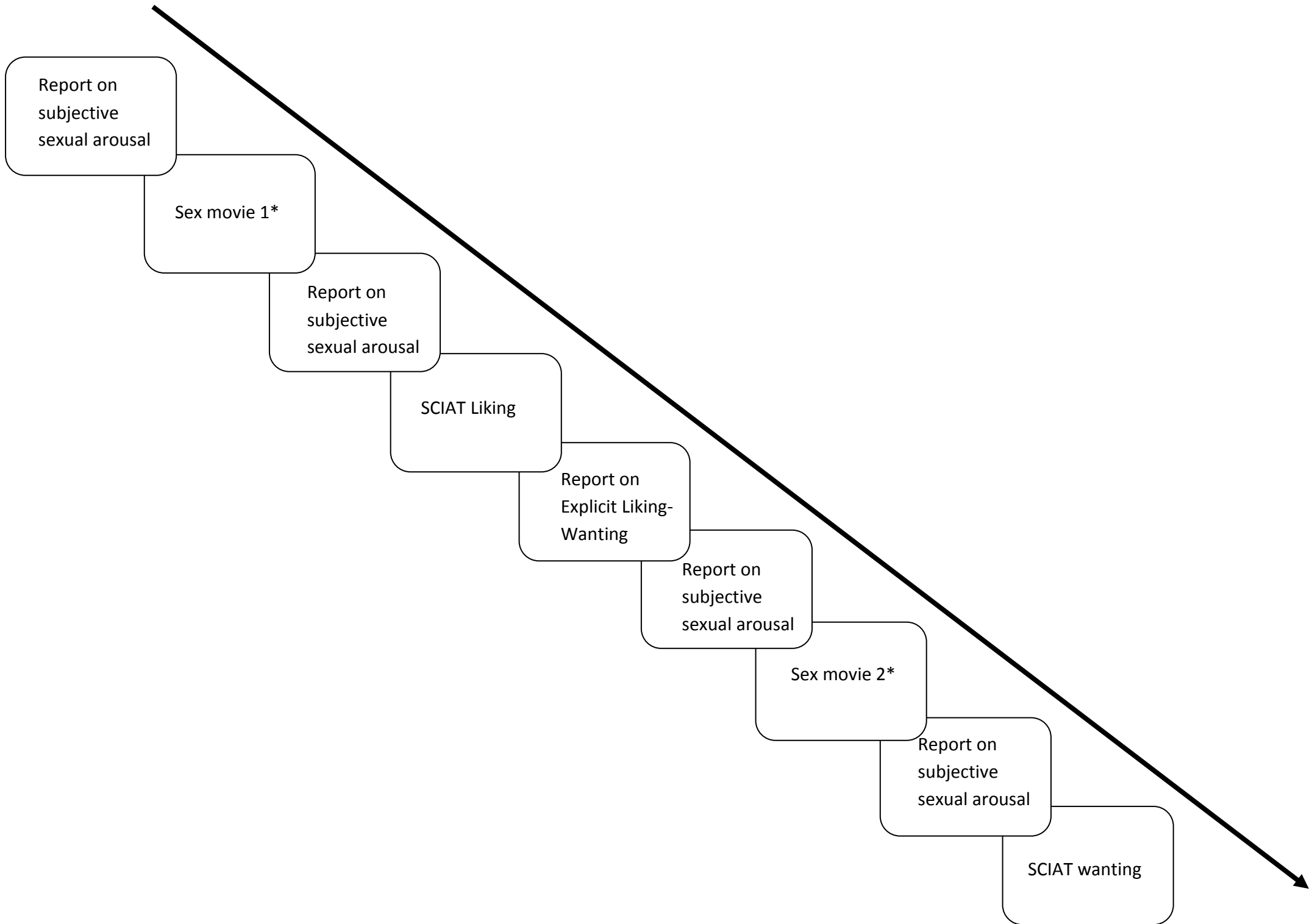


Table 1. Means and Standard Deviations of the Subjective Ratings of Sexual and Genital Arousal as a function of Gender and Prime

	Men			Women		
	Sex	Romantic	Neutral	Sex	Romantic	Neutral
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Sexual arousal 1	1.77 (.90)	1.93 (.78)	1.48 (.69)	1.65 (.63)	1.54 (.71)	1.69 (1.01)
Sexual arousal 2	3.23 (1.28)	2.15 (.86)	1.52 (.74)	1.73 (.72)	2.35 (1.06)	2.12 (1.11)
Sexual arousal 3	1.93 (1.08)	2.00 (1.07)	1.41 (.57)	2.04 (1.00)	1.58 (.58)	1.58 (.76)
Sexual arousal 4	3.40 (1.28)	1.93 (1.00)	1.48 (.69)	1.73 (.87)	1.88 (.86)	2.62 (1.42)
Genital arousal 1	1.10 (.31)	1.37 (.56)	1.10 (.31)	1.23 (.43)	1.31 (.84)	1.19 (.40)
Genital arousal 2	2.83 (1.51)	1.44 (.58)	1.21 (.41)	1.38 (.57)	1.65 (1.23)	1.81 (.85)
Genital arousal 3	1.60 (.86)	1.33 (.62)	1.07 (.26)	1.77 (.91)	1.12 (.33)	1.15 (.37)
Genital arousal 4	2.90 (.35)	1.37 (.69)	1.14 (.35)	1.43 (.76)	1.35 (.69)	2.35 (1.52)

1= before film 1; 2 = after film 1; 3 = before film 2; 4 = after film 2

Table 2. Means (in ms) and Standard Deviations of the Implicit and Explicit Liking and Wanting Scores as a function of Context and Gender

	Men			Women		
	Sex	Romantic	Neutral	Sex	Romantic	Neutral
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Implicit liking						
I like sex	733.43 (174.58)	944.35 (329.08)	769.41 (188.07)	685.54 (167.49)	627.17 (122.27)	648.45 (110.65)
I don't like sex	854.69 (263.25)	1112.87 (374.62)	933.42 (279.67)	762.90 (211.51)	730.92 (190.69)	767.64 (138.18)
Implicit wanting						
I want sex	891.75 (285.53)	1135.00 (404.72)	847.26 (275.36)	768.37 (215.44)	660.06 (198.98)	740.83 (233.08)
I don't want sex	1088.65 (343.52)	1351.79 (352.13)	1099.66 (353.77)	892.16 (251.05)	885.94 (271.68)	942.80 (216.77)
Explicit liking	90.23 (13.73)	87.08 (10.94)	90.20 (9.75)	75.72 (19.73)	74.46 (20.39)	75.78 (23.62)
Explicit wanting	76.23 (16.15)	69.73 (15.85)	70.20 (17.33)	52.92 (22.34)	61.73 (21.02)	62.50 (20.91)

Table 3. Regression analyses on the sexual outcome variables with implicit and explicit liking and wanting and their interaction terms as predictors

	β Implicit liking	β Implicit wanting	β Explicit liking	β Explicit wanting	β Implicit x Explicit liking	β Implicit x Explicit wanting
MEN						
Frequency of sex	.27*	.21	.25	-.18	.29**	-.15
Last time sex	-.18	.08	-.20	.20	.01	.17
Masturbation	.00	-.14	-.08	.18	-.19	.10
Pornographic use	-.02	-.11	-.03	.11	-.27**	.21
WOMEN						
Frequency of sex	.07	.33**	.07	.20	-.10	-.09
Last time sex	.02	-.34**	-.03	-.12	.06	-.02
Masturbation	-.03	.06	-.11	.37	-.05	.05
Pornographic use	-.14	-.02	-.15	.32**	-.11	.11

* $p < .10$; ** $p < .05$