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Published in:
Journal of Sex Research

DOI:
[10.1080/00224499.2019.1687641](https://doi.org/10.1080/00224499.2019.1687641)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2020

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Borg, C., Pawłowska, A., van Stokkum, R., Georgiadis, J. R., & de Jong, P. J. (2020). The Influence of Sexual Arousal on Self-Reported Sexual Willingness and Automatic Approach to Models of Low, Medium, and High Prior Attractiveness. *Journal of Sex Research*, 57(7), 872-884.
<https://doi.org/10.1080/00224499.2019.1687641>

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To cite this article: Charmaine Borg , Aleksandra Pawłowska , Robin van Stokkum , Janniko R. Georgiadis & Peter J. de Jong (2020) The Influence of Sexual Arousal on Self-Reported Sexual Willingness and Automatic Approach to Models of Low, Medium, and High Prior Attractiveness, The Journal of Sex Research, 57:7, 872-884, DOI: [10.1080/00224499.2019.1687641](https://doi.org/10.1080/00224499.2019.1687641)

To link to this article: <https://doi.org/10.1080/00224499.2019.1687641>



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The Influence of Sexual Arousal on Self-Reported Sexual Willingness and Automatic Approach to Models of Low, Medium, and High Prior Attractiveness

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ABSTRACT

Anecdotal evidence suggests that sexual attraction is flexible, and that high levels of sexual arousal can promote sexual willingness and approach tendencies toward a priori low attractive mates. This experimental study tested whether heightened sexual arousal can lower the threshold for sexual willingness and automatic approach tendencies toward potential sex partners of low and medium attractiveness. Heterosexual male ($n = 54$) and female ($n = 61$) participants were randomly assigned to a sexual arousal or control condition. Approach tendencies were indexed using a reaction time task. Sexual willingness was indexed using participant ratings of willingness to kiss and to consider having sex with same- and other-sex models of low, medium, and high attractiveness. Overall, participants showed stronger approach to models of high and medium than of low attractiveness. Sexual arousal weakened this differential responding but did not result in a robust increase of approach toward less attractive other-sex or same-sex models. Sexual willingness toward less attractive models was not affected by sexual arousal. Independent of condition, women reported greater sexual willingness toward same-sex models. The current pattern of findings does not support the notion that sexual arousal promotes automatic approach and sexual willingness to a broader array of sex partners.

Unlike the classical accounts positing that one's sexual patterns and attractions are stable and fully formed early in life (e.g., Bell, Weinberg, & Hammersmith, 1981; Money, 1988), it is becoming increasingly clear that human sexuality and its expression tend to be fluid, malleable (e.g., Diamond, 2008), sensitive to contextual factors (e.g., alcohol intake; Helters, Harbke, & Herbstrith, 2018). Besides, sexual attractions are capable of changing over time, with women generally exhibiting greater breadth of sexual responsiveness than men (Baumeister, 2000; Diamond, 2008; Diamond, Dickenson, & Blair, 2017; Katz-Wise, 2015).

Sexual Incentive Motivation Suggests Sexual Attraction

In its most basic form, sexual activity can be seen as a cycle, during which sexual incentives are identified and sexual goals are pursued, consumed and finally devaluated. The experience of sexual pleasure (or aversion) feeds forward to influence future sexual motivation by means of associative learning processes. This cycle of wanting (or avoiding), liking (or disliking), inhibition and learning, that has been referred to as “the sexual pleasure cycle” (Georgiadis & Kringelbach, 2012), builds on the theory of sexual incentive motivation which suggests that sexual motivation is the result of (primarily learned) external cues that interact with the internal state of the body (Toates, 2009) to produce an approach or avoidance response. The immediate evaluation of positive and negative stimuli seems to also depend on contextual factors, such as one's needs or goals

(Fishbach & Shah, 2006; Lavender & Hommel, 2007; Rotteveel & Phaf, 2004) to automatically activate motivational approach-avoidance tendencies (e.g., Neumann, Förster, & Strack, 2003; Strack & Deutsch, 2004). Thus, following the theory of sexual incentive motivation, sexual behavior is seen as inherently adaptive and flexible.

A body of research suggests that food deprivation increases approach motivation not only toward palatable but also toward unpalatable food stimuli, a tendency not observed among satiated individuals (e.g., Hoefling & Strack, 2010). Since the sexual response cycle follows similar principles as the food pleasure cycle (Georgiadis & Kringelbach, 2012), one could argue that if there is a sexual analog of food deprivation, it would increase approach tendencies toward those individuals who under different circumstances may not be considered preferred sexual partners (e.g., with regard to partner's attractiveness or sex). Even though the absence of sexual activity is not fatal for the individual, not even in the long run, the consequence of sexual inactivity on a species level is clearly detrimental, and longer than usual periods of sexual inactivity may be expected to alter the internal state, or the way the brain's reward system is tuned, which would predict differential responding to sexual incentives (Loewenstein, 1996). This view predicts that sexual abstinence will amplify the attractiveness of both preferred sexual stimuli (i.e., for heterosexual individuals, highly physically attractive other-sex models) and less preferred (i.e., for heterosexual individuals, less physically attractive other-sex models) or

even non-preferred sexual stimuli (i.e., for heterosexual individuals, same-sex models) and trigger approach tendencies toward them.

Sexual Excitation Increases the Breadth of Sexual Responding

The Dual Control Model of sexual behavior (Bancroft & Janssen, 2000) proposes a summative view on sexual response, where the stronger the excitatory influences (i.e., positive evaluations) and the weaker the inhibitory influences (i.e., negative evaluations), the stronger sexual responses will be. Thus, a sexual response occurs when sexual excitation outweighs inhibition (Bancroft, Graham, Janssen, & Sanders, 2009). Accordingly, relatively weak inhibitory and relatively strong excitatory tendencies may play a role in the development of an increased breadth of sexual responding, whereas relatively strong inhibitory and relatively weak excitatory tendencies are involved in an individual's vulnerability to sexual problems (e.g., DePesa & Cassisi, 2017).

In line with theories of emotion and motivation (e.g., Kringelbach & Rolls, 2004; Singer & Toates, 1987), the appetitive systems in the brain increase motivation in times of opportunity. Thus, when the brain receives cues of mating opportunities, high sexual arousal is experienced, which in turn leads to an increased motivation to have sex, and approach tendencies. For instance, in Ariely and Loewenstein's (2006) study, sexual arousal induced by self-stimulation of genitals was shown to influence judgment and decision-making. Male college students have shown greater preference for a wider variety of sexual stimuli and activities, and expressed greater willingness to engage in morally questionable behaviors in order to have sex, as well as greater willingness to engage in unsafe sex, when sexually aroused. Similarly, in their quantitative and qualitative studies, Bancroft and colleagues (Bancroft et al., 2004, 2003; Strong, Bancroft, Carnes, Davis, & Kennedy, 2005) have demonstrated that low inhibition of sexual arousal due to "threat of performance consequences" is associated with impaired sexual risk management in heterosexual and homosexual men. Furthermore, Shuper and Fisher (2008) have shown that, when sexually aroused, HIV-positive men who have sex with men expressed more intentions to engage in unprotected sex, and this effect was moderated by the attractiveness of the potential sexual partner. Increased sexual arousal has been associated with increased motivation to be in an enjoyment-oriented state, rather than a goal-oriented one (Skakoon-Sparling & Cramer, 2014). Through this shift in motivation, sexual arousal may increase intentions to engage in risky sexual behavior in both men and women (Skakoon-Sparling, Cramer, & Shuper, 2016). In this way, sexual arousal may play the role of an amplifier having the ability to make activities normally not perceived as arousing become erotically alluring and to amplify the attractiveness of activities already perceived as arousing, thus widening the preferred array of sexual stimuli (Ariely & Loewenstein, 2006). In line with incentive-motivation accounts (Georgiadis & Kringelbach, 2012; Toates, 2009), this view also predicts that both preferred sexual stimuli and less preferred or even non-preferred sexual stimuli will gain in perceived attractiveness and will trigger approach tendencies.

The effects of sexual arousal on sexual responding and approach tendencies seem to depend on gender and sexual orientation (e.g., Chivers, 2010). Heterosexual women show little category-specificity of sexual arousal, such that they respond in a similar way to same sex and other sex sexual stimuli. In contrast, men, transgendered individuals (i.e., individuals who do not identify with their biological sex) and lesbian women experience much higher sexual arousal in response to stimuli that corresponds with their sexual orientation (Chivers, 2010; Chivers, Rieger, Latty, & Bailey, 2004; Freund, 1963). This pattern of gender-specific responding has been shown to be robust to methodology, as evidenced by converging results in terms of subjective, genital, attentional and neuroimaging measures (Chivers, 2010; Chivers et al., 2004; Chivers & Timmers, 2012; Huberman & Chivers, 2015; Israel & Strassberg, 2009; Lykins, Meana, & Strauss, 2008; Rupp & Wallen, 2007; Sylva et al., 2013).

The Current Study

The present study was designed to investigate two possible factors that may promote the increase in breadth of sexual responding, namely sexual arousal and sexual abstinence. Accordingly, participants were randomly assigned to one of the four conditions based on sexual arousal induction (yes/no) and sexual abstinence (yes/no), to test whether heightened sexual arousal and/or sexual abstinence can widen the array of sexual stimuli that elicit sexual willingness and automatic approach tendencies. Relatedly, pictorial stimuli showing male and female models of low, medium and high prior attractiveness were used to test the impact of sexual abstinence and sexual arousal on sexual willingness and automatic approach tendencies toward models of less preferred attractiveness and non-preferred sex. Moreover, given the evidence of gender differences in breadth of sexual responding (e.g., Baumeister, 2000; Diamond, 2008), the current study included both male and female participants and explored differences in their responses.

Current dual process models emphasize the importance of differentiating between reflexive (automatic) and reflective (controlled) responses, as both may be differentially involved in people's behavior (e.g., Strack & Deutsch, 2004), including sexual behaviors (e.g., Borg, de Jong, & Schultz, 2010; Grauvogl et al., 2015; Melles et al., 2014; van Lankveld, Wolfs, & Grauvogl, 2018). Therefore, in this study, we complemented self-report measures of willingness to kiss and to consider having sex with male and female models of low, medium and high a priori attractiveness with an Approach-Avoidance reaction time task (AAT; Rinck & Becker, 2007), that was specifically designed to assess automatic approach-avoidance tendencies toward and away from these stimuli. Unfortunately, due to a large proportion of participants not complying with the abstinence requirement of the study, the effect of sexual abstinence on the breadth of sexual responding could not be tested. Therefore, the study focused on the effect of heightened sexual arousal on widening the breadth of sexual responding.

In summary, we tested the following hypotheses: Induced sexual arousal will result in (i) stronger automatic approach

toward other- and same-sex models, and a (ii) greater self-reported willingness to kiss and to have sex with other- and same-sex models. Moreover, (iii) these effects will also be evident for models that were a priori less physically attractive. Lastly, (iv) independent of the effects of induced sexual arousal, the breadth of sexual responding will be greater among women than among men, as will be evidenced by greater self-reported willingness to kiss and have sex with same sex-models as well as stronger automatic approach tendencies toward same-sex models among female participants.

Method

Participants and Recruitment

A group of healthy heterosexual students was recruited at the University of Groningen via flyers posted at the university premises as well as via advertisement on social media. To minimize selection bias, the experiment was advertised as a study on sexual preferences, without any mention of sexual abstinence or sexual arousal. Participants were included in the study if they were over 18 years old, reported being exclusively or predominantly heterosexual and reported no sexual problems. From the initially recruited 126 participants, 11 participants ($n_{women} = 7$) were excluded based on non-heterosexual orientation or the presence of sexual problems. The study was approved by and conducted in line with the regulations of the Dutch Ethical Committee of Psychology at the University of Groningen (ECP Code number: 12271 – NE). All participants gave their written informed consent and received a modest financial compensation of €19.

A power analysis was conducted using the G*Power program (Faul, Erdfelder, Lang, & Buchner, 2007) with power set at 0.80 and an alpha level set at 0.05, two-tailed. It was established that a minimum total number of participants needed to reach a medium effect size ($f = 0.25$; Cohen, 1992) in a full factorial 2 (Participant Sex) \times 2 (Sexual Arousal) between-subjects factors \times 2 (Stimulus Sex) \times 3 (Stimulus Attractiveness) within-subjects factors repeated measures analysis of variance (RM-ANOVA) was 112. The current sample of 115 ($n_{women} = 61$) fulfilled this criterion.

Sexual Abstinence Manipulation

To determine the duration of sexual abstinence a pilot study was conducted. Forty-three participants ($M_{age} = 24.51$, $SD = 5.17$, $n_{women} = 24$) were asked to imagine themselves during a period in which they experienced no sexual activity. They were then asked to indicate on a 8-point Likert-type scale (*up to 12 h – more than 2 months*) how long it would take them before they would predict feeling a pressing need to engage in some form of sexual stimulation (i.e., intercourse or masturbation). Table 1 shows frequencies of responses for men and women separately, both in the pilot study, and in the current study, including responses of those participants who were and who were not compliant with the abstinence requirement. Based on the results of the pilot study, the duration of sexual abstinence was established to be 1 week for men and 2 weeks for women.

Table 1. Frequencies of estimated time-intervals required to develop a pressing urge to engage in sexual activity.

Time-interval	Pilot study		Current study		Compliant		Non-compliant	
	Male	Female	Male	Female	Male	Female	Male	Female
up to 12 hours	2	1	1	-	1	-	-	-
12 – 24 hours	-	-	3	3	1	2	1	-
2 – 4 days	-	3	10	4	1	2	5	-
5 – 7 days	7	2	14	3	3	-	3	-
1 – 2 weeks	5	4	18	11	3	2	6	2
3 – 4 weeks	5	5	2	10	-	3	2	2
1 – 2 months	-	4	5	18	-	3	2	5
more than 2 months	-	5	2	13	-	1	1	3

Sexual Arousal Manipulation

The stimuli consisted of 10 clips that were used in a between-subjects design: (i) excerpts from a pornographic film (Moore & Blue, 2009) were selected to induce sexual arousal; and (ii) a film depicting a train ride through a winter landscape was selected for the baseline condition. Both film clips were selected by a team of 10 researchers, based on the inter-rater agreements on the following dimensions: subjective arousal, the anticipated generalizability of effects for the sample, and diversity in scenery. To ensure that the sexual arousal was sustained continuously, the pre-selected film clips preceded each task. As the induction of sexual arousal through similar pornographic film clips has been found successful in the previous research (Borg & de Jong, 2012), its effects were not assessed during the present experiment. In both conditions, the first video had a duration of 5 min and the following film clips were 2 min long. Figure 1 shows the schematic representation of the experimental design.

Still Stimuli (Pictures)

Eighteen pictures of men and 18 pictures of women in provocative poses were used. The models in the pictures were nude, staring directly at the camera (thus creating an illusion of eye contact with the viewer) and touching erogenous zones on their own bodies (such as the breasts or the genitals). For the interested reader, the stimuli are available on DataverseNL (<https://dataverse.nl/dataset.xhtml?persistentId=hdl:10411/9ZNHXP>).

The attractiveness of the models depicted in these pictures was pilot tested in the same study as the abstinence duration. Participants in the pilot study were presented with 138 pre-selected pictures and were asked to rate on a Visual Analog Scale (VAS) the attractiveness of the stimulus, their own self-assessed attractiveness relative to that of the stimulus (as it might be difficult to rate attractiveness of the same-sex individuals), their willingness to consider having sex with the individuals depicted in the stimulus, and the expected feelings of disgust associated with having sex with them. Based on these ratings the pictures were divided into three attractiveness categories: low, medium, and high. The pictures that scored in the lowest 20% on the attractiveness scale were selected for the low attractiveness category. The pictures that scored between 50% and 80% on both the attractiveness scale and the scale concerning willingness to engage in a sexual intercourse with the depicted person were

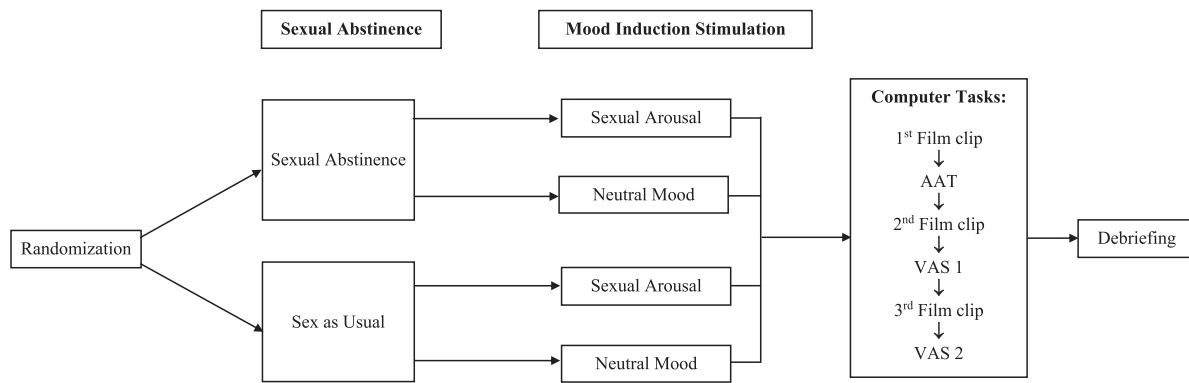


Figure 1. The experimental design, including computer tasks, in order of presentation. The AAT refers to the approach-avoidance task, while the VAS 1 and VAS 2 refer to two visual analog scales assessing sexual willingness.

selected for the medium attractiveness category. Lastly, the pictures that scored in the highest 20% on the attractiveness scale were selected for the high attractiveness category. Table 2 shows the mean attractiveness ratings for male and female models at three attractiveness levels broken down by participant sex.

Self-Report Measures

Kinsey Scale

This self-report measure developed by Kinsey, Pomeroy, and Martin (2003) was used to assess participants’ sexual orientation on a 7-point scale ranging from 0 (exclusively heterosexual) to 6 (exclusively homosexual), with an additional score used to index “non-sexual.”

Golombok–Rust Inventory of Sexual Satisfaction (GRISS)

This 28-item self-report questionnaire (Rust & Golombok, 1986) was used to assess the existence and severity of sexual problems. It consists of 12 subscales measuring impotence, premature ejaculation, anorgasmia, vaginismus, non-communication, infrequency, male and female avoidance, male and female non-sensuality, and male and female dissatisfaction. In our previous work, these subscales were shown to have good reliability and validity (Borg, de Jong, & Weijmar Schultz, 2011). Internal consistency in the present sample was established to be above Cronbach’s alpha of 0.71 for men, and above 0.83 for women.

Table 2. Means (M) and standard deviations (SD) of the attractiveness ratings of male and female stimuli in the pilot study at each attractiveness level.

Stimulus Sex	Stimulus Attractiveness	Participant Sex			
		Male		Female	
		M	SD	M	SD
Male	Low	0.71	2.26	0.77	2.39
	Medium	9.66	17.51	33.58	31.33
	High	16.29	24.74	77.03	20.93
Female	Low	2.56	5.71	1.14	2.94
	Medium	45.39	27.87	33.24	31.51
	High	91.28	8.99	54.90	37.42

Higher ratings indicate higher attractiveness.

Computer Tasks

Approach-Avoidance Task (AAT)

A modified version of the Extrinsic Affective Simon Task (EAST; De Houwer, 2003), manikin version, was used as an AAT measure to assess automatic approach and avoidance tendencies toward or away from sexual stimuli. This computerized AAT was a reaction time (RT) task where the sex-relatedness of the stimuli was not relevant for the task performance. Rather, participants were instructed to react to the picture orientation by moving the manikin toward vertical pictures and away from the horizontal pictures by using the arrow buttons (i.e., ↑ or ↓; Hinzmann, Borg, Verwoerd, & de Jong, 2019). To create a movement sensation the manikin’s legs moved with every button press (Hinzmann et al., 2019; van Hemel-ruiter, de Jong, & Wiers, 2011). When by the correct approach the manikin crossed the picture border, or when by correct avoidance the manikin crossed the screen border, the picture disappeared. To navigate the manikin to the border, participants had to make four clicks (in the correct direction). During each of the 72 trials, a format-standardized picture on the black background appeared in the middle of the screen (525 × 800 pixels for vertical and 675 × 650 for horizontal pictures). All pictures were presented in a random order. On half of the trials the manikin was presented above, and on the other half below, the picture.

Visual Analog Scale (VAS)

Participants were asked to indicate on a scale from 0 (No, never) to 100 (Sure, anytime) their willingness to kiss (VAS 1) and their willingness to consider having sex (VAS 2) with models depicted in each of the 36 randomly presented stimuli.

Procedure

During the initial assessment, participants were asked to sign an informed consent, in which they agreed to the possibility of having to abstain from any sexual activities for a period of one (men) or two (women) weeks (see Sexual Abstinence, for more details). They also completed a questionnaire package including demographic questions, the Kinsey Scale, the GRISS, and a set of auxiliary questions regarding sexual preferences, behaviors and attitudes. The questionnaire package also included the Disgust Propensity and Sensitivity Scale (van

Overveld, de Jong, Peters, Cavanagh, & Davey, 2006) as well as the Three Domains of Disgust Scale (Tybur, Lieberman, & Griskevicius, 2009), which were not used in the current study. The 126 initially recruited participants were randomly assigned to one of the four experimental conditions according to the induction of sexual arousal (yes/no) and sexual abstinence (yes/no). Participants assigned to the sexual abstinence condition ($n = 64$) were asked to sign an additional statement of commitment to indicate their compliance with the experimenter's requests. It was explicitly stated that noncompliance would not lead to exclusion from receiving financial compensation. It was also emphasized that an honest answer about noncompliance was important for the purpose of the study, as the data of the non-compliant participants had to be excluded.

Next, independent of the experimental condition assignment, each participant set up an individual appointment with an experimenter either a week (men) or 2 weeks (women), after the first session took place. The duration of the first session was approximately 60 min, and the duration of the second session was approximately 30 min. During the second session, participants were asked to indicate the number of times they had engaged in masturbation and the number of times they had engaged in sexual intercourse since the first session. Only 22 of the 54 selected participants in the sexual abstinence group reported that they indeed had abstained from any sexual activity. Because critical confounders, such as high inclination to approach sexual stimuli, may have played a decisive role in participants' (non-)compliance, the large number of participants who did not comply with the abstinence requirement of the study undermined the relevance of the sexual abstinence manipulation, rendering it impossible to attribute any difference between the experimental and control condition to abstinence per se. Compliant ($n_{\text{sexual arousal: yes}} = 10$; $n_{\text{sexual arousal: no}} = 12$; 4 vs. 5 men and 6 vs. 7 women in each condition, respectively) and non-compliant participants ($n_{\text{sexual arousal: yes}} = 15$; $n_{\text{sexual arousal: no}} = 17$; 9 vs. 11 men and 6 vs. 6 women in each condition, respectively) were evenly distributed across the two levels of sexual arousal factor. Thus, all participants that were initially assigned to the abstinence condition were included in the final analyses, in which the two-level sexual abstinence factor was dropped.

All participants were accompanied to the computer room, where they were left alone, provided with headphones and asked to watch a neutral or sexually arousing film clip. After watching the first clip participants completed the AAT, which was followed by the second clip. Consecutively, the E-Prime program was started in which participants had to complete the VAS. After having finished the computer tasks, participants were asked to indicate how many times they engaged in sexual activities during the period in between the two sessions. The experimenter did not interact with the participants between the videos nor between the tasks. Finally, participants received financial compensation and were debriefed about the nature of the study.

Data Reduction and Analysis

Data Reduction

Following the approach undertaken by Wiers, Rinck, Dicus, and Van Den Wildenberg (2009), median RTs were used to summarize participants' performance on the AAT. For each of

the six types of stimuli, the mean of the median RTs in the approach trials was subtracted from the mean of the median RTs in the avoidance trials (RT-landscape minus RT-portrait), resulting in a measure of automatic approach-avoidance tendency for each of the six stimulus types. The higher the score on the measure, the stronger the automatic tendency to approach a particular type of stimulus. Only the RT responses on the correctly executed trials were used in computing the AAT-measures. Mean ratings of willingness to kiss and of willingness to have sex with the male and female sexual stimuli of low, medium, and high attractiveness were calculated per stimulus category, with higher ratings indicating more willingness.

Statistical Analyses

All data were analyzed with SPSS (version 24.0.0.0), with a 5% level of alpha to test for the conventional level of significance. χ^2 tests and independent sample t -tests were used to explore the differences between the two sexual arousal conditions on sample characteristic variables, while z -tests with Bonferroni correction were used to compare column proportions. Frequency and descriptive statistics were used to compare compliant and non-compliant participants. To test whether participant sex and sexual arousal manipulation differentially affected automatic approach toward, and willingness to kiss and to have sex with other- and same-sex models, and whether these effects varied as a function of stimulus attractiveness, a 2 (Sexual Arousal) \times 2 (Participant Sex) \times 2 (Stimulus Sex) \times 3 (Stimulus Attractiveness) RM-ANOVA was conducted. If induced sexual arousal would result in stronger automatic approach toward, and a greater willingness to kiss and to consider having sex with models depicted in sexual stimuli, this effect would be reflected in a significant main effect of Sexual Arousal. If induced sexual arousal would result in stronger automatic approach toward, and a greater willingness to kiss and to have sex with models of medium and low attractiveness, this effect would be reflected in a significant interaction of Sexual Arousal and Stimulus Attractiveness. If induced sexual arousal would result in stronger automatic approach toward, and a greater willingness to kiss and to have sex with same-sex models, this effect would be reflected in a significant interaction of Sexual Arousal, Participant Sex, and Stimulus Sex. If women were more inclined than men to approach, kiss, and consider having sex with same-sex models, this effect would be reflected in a significant interaction of Participant Sex and Stimulus Sex. Additionally, to test whether participant sex, sexual arousal and sexual abstinence manipulation differentially affected automatic approach toward, and willingness to kiss and to have sex with other- and same-sex models, and whether these effects varied as a function of stimulus attractiveness, a 2 (Sexual Abstinence) \times 2 (Sexual Arousal) \times 2 (Participant Sex) \times 2 (Stimulus Sex) \times 3 (Stimulus Attractiveness) RM-ANOVA was conducted. The results of this analysis are not reported in the Results section; however, interested readers are directed to the online [Supplementary Tables 1–3](#).

Separate analyses were conducted on the AAT measures, the ratings of willingness to kiss, and the ratings of willingness to have sex. Significant group differences in responses to models of

Table 3. Sample characteristics.

Variable	Total		Range
	M (SD)	N	
Age (years)	23.58 (3.27)	115	18 – 38
Gender	% of N		
Male	46.96	54	
Female	53.04	61	
Ethnicity			N/A
Caucasian	83.48	96	
Asian	9.57	11	
African	1.74	2	
Latin	4.35	5	
Other	0.86	1	
In a relationship	51.30	59	N/A
Kinsey Scale			N/A
Exclusively heterosexual	58.66	67	
Predominantly heterosexual, only incidentally homosexual	34.78	40	
Predominantly heterosexual, but more than incidentally homosexual	6.56	8	
Sexual problems*	7.83	9	N/A
GRISS	M (SD)		
Male	115.25 (8.30)	53	95 – 130
Female	111.00 (11.80)	55	75 – 130
Hormonal contraception use (female)	% of N		
Total	51.61	32	N/A
Oral pill	81.25	26	
Patch	-	-	
Vaginal ring	6.25	2	
Other	12.50	4	

* Sexual problems refer to the presence of self-reported problems with erection, lubrication, pain during intercourse and inability to achieve an orgasm; GRISS = The Golombok Rust Inventory of Sexual Satisfaction.

low, medium, and high attractiveness were elucidated using independent sample *t*-tests and Bonferroni post-hoc comparisons. Gender differences in responding to male and female models of low, medium, and high attractiveness were examined using paired sample *t*-tests. Where the assumption of sphericity was violated, Greenhouse-Geisser correction was applied. Effect sizes were reported using partial eta squared (η_p^2).

Results

Sample Characteristics

Table 3 shows sample characteristics of the 115 participants that met the inclusion criteria. Participants in the sexual arousal: yes condition did not differ significantly from the participants in sexual arousal: no condition on any of the demographic characteristics and questionnaire scores (all *ps* > .212). Half of the women included in the current sample used some form of hormonal contraception (*n* = 32; 51.61%).

Sexual Abstinence Compliance

Table 4 shows the proportions of responses for compliant and non-compliant male and female participants. Overall, participants seemed to be of similar age, and they scored similarly on the GRISS. However, compared to compliant male participants, non-compliant male participants were more likely to be in a relationship, less likely to masturbate at least once a day, but more likely to engage in partnered intercourse 2–3 times a week. Moreover, non-compliant female participants were less likely to score “1 – Predominantly heterosexual, only incidentally

homosexual,” on the Kinsey Scale than the compliant female participants.

Approach-Avoidance Tendencies

Table 5 provides an overview of means and standard deviations for the AAT measures per stimulus category, broken down by manipulation and participant sex.

There was a significant main effect of Stimulus Attractiveness, indicating that overall, participants showed stronger automatic approach toward models of medium and high attractiveness compared to models of low attractiveness. This differential effect was most pronounced in women, as was reflected in a significant Stimulus Attractiveness x Participant Sex interaction effect. Most relevant for the current study there was also evidence that the impact of Stimulus Attractiveness varied as a function of Sexual Arousal, as evidenced by a significant interaction effect of those factors. This differential pattern across the dimension of stimulus attractiveness was attenuated by sexual arousal (see Figure 2) and did not result in a robust increase of automatic approach tendencies toward stimuli of low attractiveness. Finally, there was a main effect of Stimulus Sex, indicating that participants generally showed stronger automatic approach tendencies to female than to male stimuli. This effect was independent of the effects of Sexual Arousal and Stimulus Attractiveness and was similar for men and women.

Table 6 shows the results of the full-factorial 2 (Sexual Arousal) x 2 (Participant Sex) x 2 (Stimulus Sex) x 3 (Stimulus Attractiveness) RM-ANOVA on the AAT measures.

Subjective Ratings of Willingness to Kiss

Table 7 provides an overview of the means and standard deviations for the subjective measures of willingness to kiss per stimulus category per manipulation, broken down by participant sex.

The analysis showed no significant main effect of Sexual Arousal, indicating that heightened sexual arousal did not generally increase willingness to kiss models depicted in sexual stimuli. Moreover, the impact of sexual arousal manipulation on willingness to kiss did not vary as a function of Participant Sex and Stimulus Sex, indicating that sexual arousal did not increase willingness to kiss same-sex stimuli among men or women. As indicated by an absence of significant interaction effect of Sexual Arousal and Stimulus Attractiveness, the impact of sexual arousal manipulation on willingness to kiss did not vary as a function of stimulus attractiveness.

However, men and women differed in their willingness to consider having sex with same-sex and other-sex stimuli, as evidenced by a significant interaction effect of Participant Sex and Stimulus Sex. Moreover, this effect varied as a function of Stimulus Attractiveness. Thus, as revealed by paired sample *t*-tests, men were significantly more willing to kiss female, rather than male stimuli of low ($M_{\text{difference}} = 7.07$), $t(51) = 4.49$, $p < .001$, medium ($M_{\text{difference}} = 50.21$), $t(50) = 12.53$, $p < .001$, and high attractiveness ($M_{\text{difference}} = 82.14$), $t(51) = 29.02$, $p < .001$. In contrast, women were equally inclined to kiss male and female stimuli of low attractiveness ($M_{\text{difference}} = 0.01$), $t(58) = 0.05$, $p = .964$, but more inclined to kiss female than male stimuli

Table 4. Differences between compliant and non-compliant participants.

Variable	Compliant		Non-Compliant	
	Male (n= 9)	Female (n= 13)	Male (n= 20)	Female (n= 12)
	M (SD)/% of n	M (SD)/% of n	M (SD)/% of n	M (SD)/% of n
Age	23.11 (2.93)	22.77 (2.17)	23.05 (3.82)	24.33 (3.98)
GRISS	115.22 (10.24)	111.60 (15.99)	115.37 (7.14)	111.40 (13.66)
In a relationship	33.33	30.77	70.00	41.67
Masturbation frequency				
At least once a day	55.56	15.38	10.00	-
2–3 times a week	33.33	30.77	50.00	25.00
Once a week	-	7.69	20.00	33.33
Once in 2 weeks	11.11	15.38	20.00	16.67
Once a month	-	23.08	-	-
Less than once a month	-	-	-	16.67
Never	-	7.69	-	8.33
Sexual intercourse frequency				
At least once a day	11.11	7.69	15.00	-
2–3 times a week	33.33	23.08	65.00	41.67
Once a week	11.11	15.38	5.00	-
Once in 2 weeks	-	-	-	8.33
Once a month	11.11	30.77	-	8.33
Less than once a month	33.33	15.38	15.00	41.67
Kinsey Scale				
Exclusively heterosexual	77.78	38.46	75.00	66.67
Predominantly heterosexual, only incidentally homosexual	11.11	53.85	25.00	16.67
Predominantly heterosexual, but more than incidentally homosexual	11.11	7.69	-	16.67

Table 5. Means and standard deviations of the AAT measures for the stimuli of low, medium and high attractiveness as a function of group per sex.

Sexual Arousal	Participant Sex	Stimulus Attractiveness						N
		Low		Medium		High		
		Stimulus Sex		Stimulus Sex		Stimulus Sex		
		Male	Female	Male	Female	Male	Female	
		M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	
No	Male	-155.50 (298.10)	49.39 (290.86)	9.21 (296.15)	114.09 (217.49)	53.68 (299.32)	75.04 (275.80)	29
	Female	-172.22 (361.34)	-107.29 (406.22)	140.84 (386.69)	76.24 (418.03)	36.45 (316.80)	165.40 (369.85)	31
Yes	Male	7.58 (167.81)	72.10 (169.16)	37.56 (174.50)	27.02 (227.64)	-12.44 (228.64)	131.96 (215.69)	25
	Female	-136.02 (442.85)	-54.50 (329.24)	30.67 (166.33)	103.68 (289.20)	-124.60 (595.89)	98.00 (165.41)	30
Total		-119.34 (342.49)	-14.71 (320.49)	55.53 (275.60)	82.56 (300.06)	-13.30 (396.55)	117.16 (267.66)	115

Positive scores indicate faster approach than avoidance reactions to this category.

of medium attractiveness ($M_{\text{difference}} = 16.62$), $t(54) = 3.66$, $p = .001$, and more inclined to kiss male than female stimuli of high attractiveness ($M_{\text{difference}} = 40.31$), $t(58) = 9.73$, $p < .001$. Table 8 shows results of a full-factorial 2 (Sexual Arousal) x 2 (Participant Sex) x 2 (Stimulus Sex) x 3 (Stimulus Attractiveness) RM-ANOVA on the subjective ratings of willingness to kiss (VAS 1).

Subjective Ratings of Willingness to Have Sex

Table 9 provides an overview of the means and standard deviations for the subjective measures of willingness to have sex per stimulus category per manipulation, broken down by participant sex.

The analysis showed no significant main effect of Sexual Arousal, indicating that heightened sexual arousal did not generally increase willingness to consider having sex with sexual stimuli. Moreover, the impact of sexual arousal manipulation on willingness to consider having sex did not vary as a function of Participant Sex and Stimulus Sex, indicating that sexual arousal did not increase willingness to consider having sex with same-sex stimuli among men or women. As indicated by an absence of a significant Sexual Arousal and Stimulus Attractiveness interaction effect, the impact of sexual arousal manipulation on

willingness to consider having sex did not vary as a function of Stimulus Attractiveness.

Nevertheless, men and women differed in their willingness to consider having sex with same-sex and other-sex stimuli, as evidenced by a significant interaction effect of Participant Sex and Stimulus Sex, and this effect varied as a function of Stimulus Attractiveness. Thus, as revealed by paired sample t -tests, men were significantly more willing to consider having sex with female, rather than male, stimuli of low ($M_{\text{difference}} = 7.52$), $t(51) = 4.11$, $p < .001$, medium ($M_{\text{difference}} = 53.69$), $t(50) = 15.77$, $p < .001$, and high attractiveness ($M_{\text{difference}} = 71.89$), $t(51) = 35.15$, $p < .001$. In contrast, women were equally inclined to consider having sex with male and female stimuli of low attractiveness ($M_{\text{difference}} = 0.23$), $t(58) = 0.72$, $p = .472$, but more inclined to consider having sex with female than male stimuli of medium attractiveness ($M_{\text{difference}} = 20.29$), $t(54) = 4.95$, $p < .001$, and more inclined to consider having sex with male than female stimuli of high attractiveness ($M_{\text{difference}} = 34.65$), $t(58) = 10.00$, $p < .001$. Table 10 shows results of a full-factorial 2 (Sexual Arousal) x 2 (Participant Sex) x 2 (Stimulus Sex) x 3 (Stimulus Attractiveness) RM-ANOVA on the subjective ratings of willingness to consider having sex (VAS 2).

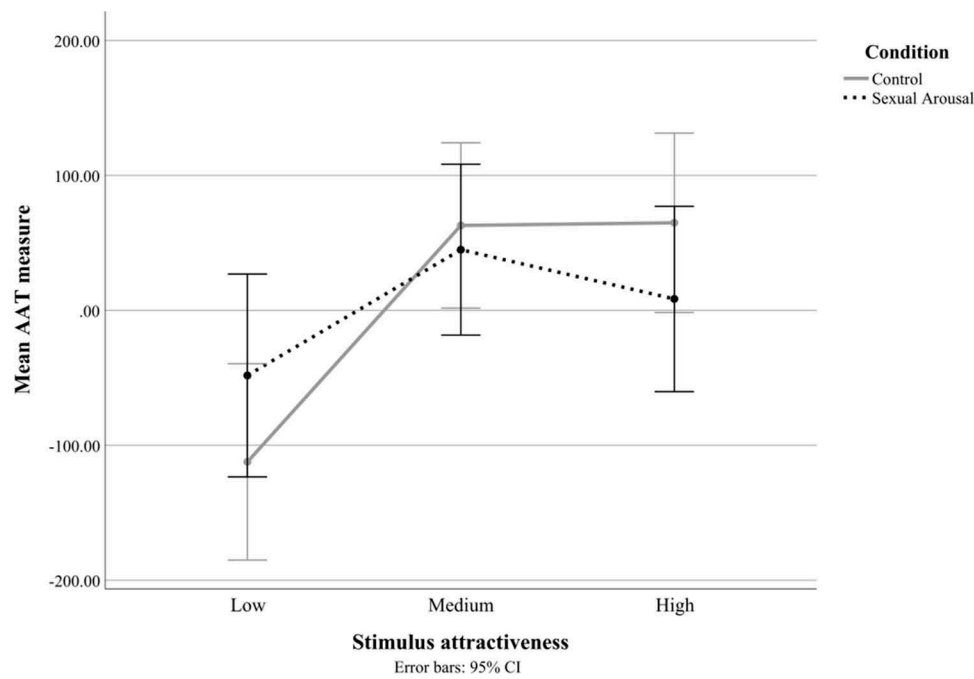


Figure 2. Differences in strength of automatic approach tendencies between sexually aroused and not aroused participants.

Table 6. Results of a full-factorial 2 (sexual arousal) x 2 (participant sex) x 2 (stimulus sex) x 3 (stimulus attractiveness) RM-ANOVA on the AAT measures.

Factor	df	F	p	η_p^2
Intercept	1	1.08	.300	0.01
Participant Sex	1	0.92	.341	0.01
Sexual Arousal	1	0.17	.685	< 0.01
Participant Sex x Sexual Arousal	1	0.98	.325	0.01
Error	107			
Stimulus Sex	1	18.23	<.001*	0.15
Stimulus Sex x Participant Sex	1	0.01	.924	< 0.01
Stimulus Sex x Sexual Arousal	1	0.23	.636	< 0.01
Stimulus Sex x Participant Sex x Sexual Arousal	1	2.46	.120	0.02
Error	107			
Stimulus Attractiveness	1.86	14.83	<.001*	0.12
Stimulus Attractiveness x Participant Sex	1.86	4.31	.017*	0.04
Stimulus Attractiveness x Sexual Arousal	1.86	3.41	.038*	0.03
Stimulus Attractiveness x Participant Sex x Sexual Arousal	1.86	0.45	.625	< 0.01
Error	199.21			
Stimulus Sex x Stimulus Attractiveness	1.90	1.96	.146	0.02
Stimulus Sex x Stimulus Attractiveness x Participant Sex	1.90	1.19	.304	0.01
Stimulus Sex x Stimulus Attractiveness x Sexual Arousal	1.90	1.23	.294	0.01
Stimulus Sex x Stimulus Attractiveness x Participant Sex x Sexual Arousal	1.90	0.87	.417	0.01
Error	202.86			

Asterisk (*) denotes statistically significant effects where $p \leq .050$.

Discussion

The main purpose of this study was to investigate possible factors that may promote the increase in breadth of sexual responding. In order to examine the influence of sexual abstinence on breadth of sexual responding, we attempted to manipulate the amount of sexual activity in a selected group of participants. However, since a substantial proportion of those participants did not manage to abstain from sexual activity during the assigned period of time, the effects of sexual abstinence could not be adequately tested. Thus, in the current study, we tested whether sexual arousal would promote

automatic (reflexive/impulsive) approach tendencies toward pictures of men and women in provocative poses as well as individuals' self-reported (reflective) willingness to kiss or have sex with these pictured men and women. In addition, we tested whether such impact would generalize to less attractive stimuli and/or to same-sex stimuli, and whether the pattern of automatic approach tendencies and sexual willingness would differ between men and women.

The main findings can be summarized as follows: (i) Overall, automatic approach tendencies and sexual willingness were greater for stimuli of medium and high attractiveness than toward stimuli of low attractiveness; (ii) This differential pattern of automatic approach as a function of stimulus attractiveness was attenuated by sexual arousal manipulation; (iii) There was no robust evidence to suggest that sexual arousal increased automatic approach tendencies to models of low attractiveness or same-sex models; (iv) Moreover, self-reported willingness to kiss and to consider having sex with the models was higher for models of high attractiveness and did not seem to be influenced by the sexual arousal manipulation; (v) Women reported higher sexual willingness to same-sex models than men, and showed stronger variability in reported willingness to kiss and to consider having sex as a function of stimulus attractiveness than men.

Sexual Arousal Effects

Consistent with previous research showing increased automatic approach to positively valenced stimuli (e.g., Chen & Bargh, 1999; Krieglmeier, Deutsch, De Houwer, & de Raedt, 2010), participants in the current study generally showed stronger automatic approach toward relatively attractive stimuli. This differential pattern was slightly attenuated by sexual arousal manipulation. Specifically, approach behavior toward other-sex stimuli of low and high attractiveness was

Table 7. Means and standard deviations of the subjective ratings of willingness to kiss (VAS 1) male and female stimuli of low, medium and high attractiveness as a function of group.

Sexual Arousal	Participant Sex	Stimulus Attractiveness						N
		Low		Medium		High		
		Stimulus Sex		Stimulus Sex		Stimulus Sex		
		Male	Female	Male	Female	Male	Female	
		M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	
No	Male	0.60 (1.75)	6.85 (9.82)	1.28 (2.84)	49.75 (30.67)	4.67 (10.37)	85.57 (19.20)	29
	Female	1.29 (3.40)	1.32 (3.11)	18.84 (19.85)	30.61 (25.24)	76.14 (21.61)	36.81 (31.65)	31
Yes	Male	0.24 (0.61)	8.28 (13.22)	0.60 (1.82)	52.83 (26.95)	2.90 (10.03)	86.49 (16.97)	25
	Female	0.73 (1.83)	0.68 (1.20)	15.77 (17.58)	38.12 (27.46)	72.68 (23.99)	31.43 (31.74)	30
Total		0.74 (2.19)	4.05 (8.60)	9.64 (15.90)	42.50 (28.69)	41.34 (39.62)	58.40 (36.78)	115

Higher ratings indicate more willingness.

Table 8. Results of a full-factorial 2 (sexual arousal) x 2 (participant sex) x 2 (stimulus sex) x 3 (stimulus attractiveness) RM-ANOVA on the subjective ratings of willingness to kiss (VAS 1).

Factor	df	F	p	η_p^2
Intercept	1	803.32	< .001*	0.89
Participant Sex	1	1.36	.251	0.01
Sexual Arousal	1	0.09	.762	< 0.01
Participant Sex x Sexual Arousal	1	0.01	.920	< 0.01
Error	102			
Stimulus Sex	1	163.01	< .001*	0.62
Stimulus Sex x Participant Sex	1	309.67	< .001*	0.75
Stimulus Sex x Sexual Arousal	1	1.33	.251	0.01
Stimulus Sex x Participant Sex x Sexual Arousal	1	0.06	.807	< 0.01
Error	102			
Stimulus Attractiveness	1.85	371.95	< .001*	0.79
Stimulus Attractiveness x Participant Sex	1.85	7.02	.002*	0.06
Stimulus Attractiveness x Sexual Arousal	1.85	0.50	.594	0.01
Stimulus Attractiveness x Participant Sex x Sexual Arousal	1.85	0.14	.855	< 0.01
Error	188.31			
Stimulus Sex x Stimulus Attractiveness	1.74	46.69	< .001*	0.31
Stimulus Sex x Stimulus Attractiveness x Participant Sex	1.74	182.78	< .001*	0.64
Stimulus Sex x Stimulus Attractiveness x Sexual Arousal	1.74	0.66	.497	0.01
Stimulus Sex x Stimulus Attractiveness x Participant Sex x Sexual Arousal	1.74	0.35	.674	< 0.01
Error	185.53			

Asterisk (*) denotes statistically significant effects where $p \leq .050$.

more similar among sexually aroused participants than among control participants, suggesting that induced sexual arousal increased automatic approach tendencies toward stimuli of low attractiveness and decreased these approach tendencies toward stimuli of high attractiveness. This effect is somewhat consistent with our hypotheses. However, considering its small effect size ($\eta_p^2 = 0.03$), as well as lack of a clear-cut

Table 10. Results of a full-factorial 2 (sexual arousal) x 2 (participant sex) x 2 (stimulus sex) x 3 (stimulus attractiveness) RM-ANOVA on the subjective ratings of willingness to consider having sex (VAS 2).

Factor	df	F	p	η_p^2
Intercept	1	822.95	< .001*	0.89
Participant Sex	1	2.90	.092	0.03
Sexual Arousal	1	0.08	.777	< 0.01
Participant Sex x Sexual Arousal	1	0.09	.763	< 0.01
Error	102			
Stimulus Sex	1	234.01	< .001*	0.70
Stimulus Sex x Participant Sex	1	348.63	< .001*	0.77
Stimulus Sex x Sexual Arousal	1	0.74	.391	0.01
Stimulus Sex x Participant Sex x Sexual Arousal	1	0.01	.932	< 0.01
Error	102			
Stimulus Attractiveness	1.79	315.39	< .001*	0.76
Stimulus Attractiveness x Participant Sex	1.79	17.40	< .001*	0.15
Stimulus Attractiveness x Sexual Arousal	1.79	0.84	.422	0.01
Stimulus Attractiveness x Participant Sex x Sexual Arousal	1.79	0.04	.952	< 0.01
Error	182.73			
Stimulus Sex x Stimulus Attractiveness	1.75	76.27	< .001*	0.43
Stimulus Sex x Stimulus Attractiveness x Participant Sex	1.75	174.75	< .001*	0.63
Stimulus Sex x Stimulus Attractiveness x Sexual Arousal	1.75	2.50	.092	0.02
Stimulus Sex x Stimulus Attractiveness x Participant Sex x Sexual Arousal	1.75	1.63	.205	0.02
Error	178.35			

Asterisk (*) denotes statistically significant effects where $p \leq .050$.

main effect of sexual arousal manipulation, it remains to be tested whether this represents a robust finding.

Moreover, sexual arousal manipulation did not affect either of the sexual willingness measures. That is, against our hypotheses, sexual arousal manipulation did not result in a general increase in willingness to kiss or to consider having sex with other- and same-sex stimuli, nor in a specific

Table 9. Means and standard deviations of the subjective ratings of willingness to have sex (VAS 2) with male and female stimuli of low, medium and high attractiveness as a function of group.

Sexual Arousal	Participant Sex	Stimulus Attractiveness						N
		Low		Medium		High		
		Stimulus Sex		Stimulus Sex		Stimulus Sex		
		Male	Female	Male	Female	Male	Female	
		M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	
No	Male	0.28 (0.61)	6.53 (8.40)	0.89 (2.11)	53.17 (26.51)	2.85 (6.73)	74.48 (15.92)	29
	Female	0.80 (3.26)	0.48 (0.79)	17.38 (20.32)	31.21 (20.56)	69.46 (26.69)	39.40 (28.10)	31
Yes	Male	0.20 (0.48)	9.19 (17.43)	0.33 (0.82)	55.64 (21.88)	0.67 (2.03)	72.85 (13.53)	25
	Female	0.77 (2.08)	0.64 (1.74)	12.30 (15.55)	39.32 (24.80)	69.94 (27.18)	30.85 (25.30)	30
Total		0.53 (2.01)	3.93 (9.78)	8.16 (14.97)	44.48 (25.34)	37.91 (39.32)	53.17 (29.26)	115

Higher ratings indicate more willingness.

increase toward same-sex stimuli or toward stimuli of low and medium attractiveness. Thus, it seems that under laboratory conditions, sexual arousal induced by means of erotic videos was ineffective in amplifying the attractiveness of less physically attractive stimuli or same-sex stimuli to a degree that would increase automatic approach tendencies and self-reported sexual willingness related to the models depicted in these stimuli. Previous research using self-stimulation at home (Ariely & Loewenstein, 2006), or erotic audio narratives (Imhoff & Schmidt, 2014) and pornographic film clips (Skakoon-Sparling et al., 2016) in the lab to increase sexual arousal, provided evidence that heightened sexual arousal increased self-reported willingness to engage in uncommon or risky sexual activities. The current findings indicate that the impact of sexual arousal does not generally extend to lowering the threshold for the automatic approach and sexual willingness toward individuals of low a priori attractiveness. Despite the fact that there was more potential for an increase in willingness to have sex with less attractive same-sex stimuli, especially in men, no such effect was observed. Therefore, the current findings provide no support for the view that the state of sexual arousal promotes widening of the array of sexual stimuli that participants are sexually attracted to by strengthening the motivation to satisfy one's sexual needs (Ariely & Loewenstein, 2006; Imhoff & Schmidt, 2014; Kringsbach & Rolls, 2004).

Gender Effects

In line with our predictions, female participants were found to be more willing to kiss and to consider having sex with female, rather than male, stimuli of medium attractiveness. Female participants were equally willing to kiss and to consider having sex with male and female stimuli of low attractiveness. In contrast, male participants were consistently more willing to kiss female than male stimuli across all attractiveness levels. Thus, in agreement with previous theoretical and empirical works (Baumeister, 2000; Diamond, 2008; Savin-Williams & Ream, 2007), as well as our predictions, female participants were characterized by a greater breadth of subjective sexual responding than male participants, as indicated by their equal willingness to kiss and to consider having sex with both male and female models of low and medium attractiveness. In contrast, the breadth of subjective sexual responding of male participants was generally small, in the sense that men were uniformly more willing to kiss and to consider having sex with female rather than with male models, regardless of their attractiveness. No generally accepted explanation exists for the observed sex differences, with researchers proposing that various evolutionary and sociocultural influences may be at play (e.g., Baumeister, 2004; Buss & Schmitt, 1993; Simpson & Gangstad, 1992). Regarding sociocultural influences, some point to the fact that there is generally a greater social acceptance toward non-heterosexual expression of female than male sexuality (e.g., Herek, 2002). Thus, perhaps the observed gender effects reflect the fact that same-sex sexual behavior among women is viewed as more socially acceptable than the same behavioral expression among men. It is also noteworthy that female participants showed no

differential preference for male and female stimuli of low attractiveness but seemed to prefer female stimuli of medium attractiveness over male stimuli of the same attractiveness, while expressing preference for male stimuli of high attractiveness over female stimuli of high attractiveness. A positive sexual response can generally be expected to occur in response to the preferred (gendered) stimuli. Yet, sexual orientation can be comprised of multiple dimensions e.g., sexual activity preference, age, nurturance, etc. (Chivers & Brotto, 2017). Thus, it could be that the highly attractive stimuli were appraised differently than those of medium and low attractiveness on one or more of those dimensions, increasing the salience of gendered preference for sexual stimuli. To arrive at firmer conclusions concerning the nature of response specificity in men and women, more research into sociocultural gender roles, as well as the cognitive and affective systems governing the processing of sexual stimuli, is needed.

Men and women showed some differences with regard to their pattern of automatic approach behaviors toward sexual stimuli of low, medium, and high attractiveness. This differential pattern seemed to be mainly driven by a relatively strong inclination of women to avoid stimuli of low attractiveness. Low value mates, such as those depicted in the stimuli of low attractiveness, can induce feelings of (sexual) disgust (Tybur et al., 2009), an emotion associated with strong avoidance tendencies (Tybur, Lieberman, Kurzban, & DeScioli, 2013). Women tend to be more prone and sensitive to disgust experiences than men (Grauvogl et al., 2015; Haidt, McCauley, & Rozin, 1994), and thus, the behavioral avoidance away from the sexual stimuli of low attractiveness observed among women might have been driven by sex differences in disgust sensitivity.

Strengths and Limitations

To our knowledge this study is the first to use stimuli categorized a priori based on the physical attractiveness of the models. It is also the first to experimentally test the causal influence of sexual arousal on automatic approach tendencies and self-reported sexual willingness, in both men and women. However, several limitations of the current study should be considered. Perhaps the biggest shortcoming pertains to the failure of the sexual abstinence manipulation, which precluded us from testing its effects. Interestingly, it appears that there were systematic differences between those participants who were compliant and those who did not. First, non-compliant participants were more likely to be in a relationship than the compliant participants. This might have increased the availability of their sexual stimulus (i.e., romantic partner), resulting in higher frequency of encounters with strong sexual incentives, which in turn could have made it more difficult to abstain from sexual activity. Indeed, non-compliant participants were less likely to masturbate at least once a day than the compliant participants and were more likely to have intercourse 2–3 times per week than the compliant participants. Rather than treating these participant characteristics as exclusion criteria, in order to more optimally determine the sexual abstinence duration, future research could include manipulation of the abstinence

duration to pinpoint the time when participants develop sexual urges more accurately. This can be done by assigning the abstinence period not only based on participants' gender, but also by accounting for the individual differences in sexual excitation propensity or sexual desire. Alternatively, scheduling testing sessions at times when participants experience a strong sexual urge and are considering engaging in sexual activity, while using abstinence duration as a covariate, may allow researchers to capture the effects of sexual abstinence more efficiently. Thus, researchers are advised to keep in mind that participants might have difficulties in refraining from any sexual activities.

The current study was conducted under laboratory conditions and it remains unknown whether similar effects can be observed in real-life situations. The sexual stimuli were categorized into three attractiveness levels, encompassing the two furthest ends of the absolute attractiveness spectrum and one category in the middle. Whereas the models of medium and high attractiveness were of comparable quality, the models of low attractiveness were markedly different, depicting relatively less attractive individuals, including older models and models of more diverse body types. Thus, the attractiveness of that stimulus category could be viewed in relative terms, since other populations could rate the models as more attractive, e.g., members of a similar age category. It could be that the models from the lowest attractiveness category elicited rather negative emotions in students compared to the models from the other two attractiveness categories. Examining both relative and absolute stimulus attractiveness could paint a more comprehensive picture regarding the influences of own and stimulus attractiveness on automatic approach tendencies and sexual willingness. Moreover, the stimuli may have not been representative of real-world conditions, where a greater variety of stimuli is present. We recommend that future researchers include more than three levels of attractiveness to account for the real-world differences in human attractiveness. Another consideration pertains to the stimulus equivalence in attractiveness ratings obtained in the pilot study. Male and female participants in the pilot study gave different ratings of attractiveness to same-sex and other-sex stimuli. Women rated male stimuli of low attractiveness at 0.77, and female stimuli of low attractiveness at 1.14, whereas men rated female stimuli of low attractiveness at 2.56 and male stimuli of low attractiveness at 0.71, all on a 100-point attractiveness scale. It is thus possible, although unlikely, that the differences attributed to interactions of participant sex and stimulus attractiveness may have been influenced by the lack of stimulus equivalence.

The current study did not utilize any subjective or genital measures of sexual arousal. Considering the excitatory potential of the pictorial stimuli used during the computer tasks, use of both subjective and genital measurements of sexual arousal could be implemented in order to gain greater experimental control and to aid interpretation of the effects observed in the behavioral and subjective tasks. Relatedly, as the erotic video clips used to induce sexual arousal were not validated, but rather pre-selected by a panel of experts,

monitoring participants' genital responses throughout the experiment could also serve as a manipulation check for the sexual arousal induction procedure. Consistent with previous AAT-research (e.g., Krieglmeyer et al., 2010; Neimeijer, Roefs, Ostafin, & de Jong, 2017; Van Gucht, Vansteenwegen, Van den Bergh, & Beckers, 2008), standard keyboards were used to assess participants' response latencies during the AAT. Because computer keyboards are typically less accurate/stable than specialized response box devices, this may have reduced the sensitivity of our AAT measures. However, the finding that the AAT effects were highly responsive to the models' attractiveness seems to indicate that the keyboards used in the current study showed considerable sensitivity to pick up differential RTs. Previous research in the context of substance misuse, phobic fears, and disordered eating supported the validity of the AAT, in the sense that AAT measures could differentiate between groups, showed prognostic value, and showed sensitivity to experimental mood manipulations (Neimeijer, de Jong, & Roefs, 2015; Neimeijer et al., 2017; van Hemel-ruiter et al., 2011; Veenstra & de Jong, 2012). The current findings support the usefulness and validity of the AAT also as a measure of automatic approach tendencies within the context of sexual stimuli.

It is also important to note that half of the female participants in the current study used hormonal contraception. Extensive literature indicates that for women the preferred physical features in their sexual partners (e.g., body type, facial features) change throughout the menstrual cycle, and with the use of hormonal contraceptives (e.g., Alvergne & Lummaa, 2010; Jones et al., 2005). Although female participants in the current study provided data in line with the hypotheses, it would be interesting to see whether the observed effects are different when women are tested at two time points, e.g., one during ovulation and one in the late luteal phase of the menstrual cycle.

Finally, it needs to be considered that though we took measures to reduce selection bias, for instance, not mentioning the term "sexual preferences," we are aware that studies advertised as being on sexual topics will likely result in some level of selection bias.

Conclusions

This study examined the effects of sexual arousal on automatic approach tendencies and self-reported sexual willingness of heterosexual men and women toward other- and same-sex models that varied in a priori attractiveness. In contrast to previous findings, no evidence was found for increased breadth of sexual responding under the influence of sexual arousal. Nevertheless, in concordance with a growing body of research, we have demonstrated that men and women differ in their sexual responding. Women showed lower sexual responding, but to a larger variety of stimuli, and men showed a tendency to respond more strongly, but solely to their preferred stimuli. Taken together, the current findings provided no support for the hypothesis that heightened sexual arousal promotes sexual interest to a broader array of sex partners.

Acknowledgments

The authors are grateful to numerous people that assisted in this study, e.g., to the many students that conducted pilot work in order to decide on the optimal stimuli and for determining the duration that is necessary for sexual abstinence. These include BSc Students, Marlene D Borchert, Irina Masselman, Marc Schnorr, Benedict Reichrath & Benjamin Ahlmeyer, and MSc students, Charlotte S. Hagenau, Frederique Wesseling, Andree Kleistra, Tim van Noppen, and Benedict Reichrath. Frederique and Benedict (the latter, conducted both his BSc and the MSc thesis on this work) were actively involved from the early stages of brainstorming about the design, in the implementation of this work, and in sorting, inputting and screening the data. Finally, we are indebted to all the participants that made this study possible.

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