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In the Heat of the Short-Term Moment: Evidence that Heightened Sexual Arousal Increases Short-Term Mating Motivation Among Men

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Abstract

Individual differences in men's short-term mating interest are well studied, both at state and trait levels. Yet, the role of sexual arousal as a source of intra-individual variation has been neglected. This research represents the first attempt to integrate sexual arousal into the human mate plasticity literature. We argue that sexual arousal directly impacts the short-term mating motivation among men regardless of their personality, relationship status, and sociosexuality. Across four experiments, we found that heightened sexual arousal consistently increased men's short-term mating motivation relative to participants in neutral and arousing control groups. Experiments 1 and 2 revealed that sexual arousal increased participants' general short-term mating motivation and their preference for a short-term relationship over a long-term one. Experiment 3 replicated the findings of the first two experiments whilst also demonstrating that this effect was not moderated by personality (i.e., Dark Triad, Big Five) or relationship status. Heightened sexual arousal also led to decreased "state" long-term mating motivation. Finally, Experiment 4 showed that sexual arousal increased the participants' preference for a short-term relationship over a long-term one, an effect that was not moderated by sociosexuality. Together, the results suggest that sexual arousal has a powerful effect on men's short-term mating motivation, and that this effect is independent of intrasexual differences in personality, relationship status, and sociosexuality.

Keywords Dark triad · Mating plasticity · Mating strategies · Personality · Sexual arousal · Short-term mating · Sociosexuality

Introduction

Not all men are the same when it comes to their motivation to engage in short-term sexual relationships. Although interest in uncommitted sex represents one of the largest psychological sex differences (Clark & Hatfield, 1989; Oliver & Hyde, 1993), there is still much variation within each sex. Some individuals are more inclined towards short-term relationships (e.g., short-term flings, one-night stands), others strive for long-term ones (e.g., marriage, cohabitation), and a larger number still are open to relationships of both kinds (Gangestad & Simpson, 2000; Schmitt, 2005; Thomas & Stewart-Williams, 2018). What underlies these divergent mating preferences? So far, research has revealed predictors

of *trait*-like short-term mating interest including personality (Egan & McCorkindale, 2007; Jackson & Kirkpatrick, 2007; Lewis et al., 2012; Nettle & Nettle, 2007; Snyder et al., 1986), sociosexuality (Sevi et al., 2018; Simpson & Gangestad, 1991; Penke & Asendorpf, 2008), and life history (Del Giudice & Belsky, 2011; Figueredo et al., 2005; Hutchings & Myers, 1994; Winemiller, 1992). A smaller, but growing body of research, also shows that other predictors, such as evolutionarily-relevant cues of wealth, infant presence, danger, and sex ratio (Thomas & Stewart-Williams, 2018; Wisman & Shrira, 2020), can affect *state*-like mating motivation.

The specific mechanisms which facilitate intra-individual variation in mating strategy among men are relatively understudied (Arnocky et al., 2016; Thomas et al., 2021). For example, no research has directly studied the role of sexual arousal in the motivation to pursue short- and long-term mating opportunities. This is surprising given that in most species sexual arousal serves vital fitness-related functions in the signalling, coordination, and motivation to mate (Metts et al., 1998). As a dual strategy species, men possess both long- and

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short-term mating strategies (Buss & Schmitt, 1993). Thus, sexual arousal might simply support a current salient mating strategy. For example, men pursuing a long-term mating strategy might show increased desire for sex with a committed partner when aroused. Alternatively, arousal might facilitate strategy change, such as temporarily upregulating short-term mating interest to capitalize on fitness enhancing opportunities.

In the current perspective, we explore the role of heightened sexual arousal and intrasexual differences in the mating motivation of men. In view of gender-specific responses to sexually arousing stimuli (Klaassen & Peter, 2015; Paul & Shim, 2008), the influence of ovulation on women's mate preferences (Durante et al., 2012; Provost et al., 2008; Gangestad et al., 2004), and gender-divergent sexual mating strategies (Baumeister, 2000; Buss & Schmitt, 1993; Gangestad & Simpson, 2000), we will focus on the role of heightened sexual arousal in mating motivation of women in a separate paper.

Short-Term Mating Interest in Men

Although both sexes have uncommitted sex, men typically show greater desire for short-term relationships than women do, likely because of historical asymmetries in the costs and benefits of short-term mating. As women carry most of the weight of gestation, partum, and post-partum, uncommitted brief sexual encounters bared relatively higher costs (low parental investment, infectious diseases, violence, etc.) for ancestral women than men (for a broad overview see, Stewart-Williams & Thomas, 2013). In contrast, lower obligatory parental investment for men means that a brief sexual encounter brings few costs yet potentially high fitness pay-offs (Buss & Schmitt, 1993; Gangestad & Simpson, 2000; Trivers, 1972). Consequently, to miss casual mating opportunities is potentially “costly” for men because they are infrequent (Dawkins, 1976; Gangestad & Simpson, 2000; Haselton & Buss, 2000). Thus, men have evolved to be more sensitive to mating cues and more motivated to engage in short-term mating than women are (Haselton & Buss, 2000). Indeed, a plethora of studies have shown that men are more ready to have casual sex with strangers (Buss & Schmitt, 1993; Clark & Hatfield, 1989; Herold & Mewhinney, 1993; Oliver & Hyde, 1993), take more risk to obtain sexual gratification (Ariely & Loewenstein, 2006), overrate women's sexual interest in themselves (Grammer et al., 2000), and lower their mating standards in the context of sexual opportunities (Pennebaker et al., 1979; Szepeswol et al., 2013; for a broad review, see Thomas, 2018).

Enduring and Temporary Predictors of Short-Term Mating Interest

Variation in motivation to pursue short-term mating strategies exists within each sex as well as between them. For instance, sociosexual orientation (SO) represents the individuals' openness to short-term mating. Those with a relatively high (unrestricted) SO are more likely to engage in short-term relationships (Simpson & Gangestad, 1991; Penke & Asendorpf, 2008). Moreover, high SO correlates with various tactics that enhance short-term mating strategies, such as avoiding commitments (Jonason & Buss, 2012) and caring less about a potential partner's sexual history (Stewart-Williams et al., 2017). Personality traits are also associated with a preference for short-term mating. For instance, in a large survey across 46 nations, Schmitt et al. (2008) found that high levels of extraversion and conscientiousness and low levels of agreeableness correlated positively with interest in short-term mating. Dark Triad traits (i.e., Machiavellianism, narcissism, and psychopathy) are also associated with a preference for uncommitted sex (Carter et al., 2014; Jonason et al., 2009)—their behavioural manifestations (e.g., a desire for power, being charming, egocentrism, and a lack of empathy) lending themselves to an exploitive short-term mating style. Finally, unsurprisingly, relationship status is negatively associated with short-term mating preference such that those who are pair-bonded show a reduced, but not always absent, interest in uncommitted sex (Buss & Schmitt, 1993; Penke & Asendorpf, 2008). In sum, ample research supports the thesis that intrasexual differences play an important role in short-term mating motivation.

Yet, these trait-like predictors represent only one source of intrasexual differences in mating motivation—humans also appear to possess fluid “mixed” mating strategies (Broude, 2000; Jackson & Kirpatrick, 2007; Gangestad & Simpson, 2000). That is, because the adaptive nature of short- and long-term mating depends on context, humans evolved both short-term and long-term mating strategies that can be implemented facultatively. For instance, Thomas and Stewart-Williams (2018) found that exposure to a variety of evolutionarily relevant stimuli (e.g., parental care, resource abundance, and danger) could change relationship preferences (short-term vs long-term) within a single experimental session. In a similar vein, exposure to signals of easy access of a potential partner was found to increase men's desire for short-term mating (Schmitt et al., 2001a, b). Moreover, research revealed that exposing participants to a sexual context could augment men's priority for looking at either a women's face or her body (Confer et al., 2010; see also Wagstaff et al., 2015). These studies suggest that human mating preferences are flexible

and context-dependent (see also Fetterman et al., 2015). However, these studies investigate mating decisions in the absence of arguably one of the central components of mating, and particular short-term mating—sexual arousal.

Sexual Arousal and Short-Term Mating Interest

Sexual arousal is associated with substantial physiological changes (e.g., hormonal, parasympathetic activation) and cognitive changes (Bankcroft, 2005; Spiering et al., 2004). The inclusion of sexual arousal is essential in any framework that serves to explain the full complexity of human mating motivation. The central aim of this paper is to test whether sexual arousal causes increased short-term mating interest, regardless of broad mating strategy and its associated predictors (e.g., personality).

There is some indirect evidence that actual heightened sexual arousal leads to psychological changes that would facilitate short-term mating. For example, a series of studies demonstrated that heightened sexual arousal among men causes greater willingness to engage in unprotected sex with strangers and increased acceptance of obtaining sex through morally questionable behaviour (Ariely & Loewenstein, 2006). Other research has found that sexual arousal biases attention towards sexually relevant cues in possible mates (Pfaus, 1999), increases men's motivation to go on a date with women (Greitemeyer, 2005; Seal et al., 1994; van Straaten et al., 2008), and causes them to be less discriminating about the attractiveness of potential partners (Baumeister et al., 2001).

Overview and Hypotheses

In four experiments, we test the hypothesis that heightened sexual arousal increases short-term mating motivation among men across a variety of measures. Moreover, we explore if intrasexual differences play a role in this process. Specifically, in Experiments 1 and 2, we tested if heightened sexual arousal increases men's "state" short-term mating motivation as captured using an adapted sociosexuality measure and self-reported preferences for short- over long-term relationships. After demonstrating a more robust relationship between induced sexual arousal (versus control conditions) and short-term mating, we examined intrasexual variation of this effect. In Experiment 3, we explored if intrasexual differences in the Dark Triad and Big Five (BFI-S) play a role in the effects of heightened sexual arousal on short-term mating motivation, and in Experiment 4, we considered the moderating role of sociosexuality.

Experiment 1

Method

Participants

Participants were 102 heterosexual men recruited via the crowd sourcing platform Amazon MTurk ($M_{\text{age}} = 30.85$, $SD = 5.35$) who received \$2.00 for participating in a short study ostensibly concerned with attraction and personality.

Procedure and Materials

Across four experiments, participants were randomly assigned to a sexual, or to neutral and arousing control conditions. Moreover, all experiments were programmed in Qualtrics and conducted online. After participants filled out a consent form to confirm that they were male, over the age of 18, and aware of the potential sexual content, we gauged their base rate level of state sexual arousal ($M_{\text{arousal}} = 3.54$, $SD = 1.00$), how positive they felt ($M_{\text{positive}} = 6.20$, $SD = 2.08$), and how negative they felt ($M_{\text{negative}} = 2.44$, $SD = 1.85$). Responses were assessed using a 9-point Likert format where 1 = *not at all* and 9 = *very much*. In addition, participants were asked to estimate how many times per week they watched pornography on a 6-point scale: 0 (8.8%), 1–3 (45.1%), 3–5 (16.7%), 5–7 (12.7%), 7–9 (5.9%), and 9+ (10.8%). In Experiments 1–4, entering base rate variables and pornography use as covariates did not alter the main findings and so we do not discuss these further.

In the sexual arousal condition, participants viewed five "erotic" pictures taken from International Affective Picture System database (Lang & Bradley, 2007) and five "GIFs" portraying various explicit heterosexual sexual acts and women in provocative poses (Hester et al., 2015). In the neutral condition, participants viewed five pictures (Lang & Bradley, 2007) and five GIFs depicting various tropical birds. All visual stimuli were timed and set at a minimum exposure time of 3 s and a maximum exposure time of 10 s. Presentation of pictures and GIFs within each condition was randomized.

Each condition was followed by a short set of questions asking to what extent the participant was sexually aroused during and after watching the GIFs/pictures. They were also asked how interesting and boring the stimuli were and to what extent they felt positive/negative whilst viewing them. All items were responded to on a scale from 1 (*Not at all*) to 7 (*Very much*). Three items inspired by the SOI-R (Penke & Asendorpf, 2008) were adapted to measure participants' state short-term mating preference: "Right now, I can imagine myself enjoying a casual sexual encounter with someone I find very attractive?"; "Right

now, I can easily imagine myself being comfortable and enjoying “casual” sex”; and finally, “Right now, I could enjoy sex with someone I find highly desirable even if it is not sure if that person has long-term potential”. All items were responded to on a scale from 1 (*Strongly disagree*) to 7 (*Strongly agree*). The items were summed up and averaged into a single state short-term mating index (SSMI; $M = 5.04$, $SD = 1.78$, $\alpha = 0.89$).

In all four experiments reported below, participants filled out a standard demographic form asking about their nationality, country of origin, age, sexual orientation (on a Likert scale from 1 = *Homosexual* to 4 = *Bisexual* to 7 = *Heterosexual*), and relationship status. Furthermore, they completed several experimental checks including about what they believed the purpose of the study was (open-ended question); their level of concentration during the study (“My level of concentration during the study was; 1 = Good, 2 = Okay, and 3 = Not Good”); where they did the study (“I did the study: 1 = at home; 2 = at College/University; 3 = Internet Café; 4 = At work; 5 = Other”); and how long they took to complete it (I did the test in: 1 = One go, 2 = In the course of an hour, 3 = Spread over a few days”). Finally, participants were debriefed and thanked for their participation.

Results and Discussion

In this experiment, and indeed all experiments in the paper, repeating the analysis excluding participants who did not complete the study in “one go” did not alter any of the main findings. In addition, all main findings were unchanged by entering the experimental checks, pornography, and sexual orientation variables as covariates and by standardizing the DVs. As such, throughout the paper, we present unmanipulated results without participant removal or the inclusion of mentioned covariates.

Self-Report Valence

First, we tested if the manipulation (sexual arousal vs neutral) affected participant’s self-reported positive affect, negative affect, sexual arousal, and interest in the stimuli. We found that participants exposed to the sexual arousal condition reported more interest in the stimuli ($M = 5.45$, $SD = 1.83$) as compared to the neutral condition ($M = 3.72$, $SD = 2.01$), $F(1, 100) = 20.59$, $p < 0.001$, $\eta_p^2 = 0.17$. Moreover, participants felt that the sexual visual stimuli were less boring ($M = 3.47$; $SD = 2.01$) as compared to the neutral visual stimuli ($M = 2.20$, $SD = 1.61$), $F(1, 100) = 11.58$, $p = 0.001$, $\eta_p^2 = 0.10$.¹ Furthermore, participants reported

feeling more positive ($M = 5.55$; $SD = 1.57$) whilst watching the sexual condition as compared to the neutral visual stimuli ($M = 4.21$, $SD = 1.76$), $F(1, 100) = 16.48$, $p < 0.001$, $\eta_p^2 = 0.14$. The type of stimuli observed had no impact on the negative feelings of the participants ($p > 0.1$).

Importantly, it was found that participants in the sexual arousal condition reported more sexual arousal whilst watching the GIFs and pictures ($M = 5.02$, $SD = 1.78$) as compared to the neutral condition ($M = 1.34$, $SD = 1.16$), $F(1, 100) = 154.78$, $p < 0.001$, $\eta_p^2 = 0.61$. In addition, participants reported being more “sexually aroused right now” (state arousal) in the sexual arousal condition ($M = 4.53$, $SD = 1.95$) as compared to the neutral condition ($M = 1.45$, $SD = 1.26$), $F(1, 100) = 90.89$, $p < 0.001$, $\eta_p^2 = 0.48$. Controlling for interest in the stimuli and positive/negative affect did not qualitatively change the effect of condition on state sexual arousal.

Short-Term Mating Motivation

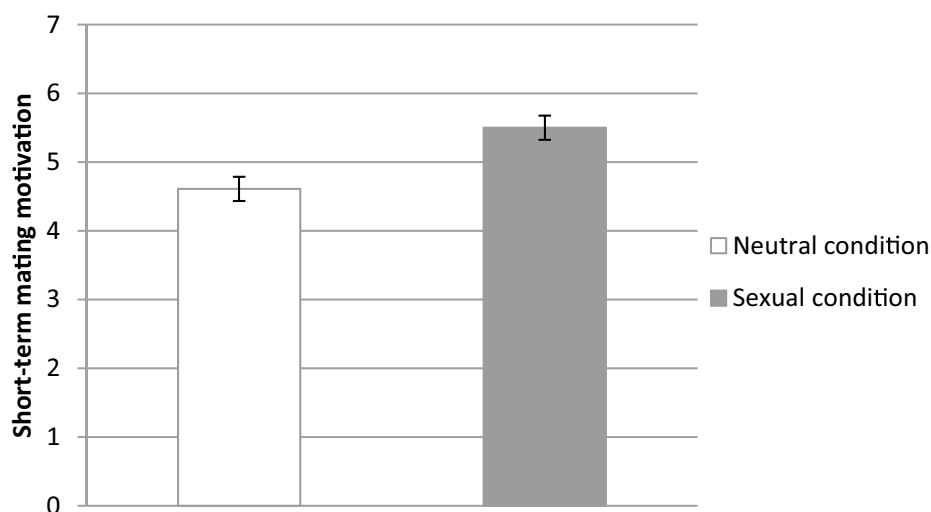
With a one-way ANOVA, we tested our main hypothesis that the sexual (vs neutral) condition would increase participants’ state short-term mating motives. As predicted men in the sexual condition showed increased short-term mating motives ($M = 5.50$, $SD = 1.67$) as compared to the neutral condition ($M = 4.61$, $SD = 1.79$), $F(1, 100) = 6.641$, $p = 0.011$, $\eta_p^2 = 0.062$ (see Fig. 1).

Including the participants’ relationship status as a separate factor did not alter the significance of this effect of condition on short-term mating motivation ($p = 0.014$). The main effect of relationship status and the interaction effect did not reach significance (all p ’s > 0.5). Thus, the effects of sexual arousal on men’s short-term mating motive were independent of their current relationship status.

Experiment 1 showed support for the thesis that sexual arousal increases short-term mating motivation among men. In line with ample research, participants reported to feel relatively more positive as a function of the sexual stimuli (Bancroft et al., 2003; Mitchell et al., 1998). In addition, perhaps not surprisingly, the stimuli in the control condition (i.e., tropical birds) were evaluated as relatively less interesting compared to the sexual stimuli. In view of the latter, in Experiment 2, we used control stimuli designed to generate similar levels of interest as the sexual stimuli. Specifically, we used images and GIFs of people engaging in high-risk sports (Galentino et al., 2017). Experiment 2 also employed an additional measurement of short-term interest, which involved participants choosing between short-term and long-term relationships. In line with Experiment 1, we predicted that sexual arousal would cause men to prefer a short-term date over a long-term relationship.

¹ “Interest” and “boredom” were positively correlated, $r(100) = .74$, $p < .001$. In view of this, we only measured the former in Experiments 2–4.

Fig. 1 Male short-term mating motivation as a function of condition (sexual vs neutral) (Experiment 1)



Note: Error bars represent 95% confidence intervals.

Experiment 2

Method

Participants

Participants were 140 male heterosexual users of Amazon MTurk ($M_{\text{age}} = 30.48$, $SD = 5.82$) who received \$2.00 for participating in a short study ostensibly concerned with attraction and personality.

Procedure and Materials

Experiment 2 followed the same procedure as Experiment 1. After participants provided consent, we gauged their initial level of state sexual arousal ($M_{\text{arousal}} = 2.39$, $SD = 1.90$) and positive/negative feelings ($M_{\text{positive}} = 6.21$, $SD = 2.03$; $M_{\text{negative}} = 2.37$, $SD = 1.84$) using a 9-point Likert format, where 1 = *not at all* and 9 = *very much*. Participants indicated again how many times per week they watched pornography on a 6-point scale; 0 (6.4%), 1–3 (37.9%), 3–5 (24.3%), 5–7 (17.9%), 7–9 (5.7%), and 9+ (7.9%).

Participants in the sexual condition were exposed to the same visual sexual stimuli used in Experiment 1. In the neutral condition, participants watched five pictures depicting people engaging in sporting activities (e.g., mountain biking, skiing) sourced from the IASP (Lang & Bradley, 2007) and five GIFs depicting “high arousing sports” (e.g., snowboarding; bunging jumping). Again, all visual stimuli were timed and set at a minimum exposure time of 3 s and a maximum exposure time of 10 s. Presentation order within each condition was randomized and followed by the same set

of short manipulation checks capturing participant interest and affect.

Similar to Experiment 1, the three items of the SSMI were averaged ($M = 5.13$, $SD = 1.60$, $\alpha = 0.87$). In addition, we asked participants to make a forced choice between a serious relationship versus a one-night stand; “Based on how you feel right now what would you prefer: 1) A one night stand and 2) A serious relationship”.

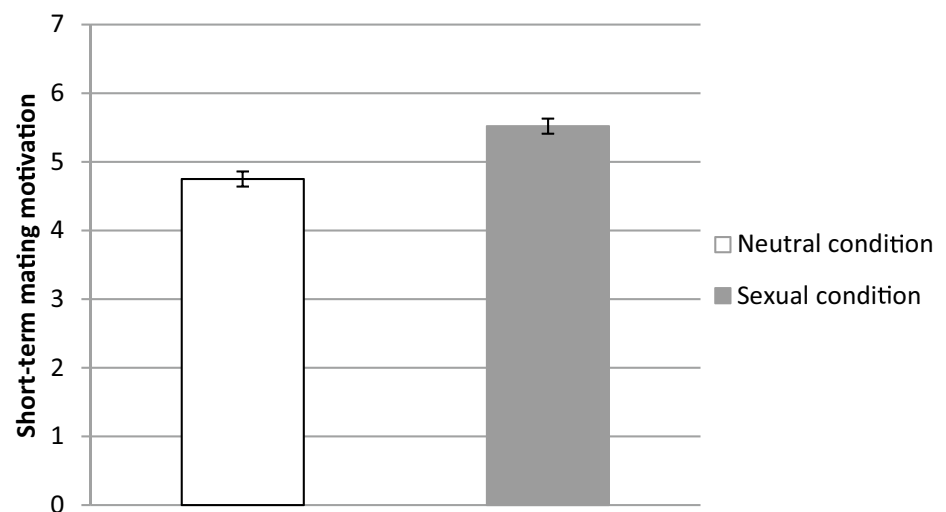
Results and Discussion

Self-Report Valence

First, we tested if the manipulation (sexual vs control stimuli) affected participant’s self-reported positive affect, negative affect, sexual arousal, and interest in the stimuli. We found that participants in the sexual condition felt relatively less negative ($M = 2.04$, $SD = 1.68$) as compared to the neutral condition ($M = 2.89$, $SD = 1.95$), $F(1, 138) = 7.48$, $p = 0.007$, $\eta_p^2 = 0.051$. Furthermore, participants’ reported feeling more positive ($M = 5.09$; $SD = 1.86$) whilst viewing the sexual stimuli as compared to the neutral stimuli ($M = 4.17$; $SD = 1.73$), $F(1, 138) = 9.14$, $p = 0.003$, $\eta_p^2 = 0.062$. Unlike Experiment 1, participants did not report higher levels of interest in the sexual versus the neutral condition ($p > 0.1$).

Again, it was found that participants in the sexual arousal condition reported greater sexual arousal whilst watching the GIFs and pictures ($M = 4.99$, $SD = 1.80$) as compared to the visual neutral condition ($M = 1.68$, $SD = 1.28$), $F(1, 138) = 157.16$, $p < 0.001$, $\eta_p^2 = 0.53$. In

Fig. 2 Male's short-term mating motivation as a function of condition (sexual versus neutral) (Experiment 2)



Note: Error bars represent 95% confidence intervals.

addition, participants reported higher levels of state sexual arousal in the sexual visual stimuli condition ($M = 4.62$, $SD = 1.77$) as compared to the neutral condition ($M = 1.77$, $SD = 1.47$), $F(1, 138) = 100.47$, $p < 0.001$, $\eta_p^2 = 0.440$. Note that the latter effect was not altered by entering positive and negative affect as a covariate.

Short-Term Mating Motivation

We proceeded with testing our main hypothesis that heightened sexual (vs neutral) arousal increases participants' state short-term mating motives. As predicted men in the sexual arousal condition showed increased short-term mating motives ($M = 5.52$, $SD = 1.35$) as compared to the neutral condition ($M = 4.75$, $SD = 1.74$), $F(1, 138) = 8.64$, $p = 0.004$, $\eta_p^2 = 0.059$ (see Fig. 2).

In addition, we entered participant's relationship status in the ANOVA as an independent factor. We found that participants who reported to be in a committed relationship were less interested in a short-term relationship ($M = 4.88$, $SD = 1.52$) as compared to those who reported to be single ($M = 5.36$, $SD = 1.65$), $F(1, 136) = 3.99$, $p = 0.048$, $\eta_p^2 = 0.028$. However, similar to Experiment 1, a main effect of condition remained ($p = 0.003$), and no interaction between relationship status and condition was found ($p > 0.4$). Finally, we looked at the participant's choice between a "relationship" and a "one-night stand" in a forced choice paradigm. In the sexual condition, 53% preferred a one-night stand over a long-term relationship, compared to 38% in the neutral condition. A Pearson chi-square test (1-sided) revealed that this was a significant difference, $\chi^2(2, N = 140) = 3.43$, $p = 0.046$.

Experiment 2 established that sexual arousal increases men's short-term motivation across two measures. However, not all men are the same when it comes to short-term motivation. As mentioned in the "Introduction" section, research has shown that high levels of extraversion and conscientiousness and low levels of agreeableness correlate positively with interest in short-term mating (Schmitt et al., 2008). Moreover, individual differences in the "Dark Triad" are associated with a stronger motivation to engage in short-term mating (Carter et al., 2014; Jonason et al., 2009). Thus, previous research has shown that a wide range of individual differences play a pivotal role in enduring trait-like interest in short-term mating. It is conceivable that these individual differences may moderate the effect of sexual arousal on short-term mating interest. In view of this, Experiment 3 was designed to explore the role of (a) individual differences in short-term mating motivation as a function of sexual arousal and (b) sexual arousal in participants' state long-term mating motivation.

Experiment 3

Method

Participants

Participants were 156 male heterosexual users of Amazon MTurk ($M_{\text{age}} = 31.40$, $SD = 5.21$) who received \$2.00 for participating in a short study ostensibly concerned with attraction and personality.

Procedure and Materials

Experiment 3 followed the same procedure as Experiments 1 and 2. Again, after participants gave consent, we gauged their base rate level of state sexual arousal ($M = 3.03$, $SD = 2.36$), positive feelings ($M = 5.82$, $SD = 2.20$), and negative feelings ($M = 2.60$, $SD = 2.01$), using a 9-point Likert scale (1 = *Not at all* to 9 = *Very much*). Finally, participants indicated how many times they watched explicit pornography during 1 week on a 6-point scale: 0 (13.5%), 1–3 (34.6%), 3–5 (23.1%), 5–7 (12.8%), 7–9 (6.4%), and 9+ (9.6%).

This was followed by the Short Dark Triad (SD3; Jones & Paulhus, 2014), a 27-item questionnaire that measures Machiavellianism, narcissism, and psychopathy. All items of the SD3 were answered using the scale 1 = *Disagree strongly* to 5 = *Agree strongly*. We reverse coded (where necessary), averaged, and summed up into three single indices. Example subscale items include “I like to use clever manipulation to get my way” (Machiavellianism; $M = 3.19$, $SD = 0.82$, $\alpha = 0.82$), “I know that I am special because everyone keeps telling me so” (narcissism; $M = 2.86$, $SD = 0.77$, $\alpha = .80$), and “People who mess with me always regret it” (psychopathy; $M = 2.51$, $SD = 0.78$, $\alpha = 0.79$).

Hereafter, participants completed a 15-item Big Five Inventory (BFI-S; Lang et al., 2011). Items on the BFI-S were all answered on a 5-point scale where 1 = *Strongly disagree* and 5 = *Strongly agree*. We averaged and summed up the items into five indices. Example subscale items include “I see myself as someone who is original, comes up with new ideas” (openness; $M = 3.71$, $SD = 0.86$, $\alpha = 0.66$), “I see myself as someone who does a thorough job” (conscientiousness; $M = 3.89$, $SD = 0.82$, $\alpha = 0.65$), “I see myself as someone who is outgoing” (extroversion; $M = 2.88$, $SD = 1.09$, $\alpha = 0.76$), “I see myself as someone who is considerate and kind to almost everyone” (agreeableness; $M = 3.50$, $SD = 0.86$, $\alpha = 0.52$), and “I see myself as someone who gets nervous easily” (neuroticism; $M = 2.56$, $SD = 1.06$, $\alpha = 0.73$).

As with Experiment 2, in Experiment 3, participants were again randomly allocated to either the sexual or the neutral condition. Once more, all visual stimuli were randomized and set to have a minimum exposure time of 3 s and a maximum exposure time of 10 s.

As with previous experiments, short manipulation checks were used which captured the participant’s interest and affect, followed by the SSMI ($M = 4.91$, $SD = 1.61$, $\alpha = 0.86$). In addition, once again inspired by the SOI-R, we constructed a state long-term mating index (SLMI; $M = 4.10$, $SD = 1.60$, $\alpha = 0.76$). This index is consistent for the three items: “Right now, I am interested in a serious relationship”; “Right now, I can see myself settling down romantically with one special person”; and finally, “Right now, I would

not want to have sex with a person until I am 100% sure that we will have a serious relationship”. Again, all items were responded to on a scale from 1 = *Strongly disagree* to 7 = *Strongly agree*.

Results and Discussion

Manipulation Check

Similar to Experiments 1–2, participants who viewed the sexual stimuli felt relatively less negative ($M = 2.24$; $SD = 1.75$) as compared to the neutral condition ($M = 3.21$; $SD = 1.89$), $F(1, 154) = 10.99$, $p = 0.001$, $\eta_p^2 = 0.067$. They also felt more positive ($M = 5.08$, $SD = 1.98$) compared to the control group ($M = 4.39$; $SD = 1.83$), $F(1, 154) = 5.05$, $p = 0.026$, $\eta_p^2 = 0.032$. Again, participants did not differ in how interested they were in the stimuli ($p > 0.19$).

Replicating previous findings, participants in the sexual condition were more sexually aroused ($M = 4.73$, $SD = 1.97$) as compared to those in the neutral condition ($M = 2.42$, $SD = 1.70$), $F(1, 154) = 61.83$, $p < 0.001$, $\eta_p^2 = 0.29$. In addition, they reported higher levels of state sexual arousal ($M = 4.63$, $SD = 1.99$ vs $M = 2.45$, $SD = 1.73$; $F(1, 154) = 53.22$, $p < 0.001$, $\eta_p^2 = 0.26$) and this was not altered by entering positive and negative affect as covariates ($p < 0.001$).

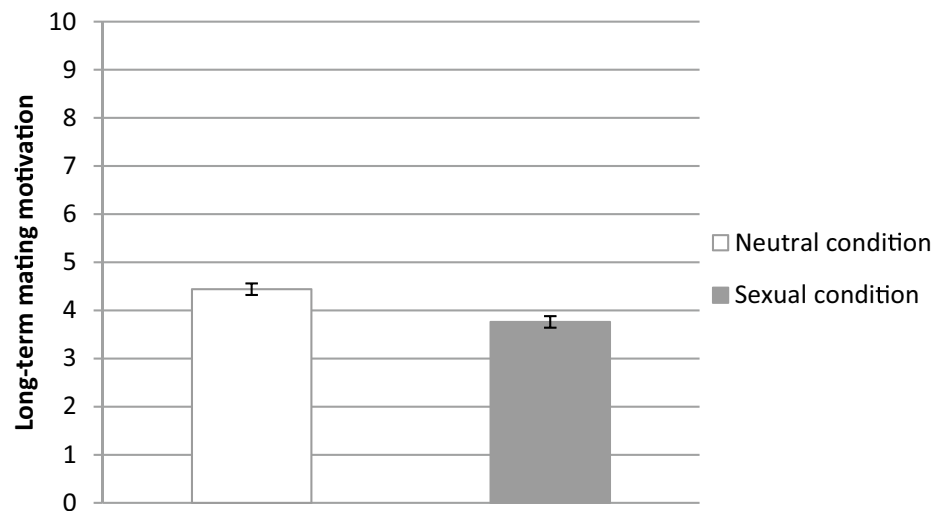
Long-Term Mating Motivation

We proceeded by exploring the role of heightened sexual arousal on state long-term motivation. It was found that the sexual arousal condition decreased state long-term mating motives ($M = 3.76$, $SD = 1.56$) as compared to the neutral condition ($M = 4.44$, $SD = 1.58$), $F(1, 154) = 7.16$, $p = 0.008$, $\eta_p^2 = 0.044$ (see Fig. 3). This effect remained significant when we entered relationship status (close relationship versus single) into the analyses ($p = 0.028$). Moreover, there was a main effect of relationship status showing that participants that were in a relationship showed a stronger state long-term mating motivation ($M = 4.57$, $SD = 1.35$), as compared to those who were single ($M = 3.23$, $SD = 1.68$), $F(1, 152) = 22.69$, $p < 0.001$, $\eta_p^2 = 0.13$. There was however no interaction between relationship status and condition ($p > 0.16$).

Short-Term Mating Motivation

We then tested our main hypothesis that the sexual (vs neutral) condition increases participants’ state short-term mating motives. Consistent with Experiments 1–2, men in the sexual condition showed increased short-term mating motives ($M = 5.38$, $SD = 1.61$) as compared to the

Fig. 3 Male's long-term mating motivation as a function of condition (sexual versus neutral) (Experiment 3)



Note: Error bars represent 95% confidence intervals.

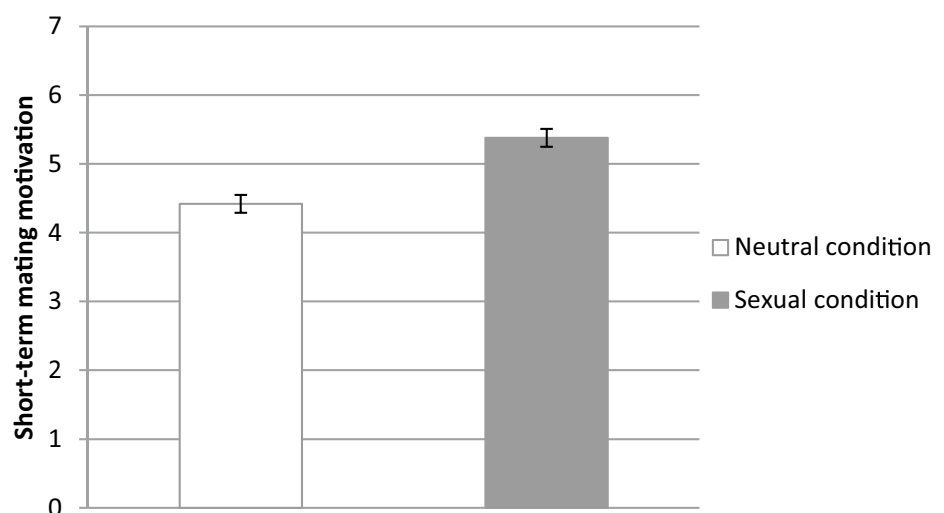
neutral condition ($M = 4.42$, $SD = 1.47$), $F(1, 154) = 14.73$, $p < 0.001$, $\eta_p^2 = 0.087$ (see Fig. 4). Note that this effect size was roughly double the size of the reduction in state long-term mating motives. Again, this effect was not altered by entering relationship status (close relationship versus single) into the analyses ($p < 0.001$) and no main effect was found for relationship status ($p > 0.7$) or its interaction with condition ($p > 0.87$).

Short-Term Mating Motivation and the Dark Triad

To test the potential relationship between heightened sexual arousal Machiavellianism, narcissism, and psychopathy, we

conducted three separate regression analyses. We carried out the first regression analyses with the main effects for condition (dummy coded; $-1 =$ sexual arousal, $1 =$ neutral arousal) and Machiavellianism (mean-centred) at step 1, and the interaction term entered at step 2 (Aiken et al., 1991). A main effect of Machiavellianism indicated that higher scores were associated with a stronger state short-term motivation, $B = 0.542$, $SE = 0.15$, $t = 3.72$, $p < 0.001$. Moreover, a main effect of condition showed that heightened sexual arousal was associated with a stronger short-term motivation, $B = -0.477$, $SE = 0.12$, $t = 4.01$, $p < 0.001$. These main effects were not qualified by a significant interaction in the second step ($p > 0.3$). This analysis was repeated

Fig. 4 Male's short-term mating motivation as a function of condition (sexual versus neutral) (Experiment 3)



Note: Error bars represent 95% confidence intervals.

with narcissism and condition in the first step, and again, we found a main effect for condition ($p < 0.001$) and narcissism, showing that higher levels of narcissism were associated with a stronger state short-term motivation, $B = 0.384$, $SE = 0.16$, $t = 2.37$, $p = 0.019$. There was no interaction in the second step ($p > 0.79$). Similarly, we found a main effect of condition ($p < 0.001$) and of psychopathy, showing that higher levels of psychopathy were associated with a stronger state short-term motivation, $B = 0.37$, $SE = 0.16$, $t = 2.38$, $p = 0.019$. Again, no interaction effects were found at step 2 ($p > 0.16$). In sum, similar to previous research, we found that higher scores on the Dark Triad were associated with an increased interest in short-term mating. However, important for the current perspective, we found that the influence of sexual arousal on the desire for short-term mating was not moderated by these traits.

Short-Term Mating Motivation and the BFI-S

To test the potential relationship between heightened sexual arousal and personality on participants' level of short-term mating motivation, we conducted five separate regression analyses. These analyses showed that there were no moderating effects between heightened sexual arousal and the five separate BFI-S indices ($p > 0.3$). Moreover, the main effect of sexual arousal on short-term mating motivation remained highly significant in each analysis ($p < 0.001$). One main effect was found for conscientiousness, $B = 0.104$, $SE = 0.05$, $t = 2.07$, $p = 0.040$, showing that higher levels of this trait were associated with a stronger short-term motivation (see Schmitt et al., 2008, for similar results).

In sum, consistent with previous research (Carter et al., 2014; Jonason et al., 2009), we found that higher scores on the Dark Triad were associated with an increased interest in short-term mating. Moreover, Experiment 3 revealed that only conscientiousness was associated with short-term mating motivation (see Schmitt et al., 2008). However, important for the current perspective, we found that the main effect of sexual arousal on short-term mating motivation was not moderated by these personality traits. Furthermore, consistent with Experiments 1–2, it was found that “relationship status” did not have an effect on men's short-term mating motivation when they were sexually aroused. In addition, Experiment 3 showed that men in the sexual condition showed a decreased interest in a long-term relationship, regardless of their relationship status.

In Experiment 4, we considered the potential moderating role of trait sociosexuality on short-term mating motivation as a function of sexual arousal. In addition, we also aimed to replicate the central findings of Experiments 1–3 using a different measure of short- and long-term mating interest. Specifically, we used an adapted version of the “Snog Marry Avoid” task (SMA; Thomas

& Stewart-Williams, 2018) which asks participants to choose between short- and long-term relationships with a series of potential suitors in order to build up a picture of their preferred mating strategy.

Experiment 4

Method

Participants

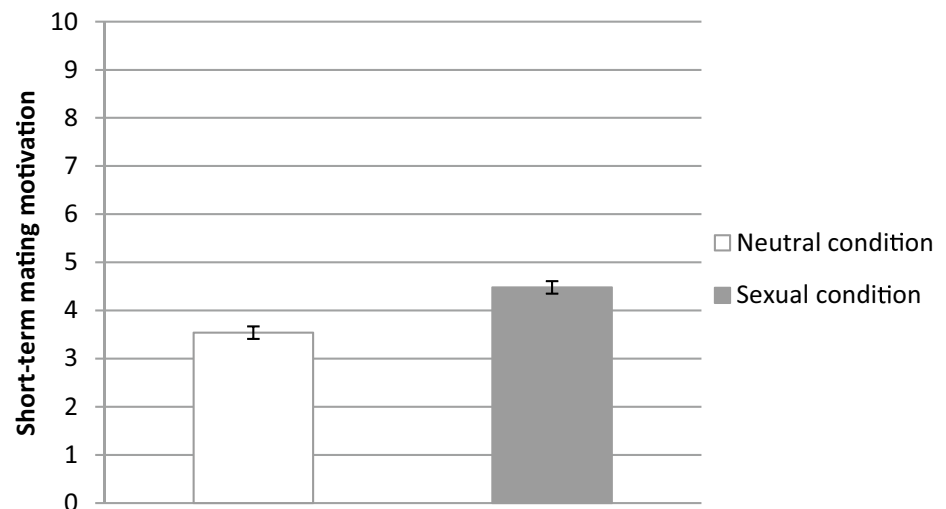
Participants were 160 male heterosexual users of Amazon MTurk ($M_{\text{age}} = 30.11$, $SD = 5.48$) who received \$2.00 for participating in a short study ostensibly concerned with attraction and personality.

Procedure and Materials

Similar to Experiments 1–3, we gauged participants' level of state sexual arousal ($M = 2.66$, $SD = 2.11$), how positive ($M = 6.53$, $SD = 2.01$) and negative they felt ($M = 2.39$, $SD = 1.95$), and how many times per week they watched pornography on a 6-point scale: 0 (8.1%), 1–3 (30%), 3–5 (25%), 5–7 (16.9%), 7–9 (12.5%), and 9+ (7.5%). This was followed by the revised Socio-sexual Orientation Inventory (SOI-R; Penke & Asendorpf, 2008), a 9-item questionnaire that consists of three subscales (behaviour, attitude, and desire). Items were reverse coded where necessary and then combined into three single indices, one for each scale. Example items include “With how many partners have you had sex within the past 12 months” (behaviour; $M = 4.04$, $SD = 1.46$, $\alpha = 0.78$); “Sex without love is OK” (attitude; $M = 6.33$, $SD = 2.24$, $\alpha = .84$; scale from 1 = *Strongly disagree* to 9 = *Strongly agree*); and “How often do you have fantasies about having sex with someone you are not in a committed romantic relationship with?” (desire; $M = 4.64$, $SD = 2.23$, $\alpha = 0.74$; scale from 1 = *Never* to 9 = *At least once a day*). Hereafter, participants were exposed to the same manipulation as in Experiments 2–3 with the same exposure time and manipulation checks.

To measure participants' short-term mating motivation, we employed a shortened version of the “Snog Marry Avoid task” (SMA) inspired by Thomas and Stewart-Williams (2018) which measures a participant's disposition towards long- and short-term mating. Participants were shown several pictures of the opposite sex and asked to pick a relationship to have with each based on their preferences. The options were either a “short-term fling”, “long-term thing”, or, if they have no interest in any relationship with that particular person, they could select “not interested”. To facilitate responding, participants were asked to imagine that they were single and had met each person once or twice

Fig. 5 Male's short-term mating motivation as a function of condition (sexual versus neutral) (Experiment 4)



Note: Error bars represent 95% confidence intervals.

through friends and that the other person thought they were attractive. Participants were also instructed to use their intuition and that there are no “right” or “wrong” answers. Our shortened version of the SMA used 10 models. A pilot study ($N=60$) revealed that the targets scored relatively high on attraction (“How good looking is this person?”; 1 = *Not at all* and 10 = *Very much*; $M=7.22$; $SD=1.90$) and relatively low in how revealing they were dressed (“Is this person dressed in a revealing way?”; 1 = *Not at all* and 10 = *Very much*; $M=2.53$; $SD=1.9$). By totalling the number of pictures chosen for each relationship type, we produced three DV’s which could range from 0 to 10. The most commonly chosen relationship type was “short-term fling” ($M=4.01$, $SD=2.36$), followed by “long-term thing” ($M=3.34$, $SD=2.21$), and finally “not interested” ($M=2.65$, $SD=2.24$).

Results and Discussion

Manipulation Checks

Again, we tested if the manipulation (sexual vs neutral arousal) affected participant’s self-reported positive affect, negative affect, sexual arousal, and interest in the stimuli. It was found that participants exposed to the sexually arousing stimuli condition were more interested in the stimuli ($M=5.57$, $SD=1.56$) as compared to the neutral condition ($M=3.85$, $SD=1.95$), $F(1, 158)=38.24$, $p<0.001$, $\eta_p^2=0.19$. Furthermore, participants felt more

positive ($M=5.52$, $SD=1.77$) whilst watching the sexual stimuli as compared to the neutral visual stimuli ($M=4.18$; $SD=1.84$), $F(1, 158)=22.34$, $p=0.001$, $\eta_p^2=0.12$. Participants did not report to feel more negative as a function of watching the visual stimuli ($p>0.47$).

Consistent with Experiments 1–3, participants in the sexual arousal condition reported sexual arousal whilst watching the sexual GIFs and pictures ($M=5.31$, $SD=1.53$) as compared to the neutral ones ($M=1.39$, $SD=0.97$), $F(1, 138)=374.22$, $p<0.001$, $\eta_p^2=0.70$. In addition, participants reported to be more state sexually aroused in the sexual arousal condition ($M=5.01$, $SD=1.61$) as compared to the neutral one ($M=1.54$, $SD=1.21$), $F(1, 158)=237.84$, $p<0.001$, $\eta_p^2=0.60$. Repeating these analyses with “interest” and “positive affect” as covariates did not remove the main effect of condition (p ’s <0.001).

Preference for “Snog, Marry, or Avoid”, Relationship Status, and SOI-R

Our first ANOVA showed that men were not more interested in a long-term relationship with the women in the sexual condition as compared to the neutral condition ($p>0.5$). Moreover, participants in the neutral condition chose the option of “not interested” ($M=2.00$, $SD=2.20$) less often than participants in the sexually arousing condition ($M=2.30$, $SD=2.24$), $F(1, 158)=3.97$, $p=0.048$, $\eta_p^2=0.024$.

We proceeded with testing our main hypothesis that the sexual (vs neutral) stimuli increases participants’

preference for a “short-term fling”, as predicted men in the sexual condition showed an increased preference for a short-term relationship ($M = 4.48$, $SD = 2.61$) as compared to the neutral condition ($M = 3.53$, $SD = 1.98$), $F(1, 158) = 6.54$, $p = 0.012$, $\eta_p^2 = 0.040$ (Fig. 5). Similar to Experiments 1–3, there were no effects for relationship status (p 's > 0.3) on men's motivation to engage in a short-term fling. Entering the aggregated score of the SOI-R as a covariate did not alter the main effect of condition on a preference for a short-term fling ($p = 0.013$).² To further investigate the role of SOI-R on participants' preference for a short-term relationship, we carried out a regression analysis with the main effects for condition (dummy coded; $-1 =$ sexual arousal, $1 =$ neutral arousal) and SOI-R (mean-centred) at step 1, and the interaction term entered at step 2 (Aiken et al., 1991). A main effect of SOI-R indicated that higher scores on the SOI-R were associated with a stronger state short-term motivation, $B = 0.416$, $SE = 0.16$, $t = 2.61$, $p = 0.010$. Moreover, a main effect on condition showed that heightened sexual arousal predicted a stronger short-term motivation, $B = 0.253$, $SE = 0.18$, $t = 2.52$, $p = 0.013$. However, the analyses did not reveal a significant interaction in the second step ($p > 0.6$).

Experiment 4 showed again support for our hypotheses that sexual desire predicts increased short-term motivation among men. Moreover, we replicated previous findings that higher scores on the SOI-R are associated with a stronger preference for short-term mating (Sevi et al., 2018; Simpson & Gangestad, 1991; Penke & Asendorpf, 2008). However, SOI-R itself did not moderate the robust finding that sexual arousal increased men's desire for a short-term fling.

General Discussion

The present studies provide support for the novel hypothesis that sexual arousal increases a short-term mating motivation among men. All four experiments showed that brief exposure to sexual stimuli increased men's desire for short-term mating across a variety of measures. Experiments 3 and 4 showed that this robust effect was not moderated by intra-sexual differences in Big Five and Dark Triad personality traits or sociosexuality. Finally, across all experiments, it was found that relationship status did not moderate arousal-linked changes in short-term mating motivation. Taken together, the results of our four experiments suggest strong support for the idea that sexually aroused men show an increase in state desire for short-term mating, independent of a variety of dispositional traits and relationship status.

² This was also the case when adding in the sub-components of the SOI-R separately.

This research is among the first to highlight that sexual arousal may play a central role in human mating plasticity and strategy activation. Several studies have shown that short- and long-term mating motivations change in response to evolutionary relevant cues such as sex ratio (Arnocky et al., 2016), pathogen prevalence (Al-Shawaf et al., 2019), resource availability, and the need for parental care (Thomas & Stewart-Williams, 2018). However, none of these studies take into account the role of sexual arousal in mating strategy plasticity. Indeed, in these studies, participants are asked to make hypothetical mating decisions, or report on their desire to have uncommitted sex, in a clinical and detached manner rather than “in the heat of the moment”, as real-world mating decisions are often made. In this research, we have shown that merely sexual arousal alone is enough to enhance the short-term mating motivation of men. This has marked implications for the mating plasticity literature. For instance, based on previous research, it is tempting to conclude that some cues, such as resource abundance, have only a small effect on male mating psychology (e.g., $d = 0.41$ from Thomas & Stewart-Williams, 2018). However, these effects are observed completely divorced from sexual arousal. It is feasible that the effects of these cues may become enhanced when in a state of sexual arousal—that arousal effectively “greases the groove” of mating plasticity which in turn could lead to a stronger effect. This is, of course, an idea which needs to be tested.

Limitations and Future Directions

The current findings are consistent with a wide range of studies (Ariely & Loewenstein, 2006; Baumeister et al., 2001; Pfaus, 1999) that show indirect support for the thesis that sexual arousal can increase men's motivation to engage in behaviour and cognitions associated with short-term mating motivation. Typically, in previous studies, participants were primed with a sexual and/or short-term mating context. Importantly, the current studies are the first to show that sexual arousal has a direct effect on men's short-term mating motivation. However, they did not address specifically if priming a sexual context is qualitatively different from experiencing the physiological effects of sexual arousal. Moreover, our research relied on “subjective” self-report measurements of sexual arousal. Although future research could examine both subjective and physiological sexual arousal (e.g., Ciardha et al., 2018; Janssen et al., 2007), it is important to note that ample studies show that, at least among men, there is a strong association between (subjective) self-report sexual arousal and physiological sexual arousal (for a broad overview, Chivers et al., 2010). In a related vein, sexual arousal was manipulated exclusively by exposing participants to visual sexual stimuli. In view of this, we

cannot exclude the possibility that our findings are specific to sexual arousal induced by visual sexual stimuli. We consider the latter unlikely because there is evidence that other forms of induced sexual arousal can increase cognitions and behaviours associated with short-term mating motivation (Ariely & Loewenstein, 2006). For instance, as previously discussed, sexual arousal induced by masturbation motivated men to show a greater willingness to engage in unprotected sex with strangers (Ariely & Loewenstein, 2006). Nevertheless, future research may wish to address whether the effect of sexual arousal on men's short-term mating motivation varies depending on the method of arousal.

In addition, we have shown that relationship status did not moderate our findings. However, our research did not take into account the length and the quality of participants' relationships (Schmitt et al., 2001a, b). It is possible that these factors play a role in men's short-term mating motivation—the effect of arousal could be context-dependent in a similar fashion to ovulatory shifts in women's extra-pair interest which can depend on factors such as relationship length and perceived partner quality (Haselton & Gangestad, 2006; Pillsworth et al., 2004). Thus, relationship satisfaction, length, partner quality, and frequency of intercourse represent key factors of interest for future research.

Finally, although we have shown that a wide range of personality variables do not moderate men's short-term mating motivation when sexually aroused, it is possible that other individual differences (Figueredo et al., 2005), environmental cues (Wisman & Shrira, 2020), and/or cultural differences (Schmitt, 2003) that we did not account for play a role in mate choice and motivation.

If sexual arousal increases short-term mating motivation, and this occurs regardless of relationship status, then an obvious next step is to consider how sexual arousal affects relationship stability. It is clear that we do not live in a world where temporary increases in the preferences for short-term mating, driven by sexual arousal or otherwise, cause men to reflexively forgo their current relationships in search for uncommitted sex. Divorce rates would be much higher than we see in Western society, presuming marriages would even come to fruition in such a world. Instead, sexual arousal may form a single, but important, link in a causal chain towards infidelity. Evolutionary psychology points to the context-dependent nature of some psychological mechanisms. For example, people experience less relationship satisfaction when their partner fails to meet their ideals, but only when better alternatives exist (Conroy-Beam et al., 2016). Future research would benefit from examining the impact of arousal-linked increases in short-term mating desire on their thoughts towards their current relationships—such as

the willingness to cheat or dissolve a relationship—and the contextual factors that mitigate against these thoughts.

Conclusions

In sum, these experiments are the first to show directly that sexual arousal increases men's short-term mating motivation and they represent the first attempt to integrate sexual arousal into the human mate plasticity literature. Moreover, they reveal that this robust relationship between sexual arousal and short-term mating motivation operates independent of a wide range of intrasexual differences. Together with future research that will map out the interplay between sexual arousal and women's mating motivation, we envision a revised “human mating framework” that recognizes that decisions about when and with whom humans mate are likely motivated by a complex combination of hormonal fluctuations, physiological arousal, and “hot” cognitions, rather than merely “cold” cognitions. As such, we hope that the current findings inspire a wide range of novel research that situates the role of sexual arousal at the heart of human mating motivation.

Author Contribution Dr. Arnaud Wisman contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Dr. Arnaud Wisman. The first draft of the manuscript was written by Dr. Arnaud Wisman and Dr. Andrew G. Thomas. All authors read and approved the final manuscript.

Declarations

Ethics Approval All four experiments adhered to the Declaration of Helsinki guidelines, and gained the prior approval by the University Research Ethics Committee.

Consent to Participate Written informed consent was obtained from all individual participants included in all four experiments.

Consent for Publication Written informed consent was obtained from all individual participants to include their data in all four experiments.

Competing Interests The authors declare no competing interests.

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