Journal of Boredom Studies (ISSN 2990-2525)
Issue 3, 2025, pp. 1-20
https://doi.org/10.5281/zenodo.15479032
https://www.boredomsociety.com/jbs

State Boredom and Sexual Arousal in Men: No Evidence for Effects on Genital and Subjective Measures

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How to cite this paper: Brown, M. L., Rieger, G., and Van Tilburg, W. A. P. (2025). State Boredom and Sexual Arousal in Men: No Evidence for Effects on Genital and Subjective Measures. *Journal of Boredom Studies*, *3*. https://doi.org/10.5281/zenodo.15479032

Abstract: Past research alleges boredom to trigger markers of sexual arousal, including sexual sensation seeking, promiscuity, and pornography consumption among men. Yet, this past work relied on self-report and did not directly investigate sexual arousal. We experimentally tested if state boredom increases male genital arousal (via penile string gauges) alongside self-reported arousal. Participants identified as exclusively heterosexual or mostly heterosexual men. They watched boredom-inducing or comparatively neutral control videos, followed by footage displaying either men or women masturbating. Bayesian tests show that despite a successful experimental induction of state boredom, participants did not display different levels of genital or subjective arousal towards preferred or less preferred targets in the boredom condition than neutral condition. Rather, results provided moderately strong evidence for the null-hypothesis. These findings suggest that previously-reported links between trait boredom and sexual sensation seeking, promiscuity, and pornography do not translate to an impact on sexual arousal at state level.

Keywords: boredom, arousal, genital arousal, emotion, sex.

Received 23 February 2025; Accepted 19 May 2025.

1. Introduction

Boredom is a common affective state that is estimated to feature in approximately 2.8% of each 30-minute period of people's waking hours (Chan et al., 2018)—the equivalent of 2 years in an 80-year long life. It is an unpleasant experience (Smith and Ellsworth, 1985), and distinct in its phenomenology from correlated feelings such as sadness, frustration, anger, apathy, and depression (Goldberg et al., 2011; Van Tilburg and Igou, 2012, 2016). Boredom is often defined as "the aversive experience of wanting, but being unable, to engage in satisfying activity" (Eastwood et al., 2012, p. 428) and features an inability to focus or engage attention on an activity (Hunter and Eastwood, 2018; Tam et al., 2021). People who feel bored generally report restlessness (Danckert et al., 2018a), disinterest (Eastwood et al., 2012), and a lack of purpose and challenge (Van Tilburg and Igou, 2012).

Researchers propose that boredom serves a self-regulatory psychological function. By signaling a lack of purpose, novelty, excitement, attentional, and cognitive engagement, boredom may encourage the search for alternative activities that redress this imbalance (Bench and Lench, 2019; Danckert et al., 2018b; Elpidorou, 2014; Tam et al., 2021; Van Tilburg and Igou, 2011; Westgate and Wilson, 2018). This self-regulatory pursuit may have positive outcomes, such as sparking curiosity (Hunter et al., 2016), retrieving self-soothing nostalgic memories (Van Tilburg et al., 2013), and encouraging exploration (Danckert, 2019). Yet, most documented correlates and consequences of boredom have focused on the negatives rather than the positives, including excessive gambling (Mercer and Eastwood, 2010), substance use (LePera, 2011), and monetary risk-taking (Kiliç et al., 2019) to name just a few (for reviews, see Moynihan et al., 2021b; Van Tilburg et al., 2024; Vodanovich and Watt, 2016). Accordingly, despite its psychological functionality and select positive outcomes, research has predominately focused on negative consequences.

1.1. Boredom and Sexual Arousal and Behavior

Sexual arousal is an important element of reproductive behavior (Levin, 2005). There are several psychological and situational predictors of sexual arousal. These include mood, attention, and use of pornography or alcohol (De Jong, 2009; George and Norris, 1991; Julien and Over, 1988; Mitchell et al., 1998), in addition to physical attraction (Janssen et al., 2007). Among the various causes of sexual arousal, boredom has recently gained increased attention.

Moynihan and colleagues (2021b) proposed that boredom triggers a desire for increasing physiological arousal, which sexual activities may offer and thereby help reduce boredom. These researchers furthermore suggested that sexual activities quench temporarily the awareness of one's purposeless predicament under boredom (see also Wisman, 2006). The acute focus on pleasure and excitement that comes with sexual activities (Kor et al., 2014; Reid et al., 2008) helps people to disconnect from undesirable feelings (Chaney and Chang, 2005; Reid et al., 2009; Taubman Ben-Ari, 2004).

Research, predominantly among men, shows that people who score high on trait boredom express greater sexual sensation seeking, report a higher willingness to engage in risky sexual behavior, are more likely to engage with pornography (Arnett, 1990; Bőthe et al., 2020; Miller et al., 2014; Moynihan et al., 2021a, 2022), and masturbate more (Gana et al.,

2001). Further, trait boredom has been alleged a cause of risky sexual behavior (e.g., Miller et al., 2014), and sex addiction (Chaney and Blalock, 2006). In a qualitative study by Jewkes and colleagues (2010) on male rapists' motives, feelings of boredom were reported as reason for conducting rape in as many as one-third of cases. In addition, a recent systematic review (de Oliveira and Carvalho, 2020) found evidence for a link between boredom proneness and hypersexuality—an impulse control disorder featuring compulsive sexual behavior. A study by Coleman and colleagues (2023), with a large sample of over 800 participants, suggested that this link may be attributable to the poorer self-regulation of affect among those high in boredom proneness, with sexual behavior being sought out by those high in boredom proneness in the attempt to remedy negative moods and boredom. Indeed, empirical evidence tentatively supports the notion that sexual content may reduce boredom. Bergen and colleagues (2015) found that levels of state boredom dropped after sexual online interactions with others. Moreover, pornography use appears to be a coping mechanism among those high in trait boredom, which in-itself increased overall sexual sensation seeking (Moynihan et al., 2021a, 2022). With boredom being commonly experienced throughout the population, and currently on the rise in Western society (Chin et al., 2017), understanding the link between boredom and sexual arousal is pressing.

Notably, all these past studies relied on self-reports and with few exceptions measured boredom not as state experience but rather as individual difference—i.e., some people, more than others, feel bored frequently and see life in general as dull (Tam et al., 2021; Van Tilburg, 2024). In sum, the previously alleged link between boredom and men's sexual arousal is exclusively inferred based on correlational studies, by looking primarily at differences in boredom between persons rather than within individuals, and by solely using subjective self-report measures of their sexual arousal. Thus, despite the possible causal impact of boredom on sexual arousal and its markers (e.g., sexual sensation seeking) in theory and reviews (e.g., de Oliveira et al., 2021; Koukounas and McCabe, 1997; Moynihan et al., 2021b), the current lack of experimental methods and objective measures of sexual arousal render these interpretations speculative. We sought to address this issue by investigating if state boredom causes men's arousal when presented with pornographic stimuli, using an experimental methodology with an objective sexual arousal measure.

1.2. Current Study

Existing empirical and theoretical work has linked boredom, especially among men, to various self-reported sexual behaviors and sexual arousal measures in response to preferred-sex others. We build on this prior work in several ways. We sought to test if boredom increases men's sexual arousal by measuring this directly, using an objective measure of genital arousal, in addition to self-reports of sexual arousal. Building on earlier theorizing, it is plausible that state boredom may do so. Researchers have proposed that individuals who feel bored may be attuned to remedies to their predicament available in the environment (Moynihan et al., 2021a, 2022), and may display a readiness to focus attend on sexual stimuli and become aroused.

We employed a within-subjects experimental design in which we manipulated state feelings of boredom. Different from prior work on the topic, this approach offered us to evaluate the hitherto-unsubstantiated but critical assumption that boredom causally raises

sexual arousal. This experimental approach also offered the opportunity to test whether the link between boredom and sexual arousal occurs in response to boredom states, rather than individual differences in boredom.[1]

2. Method

2.1. Participants

Participants were 48 male individuals recruited through advertisements in emails and social media sites, and through the university research recruitment pool. Four participants were excluded from analyses of genital arousal due to issues with the apparatus. We sought to collect data from as many participants as practically and financially feasible within a limited period of time, which given the nature of the study can be particularly challenging. The study received ethical approval by the Ethics Committee of the University of Essex Research Governance team.

Sexual orientation was not a key factor in this study (which was about the link of sexual arousal with boredom), and therefore we did not actively search for men of specific sexual orientations. For this reason, the majority (but not all) men who took part in this research identified as heterosexual. Still, it was important to collect data on sexual orientation, as the degree of sexual arousal is dependent on which sex was preferred. We detail the procedures of how to assess arousal to the preferred sex towards the end of Method section.

Participants reported their sexual orientation using the Kinsey et al. (1948) 7-point Likert scale. Men self-identified as "exclusively heterosexual" (n = 25), "mostly heterosexual" (n = 14), "bisexual leaning heterosexual" (n = 1), "bisexual" (n = 2), or "bisexual leaning gay" (n = 2). Averaged genital arousal scores were highest for female targets for 36 (38) participants in the high (low) boredom condition, with 8 (6) preferring male targets. Averaged self-reported sexual arousal in the low boredom condition indicated preference for female sexual targets among 42 participants and for male targets in 2 participants, and the same frequencies in the high boredom condition.

Participants' mean (SD) age was 26.04 (12.12). Twenty were White, followed by 14 Asian, 5 Mixed, and 4 Black; 2 participants selected the "other" labeled ethnicities.

2.2. Procedure, Materials, and Measures

Before taking part, participants gave informed consent and declared that they were at least 18 years old. They also completed an online survey on self-reported age, gender, ethnicity, and sexual orientation.[2] On arrival in the lab, participants were seated in a private, sound-proof

[1] Data can be accessed at: https://osf.io/eshbt/.

[2] Participants reported prior to the lab experiment also their trait boredom, sexual sensation seeking, and pornography consumption. The participant recruitment for studies on genital arousal can be challenging, and, in line with good practice, we restricted data collection to a set period of time. We included measures of trait boredom, sexual sensation seeking, and pornography consumption as exploratory variables for the eventuality that a larger number of participants had taken part, of sufficiently size to examine these variables. Unfortunately, the sample we managed to collect did not afford examination of these variables and we limited ourselves to the key (within-person) analyses accordingly.

booth. They received instructions on how to put on the penile string gauge, which resembles a small flexible lasso and captures the change in penile circumference. Genital arousal in men is a strong indicator of sexual arousal to stimuli (Janssen, 2011; Janssen et al., 2002), and penile string gauges have high validity and reliability for their intended use (e.g., Farkas et al., 1979; Janssen, 2012; Janssen et al., 1997), therefore it is the preferred measure of male sexual arousal (Seto, 2004).

Genital response was assessed every 5 milliseconds using a BIOPAC MP160 unit and AcqKnowledge software. Signals were acquired at a sampling rate of 200 Hz, followed by low-pass filtering (10 Hz) and digitization (16 bits). Prior to participant testing, the gauge had been calibrated using a cone in increments of 5mm, with calibration points at 80mm and 110mm intervals. We checked the signal and accuracy of the genital device before commencing each experimental session.

Next, participants watched eight 3-minute pornographic videos. Four of these displayed a man masturbating and four displayed a woman masturbating; all actors were alone in a bedroom, with close ups on genitals and some women using vibrators. All videos were edited using Shutter Encoder to be of similar quality, ratio, and lighting. The chosen male and female models had been previously rated as the most attractive from a pool of 200 videos and used in past work on sexual arousal (Rieger et al., 2015).

Each pornographic clip was preceded by a non-sexual stimulus. This was either one of four 3-minute videos of a washing machine (high boredom condition) or one of four comparatively neutral 3-minute clips from a nature documentary (low boredom condition; Moynihan et al., 2015). These videos allowed the participants to reach an unaroused state before and after each sexual video, but also facilitated our experimental boredom induction. Previous studies have used neutral videos from 90s to 120s while remaining an adequate length to reduce arousal to a baseline state (Gruia et al., 2022).

Pairings of (high vs low) boredom videos with subsequent pornographic clips were randomized in order across participants. However, to ensure that each participant was exposed to both nature and boredom videos, pairings were balanced such that the male clips were twice preceded by a high boredom video and twice by a low boredom video; likewise, the female videos were twice preceded by a high boredom video and twice by a low boredom video. After watching the high or low boredom video, and before proceeding to the pornographic video, participants reported felt boredom on three manipulation check items, and participants also self-reported sexual arousal after watching each of the pornographic videos (details below).

The genital arousal data were processed using established procedures (Watts et al., 2018): First, we averaged and then *z*-scored, within participants, the genital arousal responses to each sexual video. We also averaged and *z*-scored, within participants, the arousal responses to the 10 seconds that preceded each sexual video (these 10 seconds were our baseline measure for each video). Furthermore, for each combination of stimulus sex and boredom condition, we created averages to reflect each participant's overall response to both males and females, and this after high or low exposure to boredom.

We then calculated participants' sexual arousal to their preferred sex and less-preferred sex (technically, "more-arousing sex" and "less-arousing sex"). Specifically, we checked for each participant whether they were more aroused to males or to females, on average; the higher one was considered the preferred sex, and the lower one was considered the less-preferred sex, consistent with past research (Raines et al., 2021). Doing so helped us accommodate the fact that not all participants were heterosexual, and that we had a handful of bisexual males for whom we would not a-priori decide to which sex they should be more or less aroused to; measure of preferred sex across sexual orientations was therefore more meaningful than a measure to one sex or the other. This resulted in four averages for each participant: genital arousal to the preferred sex for the high boredom condition, genital arousal to the preferred sex for the low boredom condition, genital arousal to the less-preferred sex for the high boredom condition, and genital arousal to the less-preferred sex for the low boredom condition.

We also employed a subjective measure of sexual arousal using a three-item scale presented after each pornographic video ("How sexually appealing is this person to you?", "How much would you like to have sex with this person?", "How sexually attracted are you to this person?"; 1 = *not at all*, 7 = *very much*). A three-item boredom manipulation check ("How bored were you watching this video?", "How engaging was this video to you?" [reversed], "How dull was this video?"; 1 = *not at all*, 7 = *very much*) featured after each high or low boredom video, and before the ensuing pornographic clip. The orders of items in subjective sexual arousal and the boredom manipulation check were randomized. The subjective arousal measures were averaged and *z*-scored using the same procedure as for the genital arousal measure.

3. Results

3.1. Boredom Manipulation Check

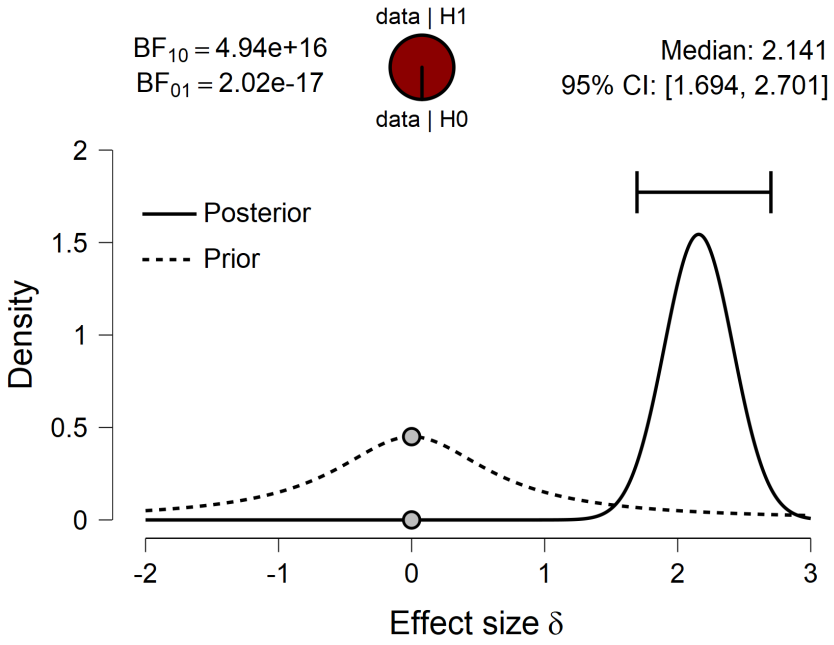
We compared the aggregated self-reported boredom reported after high boredom videos against self-reported boredom after the low boredom videos using a Bayesian paired samples *t*-test in JASP (JASP Team, 2024). We assumed an equal prior probability of the null-model and alternative model, specifying the default Cauchy distribution with spread $r = 0.707$ (Van Doorn et al., 2021). On average, participants felt more bored after watching the highly boring videos ($M = 6.18$, $SD = 0.80$; Credibility Interval [*CI*95%] = [5.94; 6.41]) than the low boredom videos ($M = 3.62$, $SD = 1.04$, *CI*95% = [3.31; 3.92]). Given these priors and data, the alternative model was estimated $BF_{10} = 4.94\times10^{16}$ ($e = 2.30\times10^{-20}$) times more likely than the null, considered very strong evidence for it (Hoijtink et al., 2019). Figure 1 displays prior and posterior effect sizes, with positive values reflecting a greater standardized difference between high and low boredom conditions. We conclude that the manipulation was successful.

3.2 Genital Arousal

We hypothesized that manipulated boredom increases genital arousal towards preferred-sex sexual stimuli. We accordingly predicted that sexual response would be strongest for a sexual video (vs baseline) when boredom was high and the target was preferred. We tested this with a three-way interaction, using the following design: 2 (boredom condition: high vs low) × 2

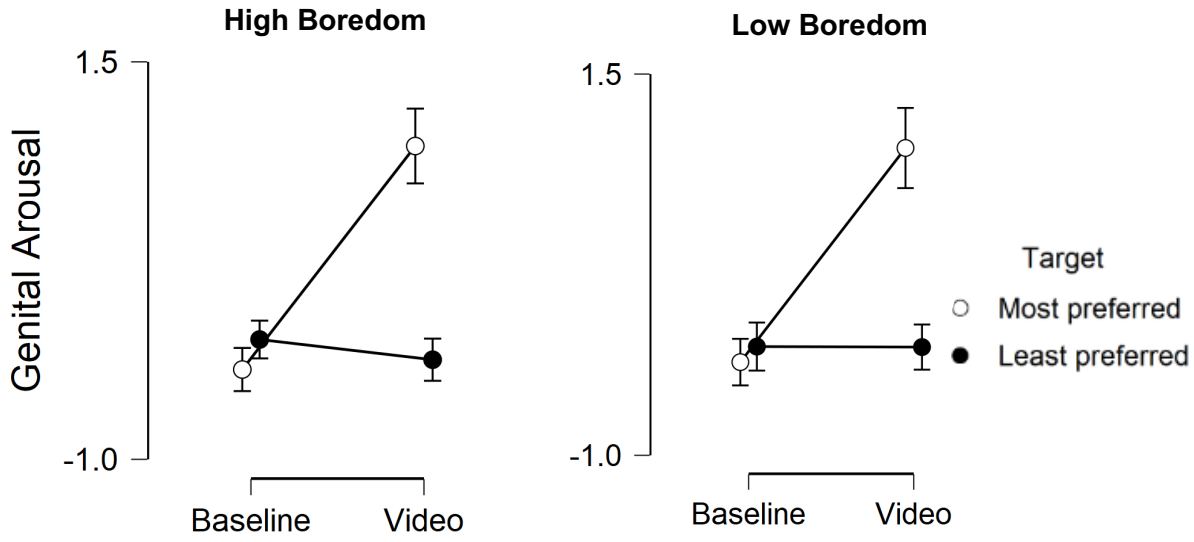
(measurement: baseline vs video response) × 2 (target: most preferred vs least preferred) Bayesian within-subjects ANOVA. Figure 2 displays the means and credibility intervals.

Figure 1. Prior and Posterior Effect Sizes for the Difference in Felt Boredom Across Boredom Conditions



Note: Higher values indicate a higher felt boredom in the high boredom condition compared to the low boredom condition.

Figure 2. Genital Arousal Across Conditions



Note: Higher scores indicate higher genital arousal. Error bars represent 95% credibility intervals.

We followed recommendations by Van den Bergh et al. (2020) for Bayesian ANOVA: given the large number of interaction terms (resulting in 19 possible unique models, including the null-model), we considered model-averaged results for 'matched' models only; i.e., models with interaction terms were compared only to other models that feature the same independent variables but without the interaction term (as suggested by Sebastiaan Mathôt; see Van den Bergh et al., 2020). This resulted in seven averaged models whose predictors were each assigned a prior inclusion probability of $P = .263$, with the exception of the triple interaction model, which was assigned a prior inclusion probability of $P = .053$.[3]

Table 1 gives the results of this analysis, and Table 2 reports corresponding posteriors. Inclusion Bayes factors provided strong evidence for considering main effects of measurement and target, alongside a measurement × target interaction. At the same time, the data offered moderate evidence for the absence of any main or interaction effects of boredom. Three pairwise comparisons within the measurement × target interaction, using Bayesian paired sample *t*-tests, offered (1) strong evidence for genital arousal increasing relative to baseline when watching the most preferred target, $BF_{10} = 3.68\times10^{11}$ ($e = 8.14\times10^{-15}$), (2) strong evidence for genital arousal being higher for videos that featured most preferred vs least preferred targets, $BF_{10} = 1.41\times10^{10}$ ($e = 1.02\times10^{-13}$), and (3) moderate evidence for no change in genital arousal between baseline and video when watching least preferred targets, $BF_{10} = .16\times10^{11}$ ($e = 1.40\times10^{-5}$).

In all, and in defiance of our hypothesis, the results evidenced moderately strongly an absence of any experimental boredom effects. Instead, results indicated that genital arousal generally increased when watching a pornography video of a preferred-sex target.

Table 1. Matched Model Averaged Results for Genital Arousal

Effects	*P*(inclusion)	*P*(inclusion | data)	$BF_{inclusion}$
Boredom	0.263	0.113	0.13
Measurement	0.263	2.820×10^{-25}	8.00×10^{14}
Target	0.263	2.825×10^{-25}	3.79×10^{11}
Boredom × Measurement	0.263	0.026	0.19
Boredom × Target	0.263	0.023	0.17
Measurement × Target	0.263	0.999	3.46×10^{24}
Boredom × Measurement × Target	0.053	9.627×10^{-4}	0.24

Note: Compares models that contain the effect to equivalent models stripped of the effect. Analysis suggested by Sebastiaan Mathôt.

[3] Note that each of the 19 possible models (including null-model) was assigned the same prior of $P = 1/19 = .053$. The triple interaction model cannot be averaged with any other model and hence retains its individual $P = .053$ as its prior inclusion probability.

Table 2. Model Averaged Posteriors for Genital Arousal

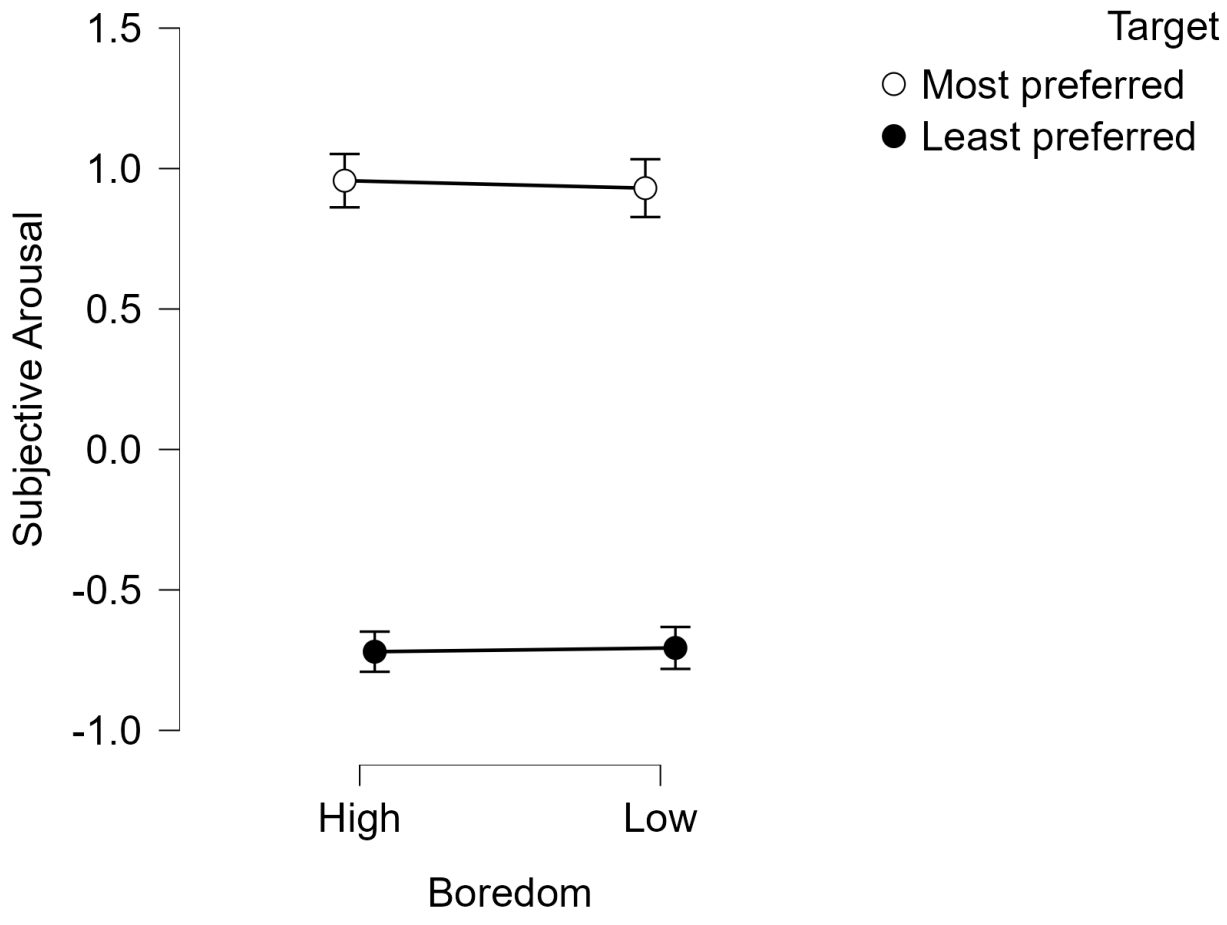
Variable	Condition	*M*	*SD*	95% *CI* Lower	95% *CI* Upper
Intercept		-0.01	0.04	-0.08	0.07
Boredom	High	-0.02	0.03	-0.08	0.04
	Low	0.02	0.03	-0.04	0.07
Measurement	Baseline	-0.33	0.03	-0.39	-0.27
	Video	0.33	0.03	0.27	0.39
Target	Most preferred	0.29	0.03	0.23	0.35
	Least preferred	-0.29	0.03	-0.36	-0.23
Boredom × Measurement	High & Baseline	0.01	0.03	-0.05	0.07
	High & Video	-0.01	0.03	-0.08	0.04
	Low & Baseline	-0.01	0.03	-0.08	0.04
	Low & Video	0.01	0.03	-0.05	0.07
Boredom × Target	High & Most preferred	-0.01	0.03	-0.07	0.05
	High & Least preferred	0.01	0.03	-0.05	0.06
	Low & Most preferred	0.01	0.03	-0.05	0.06
	Low & Least preferred	-0.01	0.03	-0.07	0.05
Measurement × Target	Baseline & Most preferred	-0.36	0.03	-0.42	-0.30
	Baseline & Least preferred	0.36	0.03	0.30	0.42
	Video & Most preferred	0.36	0.03	0.30	0.42
	Video & Least preferred	-0.36	0.03	-0.42	-0.30
Boredom × Measurement × Target	High & Baseline & Most preferred	-0.01	0.03	-0.07	0.04
	High & Baseline & Least preferred	0.01	0.02	-0.05	0.07
	High & Video & Most preferred	0.01	0.02	-0.05	0.07
	High & Video & Least preferred	-0.01	0.02	-0.07	0.04
	Low & Baseline & Most preferred	0.01	0.02	-0.05	0.07
	Low & Baseline & Least preferred	-0.01	0.03	-0.07	0.04
	Low & Video & Most preferred	-0.01	0.03	-0.07	0.04
	Low & Video & Least preferred	0.01	0.03	-0.05	0.07

3.3. Subjective Sexual Arousal

We next tested our hypothesis that manipulated boredom increases arousal towards preferred-sex sexual stimuli in the context of subjective (self-reported) sexual arousal. We specifically anticipated a two-way interaction, where subjective sexual arousal was expected to be highest when boredom was high and the target was most preferred (note that the baseline measurement for genital arousal does not apply to subjective sexual arousal). We tested this with a 2 (boredom condition: high vs low) × 2 (target: most preferred vs least preferred) Bayesian within-subjects ANOVA. Figure 3 displays results for conditional means and credibility intervals.

We again followed recommendations by Van den Bergh et al. (2020), and considered model-averaged results for 'matched' models only (as suggested by Sebastiaan Mathôt). This resulted in three averaged models, whose predictors were each assigned a prior inclusion probability of $P = .400$, with the exception of the interaction model, which was assigned a prior inclusion probability of $P = .200$.[4]

Figure 3. Subjective Sexual Arousal Across Conditions



Note: Higher scores indicate higher subjective sexual arousal. Error bars represent 95% credibility intervals.

[4] Note that each of the 5 possible models (including null-model) was assigned the same prior of $P = 1/5 = .200$. The two-way interaction model cannot be averaged with any other model and hence retains its individual $P = .200$ as its prior inclusion probability.

Table 3 gives the results of this analysis, and Table 4 reports corresponding posteriors. Inclusion Bayes factors provided strong evidence for a main effect of target, moderate evidence for the absence of a boredom main effect, and—against our prediction—moderate evidence for the absence of a measurement × target interaction. In all, the results indicated that people experienced more subjective sexual arousal when watching a video with their most preferred versus least preferred targets, and that this their subjective sexual arousal was likely not influenced by induced boredom, consistent with the results for genital arousal reported above.

Table 3. Matched Model Averaged Results for Subjective Sexual Arousal

Effects	*P*(inclusion)	*P*(inclusion | data)	$BF_{inclusion}$
Boredom	0.400	0.188	0.25
Target	0.400	0.946	$3.82\times10^{+29}$
Boredom × Target	0.200	0.054	0.29

Note. Compares models that contain the effect to equivalent models stripped of the effect. Analysis suggested by Sebastiaan Mathôt.

Table 4. Model Averaged Posteriors for Subjective Sexual Arousal

				95%*CI*	
Variable	*Level*	*M*	*SD*	*Lower*	*Upper*
Intercept		.12	.015	.09	.14
Boredom	High	.00	.018	-.04	.04
	Low	-.00	.018	-.04	.03
Target	Most preferred	.83	.028	.77	.88
	Least preferred	-.83	.028	-.88	-.77
Boredom × Target	High & most preferred	.01	.012	-.02	.03
	High & least preferred	-.01	.012	-.03	.01
	Low & most preferred	-.01	.012	-.03	.02
	Low & least preferred	.01	.012	-.02	.03

4. Discussion

We set out to test if state boredom causally increases genital and self-reported sexual arousal among men in response to sexual stimuli. Findings indicated that their genital and subjective arousal for preferred sex targets did not vary as a function of boredom, despite the boredom manipulation being highly effective. In fact, Bayes factors offered moderately strong evidence for the *absence* of any influence of boredom on sexual arousal, be that in the form of main effect or interactions. Instead, we found strong evidence for genital and self-reported sexual arousal to increase for preferred sex target relative to less-preferred sex targets.

Whereas past work operationalized sexual behavior and attitudes in the forms of (self-reported) sexual sensation seeking, pornography consumption, willingness to engage in risky sexual behavior, and frequencies of masturbating (Arnett, 1990; Bőthe et al., 2020; Gana et al., 2001; Miller et al., 2014; Moynihan et al., 2021a, 2022), we are the first to link boredom to direct measures of sexual arousal—operationalized as genital arousal and self-reported sexual arousal. These extensions are important, as prior theorizing has often assumed that links between boredom and sexual behaviors or attitudes are in part rooted in the arousal processes (e.g., sexual stimuli may alleviate low arousal under boredom by increasing it). Our null-findings are therefore informative: they suggest that whatever explains the link between boredom and sexual behavior at the level of individual difference correlates may not involve changes in sexual arousal changes in response to state boredom.

What, then, might explain that boredom is linked to sexual behavior and motivations in past findings but not ours? One possibility is that variables such as sexual sensation seeking, pornography consumption, and willingness to engage in risky sexual behavior are not elevated under (trait) boredom because they serve to increase arousal, but rather than they help to engage attention. Trait boredom is associated with failures to sustain attention (e.g., Isacescu et al., 2017) and attempts to reengage it (Tam et al., 2021). Indeed, Moynihan and colleagues (2021a, 2022) have suggested that the links between trait boredom and sexual sensation seeking, and between trait boredom and pornography consumption, reflect attempts to distract oneself from a boring predicament, which speculatively may reflect the pursuit of attentional reengagement with something else (i.e. sexual stimuli). If this is the case, then one might expect state boredom not to increase sexual arousal, but rather that it would increase attentional towards sexual stimuli (e.g., pornographic imagery) relative to control. Following this line of argumentation, a reason why boredom may be associated with sexual behavior independently of sexual arousal is that it may simply offer people something to do. Researchers have suggested that boredom serves as a call to action (Elpidorou, 2014), and experiments show that boredom leads to the pursuit of novel activities regardless of whether those stimuli are pleasant or not (Bench and Lench, 2019). Plausibly, sexual behaviors may offer bored individuals simply something to do, although boredom itself does not affect their arousability.

Another possibility for the putative divergence between our state boredom versus past trait boredom findings is that the two are characterized by partly distinct psychological mechanisms. Notably, state boredom has been proposed to help regulate attention, arousal, meaning, and novelty pursuit, for example by prompting disengagement with current (in)activity in favor of alternatives that appear more satisfying (Bench and Lench, 2019; Eastwood et al.,

2012; Elpidorou, 2014; Van Tilburg and Igou, 2012). Trait boredom, on the other hand, has been argued to involve an inability to pursue fulfilling activity effectively, despite the desire to do so (Danckert, 2019; Elpidorou, 2014), with Tam and colleagues (2021) proposing that trait boredom may reflect the enduring failure to effectively cope with state boredom over time. Perhaps, sexual behavior and motivations investigated in past work on trait boredom represent self-regulation *failures* rather than self-regulation attempts, which may be expected to occur in the face of trait boredom, but not necessarily to result of state boredom. Indeed, Lin and colleagues (2023) found that trait, but not state boredom, correlated with solitary sexual activity during the COVID-19 pandemic, which hints at the importance of differentiating state and trait boredom mechanisms in context of sexual behavior and motivations.

Placing the current findings in the literature on affect-dependent sexual arousal more broadly, the current null-findings may hint that the link between affect and genital arousal is more complex than we anticipated. Indeed, research shows that the impact of positive and negative mood states in genital arousal are probably not straightforward. For example, Mitchell and colleagues (1998) found that happy music (e.g., Mozart's *Eine Kleine Nacht Musik*) increased genital arousal responses to sexual stimuli in 24 men compared to control, and that sad music (e.g., Albinoni's *Adagio in G Minor*) reduced it; a mostly similar pattern of findings was obtained by Ter Kuile et al. (2010) among a group of 32 women. Strikingly, the 'neutral' control condition activity in Mitchell el al. (1998), which produced intermediate levels of genital arousal, seems comparatively boring: press a button for each 't' in an audio sequence of letters, for five minutes. An earlier study on genital arousal in 15 men, by Meisler and Carey (1991), found that positive (vs negative) mood inductions did not alter genital arousal in response to erotica, but did increase (vs decrease) subjective arousal after a delay. Work by Carvalho and colleagues (2017) in a larger sample of 52 men and 73 women found, instead, that subjective sexual arousal in response to pornography was unaffected by positive and negative mood inductions (vs control) induced using non-sexual videos. Taken together, there seems to be considerable divergence in genital and self-reported sexual arousal findings from experiments that induced positive and negative forms of affect, with the current study further adding to this discrepancy.

4.1. Limitations and Future Directions

In keeping with most of the previous work on the boredom-sexual behavior link, we focused only on men. Women's sexual arousal has been less studied than men's (Chivers, 2017) and often their arousal does not reflect their subjective sexual preferences (Rieger et al., 2016), which would make it more difficult to make predictions of boredom's impact (or indeed lack thereof) on their genital arousal. Other research has furthermore found that men are, on average, more boredom-prone (Polly et al., 1993; Watt and Vodanovich, 1999) and more sexually bored (Watt and Ewing, 1996) than women. That being said, genital arousal (and boredom) can be successfully measured in women (Suschinsky et al., 2015). Future research should therefore consider women and look into potential gender differences in the link between boredom and sexual arousal.

While the present study did not purposefully target specific sexual orientations, it is worthwhile to examine further if there are differences by sexual orientation in responses to boredom. McCoul and Haslam (2001) found that sexual sensation seeking and impulsivity were

associated with risky sexual behaviors among heterosexual men, but that this was not the same for gay men. Other research found that gay men engaged in more non-committal sexual behaviors in comparison to heterosexual and bisexual men (Schmitt, 2007). Given the links that boredom has with impulsiveness and sensation seeking (Dahlen et al., 2004; Moynihan et al., 2017), it is possible that there are differences in the impact of boredom depending on sexual orientation.

The present study may have benefitted from a mixed factorial design with boredom state as a between participants variable to reduce possible carry over effects from prior videos. Future studies should consider using this design to eliminate any effects caused by the switching of boredom and neutral stimuli throughout the experiment. Having said that, the boredom manipulation proved highly effective with the current within-person design.

5. Conclusion

For the first time we experimentally tested the causal effect of state boredom on sexual arousal in men. Our findings show that experimentally induced boredom unlikely increases sexual arousal—objectively assessed with a genital arousal measure and subjectively assessed using self-reports—with the data providing moderately strong support for the absence of a role for boredom. These findings provide much needed insight into the links between boredom and sexual arousal.

References

Arnett, J. (1990). Contraceptive Use, Sensation Seeking, and Adolescent Egocentrism. *Journal of Youth and Adolescence*, *19*, 171–180. https://doi.org/10.1007/bf01538720

Bench, S. W., and Lench, H. C. (2019). Boredom as a Seeking State: Boredom Prompts the Pursuit of Novel (Even Negative) Experiences. *Emotion*, *19*, 242–254. https://doi.org/10.1037/emo0000433

Bergen, E., Ahto, A., Schulz, A., Imhoff, R., Antfolk, J., Schuhmann, P., Alanko, K., Santtila, P., and Jern, P. (2015). Adult-adult and adult-child/Adolescent Online Sexual Interactions: An Exploratory Self-report Study on the Role of Situational Factors. *The Journal of Sex Research*, *52*, 1006–1016. https://doi.org/10.1080/00224499.2014.914462

Bőthe, B., Tóth-Király, I., Potenza, M. N., Orosz, G., and Demetrovics, Z. (2020). High-frequency Pornography Use May Not Always Be Problematic. *The Journal of Sexual Medicine*, *17*, 793–811. https://doi.org/10.1016/j.jsxm.2020.01.007

Carvalho, J., Pereira, R., Barreto, D., and Nobre, P. J. (2017). The Effects of Positive Versus Negative Mood States on Attentional Processes During Exposure to Erotica. *Archives of Sexual Behavior*, *46*, 2495–2504. https://doi.org/10.1007/s10508-016-0875-3

Chan, C. S., Van Tilburg, W. A. P., Igou, E. R., Poon, C. Y., Tam, K. Y., Wong, V. U., and Cheung, S. K. (2018). Situational Meaninglessness and State Boredom: Cross-sectional and Experience-sampling Findings. *Motivation and Emotion*, *42*, 555–565. https://doi.org/10.1007/s11031-018-9693-3

Chaney, M. P., and Blalock, A. C. (2006). Boredom Proneness, Social Connectedness, and Sexual Addiction Among Men Who Have Sex with Male Internet Users. *Journal of Addictions & Offender Counseling*, *26*, 111–122. https://doi.org/10.1002/j.2161-1874.2006.tb00012.x

Chaney, M. P., and Chang, C. Y. (2005). A Trio of Turmoil for Internet Sexually Addicted Men Who Have Sex with Men: Boredom Proneness, Social Connectedness, and Dissociation. *Sexual Addiction & Compulsivity*, *12*, 3–18. https://doi.org/10.1080/10720160590933671

Chin, A., Markey, A., Bhargava, S., Kassam, K. S., and Loewenstein, G. (2017). Bored in the USA: Experience Sampling and Boredom in Everyday Life. *Emotion*, *17*, 359–368. https://doi.org/10.1037/emo0000232

Chivers, M. L. (2017). The Specificity of Women's Sexual Response and Its Relationship with Sexual Orientations: A Review and Ten Hypotheses. *Archives of Sexual Behavior*, *46*, 1161–1179. https://doi.org/10.1007/s10508-016-0897-x

Coleman, E., Rahm-Knigge, R. L., Danielson, S., Nielsen, K. H., Gleason, N., Jennings, T., and Miner, M. H. (2023). The Relationship Between Boredom Proneness, Attachment Styles and Compulsive Sexual Behavior. *Journal of Sex & Marital Therapy*, *49*(2), 172–188. https://doi.org/10.1080/0092623X.2022.2086511

Dahlen, E. R., Martin, R. C., Ragan, K., and Kuhlman, M. M. (2004). Boredom ^roneness in Anger and Aggression: Effects of Impulsiveness and Sensation Seeking. *Personality and Individual Differences*, *37*, 1615–1627. https://doi.org/10.1016/j.paid.2004.02.016

Danckert, J. (2019). Boredom: Managing the Delicate Balance Between Exploration and Exploitation. In J. Ros Velasco (Ed.), *Boredom Is in Your Mind* (pp. 37–53). Springer.

Danckert, J., Hammerschmidt, T., Marty-Dugas, J., and Smilek, D. (2018b). Boredom: Under-aroused and Restless. *Consciousness and Cognition*, *61*, 24–37. https://doi.org/10.1016/j.concog.2018.03.014

Danckert, J., Mugon, J., Struk, A., and Eastwood, J. (2018a). Boredom: What Is It Good For? In H. Lench (Ed.), *The Function of Emotions* (pp. 93–119). Springer.

De Jong, D. C. (2009). The Role of Attention in Sexual Arousal: Implications for Treatment of Sexual Dysfunction. *Journal of Sex Research*, *46*, 237–248. https://doi.org/10.1080/00224490902747230

de Oliveira, L., Carvalho, J., and Nobre, P. (2021). A Systematic Review on Sexual Boredom. *The Journal of Sexual Medicine*, *18*, 565–581. https://doi.org/10.1016/j.jsxm.2020.12.019

Eastwood, J. D., Frischen, A., Fenske, M. J., and Smilek, D. (2012). The Unengaged Mind. *Perspectives on Psychological Science*, *7*, 482–495. https://doi.org/10.1177/1745691612456044

Elpidorou, A. (2014). The Bright Side of Boredom. *Frontiers in Psychology*, *5*, 1245. https://doi.org/10.3389/fpsyg.2014.01245

Farkas, G. M., Sine, L. F., and Evans, I. M. (1979). The Effects of Distraction, Performance Demand, Stimulus Explicitness and Personality on Objective and Subjective Measures of Male

Sexual Arousal. *Behaviour Research and Therapy*, *17*, 25–32. https://doi.org/10.1016/0005-7967(79)90047-0

Gana, K., Trouillet, R., Martin, B., and Toffart, L. (2001). The Relationship Between Boredom Proneness and Solitary Sexual Behaviors in Adults. *Social Behavior and Personality: An International Journal*, *29*, 385–389. https://doi.org/10.2224/sbp.2001.29.4.385

George, W. H., and Norris, J. (1991). Alcohol, Disinhibition, Sexual Arousal, and Deviant Sexual Behavior. *Alcohol Health and Research World*, *15*, 133.

Goldberg, Y. K., Eastwood, J. D., LaGuardia, J., and Danckert, J. (2011). Boredom: An Emotional Experience Distinct from Apathy, Anhedonia, or Depression. *Journal of Social and Clinical Psychology*, *30*, 647–666. https://doi.org/10.1521/jscp.2011.30.6.647

Gruia, D. C., Holmes, L., Raines, J., Slettevold, E., Watts-Overall, T. M., and Rieger, G. (2022). Stability and Change in Sexual Orientation and Genital Arousal Over Time. *The Journal of Sex Research*, *60*, 294–304. https://doi.org/10.1080/00224499.2022.2060927

Hoijtink, H., Mulder, J., van Lissa, C., and Gu, X. (2019). A Tutorial on Testing Hypotheses Using the Bayes Factor. *Psychological Methods*, *24*, 539–556. https://doi.org/10.1037/met0000201

Hunter, J. A., Abraham, E. H., Hunter, A. G., Goldberg, L. C., and Eastwood, J. D. (2016). Personality and Boredom Proneness in the Prediction of Creativity and Curiosity. *Thinking Skills and Creativity*, *22*. https://doi.org/48-57. S1871187116300773

Hunter, J, A., and Eastwood, J. D. (2018). Does State Boredom Cause Failures of Attention? Examining the Relations Between Trait Boredom, State Boredom, and Sustained Attention. *Experimental Brain Research*, *236*, 2483–2492. https://doi.org/10.1007/s00221-016-4749-7

Isacescu, J., Struk, A. A., and Danckert, J. (2017). Cognitive and Affective Predictors of Boredom Proneness. *Cognition and Emotion*, *31*, 1741–1748. https://doi.org/10.1080/02699931.2016.1259995

Janssen, E. (2011). Sexual Arousal in Men: A Review and Conceptual Analysis. *Hormones and Behavior*, *59*, 708–716. https://doi.org/10.1016/j.yhbeh.2011.03.004

Janssen, E. (2012). Psychophysiological Measurement of Sexual Arousal. In M. W. Wiederman and B. E. Whitley Jr. (Eds.), *Handbook for Conducting Research on Human Sexuality* (pp. 146–179). Psychology Press.

Janssen, E., Vissenberg, M., Visser, S., and Everaerd, W. (1997). An in vivo Comparison of Two Circumferential Penile Strain Gauges: The Introduction of a New Calibration Method. *Psychophysiology*, *34*, 717–720. https://doi.org/10.1111/j.1469-8986.1997.tb02147.x

Janssen, E., Vorst, H., Finn, P., and Bancroft, J. (2002). The Sexual Inhibition (SIS) and Sexual Excitation (SES) Scales: II. Predicting Psychophysiological Response Patterns. *Journal of Sex Research*, *39*, 127–132. https://doi.org/10.1080/00224490209552131

Janssen, E., McBride, K. R., Yarber, W., Hill, B. J., and Butler, S. M. (2007). Factors that Influence Sexual Arousal in Men: A Focus Group Study. *Archives of Sexual Behavior*, *37*, 252–265. https://doi.org/10.1007/s10508-007-9245-5

JASP Team. (2024). *JASP* (Version 0.19.0) [Computer software].

Jewkes, R., Sikweyiya, Y., Morrell, R., and Dunkle, K. (2010). Why, When and How Men Rape: Understanding Rape Perpetration in South Africa. *South African Crime Quarterly*, *34*. https://doi.org/10.17159/2413-3108/2010/v0i34a874

Julien, E., and Over, R. (1988). Male Sexual Arousal Across Five Modes of Erotic Stimulation. *Archives of Sexual Behavior*, *17*, 131–143. https://doi.org/10.1007/bf01542663

Kinsey A. C., Martin C. E., and Pomeroy W. B. (1948). *Kinsey Scale.* WB Saunders.

Kiliç, A., Van Tilburg, W. A. P., and Igou, E. R. (2019). Risk-taking Increases under Boredom. *Journal of Behavioral Decision Making*, *33*, 257–269. https://doi.org/10.1002/bdm.2160

Kor, A., Zilcha-Mano, S., Fogel, Y. A., Mikulincer, M., Reid, R. C., and Potenza, M. N. (2014). Psychometric Development of the Problematic Pornography Use Scale. *Addictive Behaviors*, *39*, 861–868. https://doi.org/10.1016/j.addbeh.2014.01.027

Koukounas, E., and McCabe, M. (1997). Sexual and Emotional Variables Influencing Sexual Response to Erotica. *Behaviour Research and Therapy*, *35*, 221–230. https://doi.org/10.1016/s0005-7967(96)00097-6

LePera, N. (2011). Relationships Between Boredom Proneness, Mindfulness, Anxiety, Depression, and Substance Use. *The New School Psychology Bulletin*, *8*, 15–25.

Levin, R. J. (2005). Sexual Arousal—Its Physiological Roles in Human Reproduction. *Annual Review of Sex Research*, *16*, 154–189. https://doi.org/10.1080/10532528.2005.10559832

Lin, Y., LePine, S. E., Krause, A. N., and Westgate, E. C. (2023). A Little Help from My Friends: Lack of Social Interaction Predicts Greater Boredom During the COVID-19 Pandemic. *Social and Personality Psychology Compass*, *17*, e12871. https://doi.org/10.1111/spc3.12871

McCoul, M. D., and Haslam, N. (2001). Predicting High Risk Sexual Behaviour in Heterosexual and Homosexual Men: The Roles of Impulsivity and Sensation Seeking. *Personality and Individual Differences*, *31*, 1303–1310. https://doi.org/10.1016/s0191-8869(00)00222-1

Meisler, A. W., and Carey, M. P. (1991). Depressed Affect and Male Sexual Arousal. *Archives of Sexual Behavior*, *20*, 541–554. https://doi.org/10.1007/BF01550953

Mercer, K. B., and Eastwood, J. D. (2010). Is Boredom Associated with Problem Gambling Behaviour? It Depends on What You Mean by 'Boredom.' *International Gambling Studies*, *10*, 91–104. https://doi.org/10.1080/14459791003754414

Miller, J. A., Caldwell, L. L., Weybright, E. H., Smith, E. A., Vergnani, T., and Wegner, L. (2014). Was Bob Seger Right? Relation Between Boredom in Leisure and [Risky] Sex. *Leisure Sciences*, *36*, 52–67. https://doi.org/10.1080/01490400.2014.860789

Mitchell, W. B., Dibartolo, P. M., Brown, T. A., and Barlow, D. H. (1998). Effects of Positive and Negative Mood on Sexual Arousal in Sexually Functional Males. *Archives of Sexual Behavior*, *27*, 197–207. https://doi.org/10.1023/a:1018686631428

Moynihan, A. B., Van Tilburg, W. A. P., Igou, E. R., Wisman, A., Donnelly, A. E., and Mulcaire, J. B. (2015). Eaten up by Boredom: Consuming Food to Escape Awareness of the Bored Self. *Frontiers in Psychology*, *6*, 369. https://doi.org/10.3389/fpsyg.2015.00369

Moynihan, A. B., Igou, E. R., and Van Tilburg, W. A. P. (2017). Boredom Increases Impulsiveness: A Meaning-regulation Perspective. *Social Psychology*, *48*, 293–309. https://doi.org/10.1027/1864-9335/a000317

Moynihan, A. B., Igou, E. R., and Van Tilburg, W. A. P. (2021a). Bored Stiff: The Relationship Between Meaninglessness, Sexual Sensation Seeking, and Promiscuous Attitudes Via Boredom Susceptibility. *Personality and Individual Differences*, *168*, 110295. https://doi.org/10.1016/j.paid.2020.110295

Moynihan, A. B., Igou, E. R., and Van Tilburg, W. A. P. (2021b). Existential Escape of the Bored: A Review of Meaning-regulation Processes under Boredom. *European Review of Social Psychology*, *32*, 161–200. https://doi.org/10.1080/10463283.2020.1829347

Moynihan, A. B., Igou, E. R., and Van Tilburg, W. A. P. (2022). Pornography Consumption as Existential Escape from Boredom. *Personality and Individual Differences*, *198*, 111802. https://doi.org/10.1016/j.paid.2022.111802

Polly, L. M., Vodanovich, S. J., Watt, J. D., and Blanchard, M. J. (1993). The Effects of Attributional Processes on Boredom Proneness. *Journal of Social Behavior & Personality*, *8*, 123–132.

Raines, J., Holmes, L., Watts-Overall, T. M., Slettevold, E., Gruia, D. C., Orbell, S., and Rieger, G. (2021). Patterns of Genital Sexual Arousal in Transgender Men. *Psychological Science*, *32*, 485–495. https://doi.org/10.1177/0956797620971654

Reid, R. C., Carpenter, B. N., Spackman, M., and Willes, D. L. (2008). Alexithymia, Emotional Instability, and Vulnerability to Stress Proneness in Patients Seeking Help for Hypersexual Behavior. *Journal of Sex & Marital Therapy*, *34*, 133–149. https://doi.org/10.1080/00926230701636197

Reid, R. C., Harper, J. M., and Anderson, E. H. (2009). Coping Strategies Used by Hypersexual Patients to Defend Against the Painful Effects of Shame. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, *16*, 125–138. https://doi.org/10.1002/cpp.609

Rieger, G., Cash, B. M., Merrill, S. M., Jones-Rounds, J., Dharmavaram, S. M., and Savin-Williams, R. C. (2015). Sexual Arousal: The Correspondence of Eyes and Genitals. *Biological Psychology*, *104*, 56–64. https://doi.org/10.1016/j.biopsycho.2014.11.009

Rieger, G., Savin-Williams, R. C., Chivers, M. L., and Bailey, J. M. (2016). Sexual Arousal and Masculinity-femininity of Women. *Journal of Personality and Social Psychology*, *111*, 265–283. https://doi.org/10.1037/pspp0000077

Schmitt, D. P. (2007). Sexual Strategies Across Sexual Orientations. *Journal of Psychology & Human Sexuality*, *18*, 183–214. https://doi.org/10.1300/j056v18n02_06

Seto, M. C. (2004). Pedophilia and Sexual Offenses Against Children. *Annual Review of Sex Research*, *15*(1), 321–361.

Smith, C. A., and Ellsworth, P. C. (1985). Patterns of Cognitive Appraisal in Emotion. *Journal of Personality and Social Psychology*, *48*, 813–838. https://doi.org/10.1037/0022-3514.48.4.813

Suschinsky, K. D., Shelley, A. J., Gerritsen, J., Tuiten, A., and Chivers, M. L. (2015). The Clitoral Photoplethysmograph: A Pilot Study Examining Discriminant and Convergent Validity. *The Journal of Sexual Medicine*, *12*, 2324–2338. https://doi.org/10.1111/jsm.13047

Tam, K. Y., Van Tilburg, W. A. P., Chan, C. S., Igou, E. R., and Lau, H. (2021). Attention Drifting in and out: The Boredom Feedback Model. *Personality and Social Psychology Review*, *25*, 251–272. https://doi.org/10.1177/10888683211010297

Taubman Ben-Ari, O. (2004). Intimacy and Risky Sexual Behavior—What Does It Have to Do with Death? *Death Studies*, *28*, 865–887. https://doi.org/10.1080/07481180490490988

Ter Kuile, M. M., Both, S., and Van Uden, J. (2010). The Effects of Experimentally-induced Sad and Happy Mood on Sexual Arousal in Sexually Healthy Women. *The Journal of Sexual Medicine*, *7*, 1177–1184. https://doi.org/10.1111/j.1743-6109.2009.01632.x

Van den Bergh, D., Van Doorn, J., Marsman, M., Draws, T., Van Kesteren, E. J., Derks, Dablander, F., Gronau, Q. F., Kucharský, Š., Gupta, A. R. K. N., Sarafoglou, A., Voelkel, J. G., Stefan, A., Ly, A., Hinne, M., Matzke, D., and Wagenmakers, E.-J. (2020). A Tutorial on Conducting and Interpreting a Bayesian ANOVA in JASP. *L'Année psychologique*, *120*, 73–96. https://doi.org/10.3917/anpsy1.201.0073

Van Doorn, J., Van den Bergh, D., Böhm, U., Dablander, F., Derks, K., Draws, T., Etz, A., Evans, N. J., Gronau, Q. F., Haaf, J. M., Hinne, M., Kucharský, Š., Ly, A., Marsman, M., Matzke, D., Gupta, A. R. K. N., Sarafoglou, A., Stefan, A., Voelkel, J, G., and Wagenmakers, E.-J. (2021). The JASP Guidelines for Conducting and Reporting a Bayesian Analysis. *Psychonomic Bulletin & Review*, *28*, 813–826. https://doi.org/10.3758/s13423-020-01798-5

Van Tilburg, W. A. P., and Igou, E. R. (2011). On Boredom and Social Identity: A Pragmatic Meaning-regulation Approach. *Personality and Social Psychology Bulletin*, *37,* 1679–1691. https://doi.org/10.1177/0146167211418530

Van Tilburg, W. A. P., and Igou, E. R. (2012). On boredom: Lack of Challenge and Meaning as Distinct Boredom Experiences. *Motivation and Emotion*, *36*, 181–194. https://doi.org/10.1007/s11031-011-9234-9

Van Tilburg, W. A. P., and Igou, E. R. (2016). Going to Political Extremes in Response to Boredom. *European Journal of Social Psychology*, *46*, 687–699. https://doi.org/10.1002/ejsp.2205

Van Tilburg, W. A. P., Igou, E. R., and Sedikides, C. (2013). In Search of Meaningfulness: Nostalgia as an Antidote to Boredom. *Emotion*, *13*, 450–461. https://doi.org/10.1037/a0030442

Van Tilburg, W. A. P., Moynihan, A. B., Chan, C. S., and Igou, E. R. (2024). Boredom Proneness. In M. Bieleke, W. Wolff, and C. Martarelli (Eds.), *Handbook of Boredom Research* (pp. 191–210). Routledge.

Vodanovich, S. J., and Watt, J. D. (2016). Self-report Measures of Boredom: An Updated Review of the Literature. *The Journal of Psychology*, *150*. https://doi.org/196-228. 10.1080/00223980.2015.1074531

Watt, J. D., and Ewing, J. E. (1996). Toward the Development and Validation of a Measure of Sexual Boredom. *Journal of Sex Research*, *33*, 57–66. https://doi.org/10.1080/00224499609551815

Watt, J. D., and Vodanovich, S. J. (1999). Boredom Proneness and Psychosocial Development. *The Journal of Psychology*, *133*, 303–314. https://doi.org/10.1080/00223989909599743

Watts, T. M., Holmes, L., Raines, J., Orbell, S., and Rieger, G. (2018). Sexual Arousal Patterns of Identical Twins with Discordant Sexual Orientations. *Scientific Reports*, *8*. https://doi.org/10.1038/s41598-018-33188-2

Westgate, E. C., and Wilson, T. D. (2018). Boring Thoughts and Bored Minds: The MAC Model of Boredom and Cognitive Engagement. *Psychological Review*, *125*, 689–713. https://doi.org/10.1037/rev0000097

Wisman, A. (2006). Digging in Terror Management Theory: To Use or Lose the Symbolic Self? *Psychological Inquiry*, *17*, 319–326. https://doi.org/10.1080/10478400701369468