



Sexually arousing ads induce sex-specific financial decisions in hungry individuals

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ABSTRACT

People's financial decisions are influenced by sexual (vs. neutral) stimuli, and exposure to such stimuli makes men, more than women, eager to spend money immediately, take financial risks, and “show off” their wealth. Hunger also influences financial decisions, such that hungry (vs. satiated) individuals are more likely to exhibit financial impatience (choosing smaller-sooner over larger-later monetary rewards). In the present study, we examine the moderating roles of participant sex and hunger in the association between sexual stimuli and financial impatience. Results indicate that exposure to sexually arousing (vs. neutral or no) ads makes men more financially impatient than women. Hunger further moderates this effect, such that monetary choices do not differ across conditions for satiated individuals, whereas hungry men (women) become more impatient (patient) in their monetary choices after viewing sexually arousing ads.

1. Introduction

Exposure to sex cues (vs. cues unassociated with sex) makes men take more risks and increases their inclination to “show off” their wealth and spend money immediately (e.g., Cheng & Chiou, 2018; Chiou, Wu, & Cheng, 2015; Dreber, Gerdes, & Gränsmark, 2013; Kim & Zauberman, 2013; Ronay & Hoppel, 2010; Van den Bergh, Dewitte, & Warlop, 2008). For women, similar exposure produces mixed results, but seems to have a weaker overall impact on their financial decisions (Griskevicius et al., 2007; Hayden, Parikh, Deaner, & Platt, 2007; Wilson & Daly, 2004). Hunger (vs. satiation) also affects financial decisions, and makes individuals more financially impatient; that is, choosing smaller-sooner over larger-later monetary rewards (for a meta-analysis, see Orquin & Kurzban, 2016). In the present research, we examine whether there are sex differences in the effect of exposure to sexually arousing (vs. neutral or no) ads on financial impatience. Furthermore, we explore whether individuals' sense of hunger moderates this presumed effect.

2. Conceptual framework

According to Parental Investment Theory, because men (women) are characterized by lower (higher) minimal obligatory parental investment, the sexes have evolved to diverge in their mating strategies

and preferences (Trivers, 1972). Indeed, ample evidence from diverse cultures, epochs, economic circumstances, and political systems shows that men prioritize beauty in a female partner, whereas women prioritize status and wealth in a male partner (Buss, 1989; Conroy-Beam, Buss, Pham, & Shackelford, 2015; Schmitt et al., 2012; Shackelford, Schmitt, & Buss, 2005). Since the mating tactics used by one sex typically mirror the mate preferences of the other, men and women use different tactics to attract mates (Buss & Schmitt, 1993). Accordingly, when individuals' mating-related motivational states are activated, women primarily engage in beauty-enhancing activities, whereas men display signs of their status and wealth (Griskevicius et al., 2007; Hill & Durante, 2011).

2.1. Sex cue exposure and financial impatience

Studies about financial decisions document that mating motives and sex cues make men, but not women, more financially impatient (Cheng & Chiou, 2018; Li, Kenrick, Griskevicius, & Neuberg, 2012; Wilson & Daly, 2004). For example, men, but not women, are willing to forego significantly more money to view opposite-sex faces, the more attractive these faces are (Hayden et al., 2007). In a consumer context, when men are exposed to commercials or magazines featuring sexual (vs. neutral) content, they make more impatient financial decisions (Kim & Zauberman, 2013; Van den Bergh et al., 2008). Compared to women,

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men are also more easily aroused by visual sexual stimuli (Bailey, Gaulin, Agyei, & Gladue, 1994; Hamann, Herman, Nolan, & Wallen, 2004), have a stronger sex drive, with more frequent and intense sexual desires (Baumeister, Catanese, & Vohs, 2001; Lippa, 2009), and have more positive attitudes toward explicit depictions of sex in advertising (Dahl, Sengupta, & Vohs, 2009; Sengupta & Dahl, 2008). Following previous research, we therefore hypothesized that exposure to sexually arousing (vs. neutral or no) ads will make men more financially impatient than women.

2.2. Interactive effects of sex cue exposure and hunger on financial impatience

Hungry (vs. satiated) individuals also favor immediate relative to delayed consumption, and therefore tend to choose smaller-sooner rewards in intertemporal choice. Several studies (reviewed in Orquin & Kurzban, 2016) have shown that hunger leads to impatient choices, especially in the food domain, but also in financial decision-making. Because both hunger and sexual desire have been shown to induce financial impatience, these drive states may interact to influence people's financial decisions. Indeed, there is some evidence that two distinct drive states can summate to generate a greater drive strength than each drive alone (Amsel & Maltzman, 1950; Arnett & Newman, 2000; Braun, Wedekind, & Smudski, 1957; Corr, 2013), suggesting that the simultaneous sensation of both sexual desire and hunger will induce a stronger response than each of these states separately. Therefore, it is reasonable to think that hunger may moderate the effect of exposure to sexually arousing (vs. neutral or no) ads on financial impatience, such that sexually arousing ads will exert a stronger influence in hungry (vs. satiated) individuals. Thus, we explored the potential interplay between hunger and exposure to sexually arousing (vs. neutral or no) ads on financial impatience. We tested this possibility in an exploratory manner because extant evidence did not warrant a formal hypothesis.

3. Method

3.1. Participants, procedure and measures

A convenience sample of undergraduates voluntarily agreed to participate in the study during lecture breaks and did not receive monetary compensation for their participation. The final sample consisted of 264 undergraduates (51% women) at a Scandinavian university. One additional participant was originally recruited, but was excluded due to failure to reply to any of the hunger items. Participants were assigned to one of three different conditions: sexual ads, neutral ads, and no ads.¹ In the neutral ads condition, participants were exposed to pictures of six ads featuring nature content (same ads for men and women). Participants in the sexual ads condition were exposed to pictures of six ads with sexual content. Men viewed ads portraying attractive women who were getting undressed, wearing provocative clothing, or posing in sexy positions. Women viewed ads portraying attractive men who were getting undressed, flexing their abdominal muscles in a sexy manner, or posing half-naked in bed in a sexually explicit way (for a similar method, see Kim & Zauberman, 2013; Van den Bergh et al., 2008). All ads in the sexual and neutral conditions were found via an online search on Google. In the sexual ads condition, search terms included “sexy ads,” “sexy ads female,” “Sexy ads male,” in combination with brands known for sexually explicit advertising

campaigns (e.g., Abercrombie & Fitch, American Apparel, Dolce & Gabbana, Tom Ford). In the neutral ads condition, we used search terms such as “nature ads” and “environmental ads.”

Participants in the neutral and sexual ads conditions rated how 1) sexy, 2) hot, and 3) arousing the ads they saw were (1 = *strongly disagree*; 7 = *strongly agree*). We created an index of *ad sexiness* from the average of these items ($\alpha = 0.93$). After rating the ads, participants were presented with a series of binary choices between smaller-sooner and larger-later rewards. Participants in the no ads condition did not see any ads, completing this part of the survey immediately following the demographic questions. The binary choices included eight delay-discounting items (Li, 2008). These items measure the degree to which an individual is currently financially impatient. Items include monetary tradeoffs such as, for example, choosing between \$35 in 20 days (alternative A) or \$30 tomorrow (alternative B). Participants indicated their monetary choices on a 7-point scale (1 = *definitely alternative A*; 4 = *not sure*; 7 = *definitely alternative B*). We averaged these responses and created an index of *financial impatience* ($\alpha = 0.89$; higher values indicate more financial impatience).

Next, all participants replied to six items meant to measure their level of hunger (1 = *strongly disagree*; 7 = *strongly agree*). An exploratory factor analysis with varimax rotation revealed that only four items loaded on a common hunger factor. These items (Right now, I feel very hungry; It feels like I have good appetite right now; I need to do something about my hunger; I would like to have something appetizing right now) had an eigenvalue of 3.39, explained 56.52% of the variance, and did not contain any cross-loadings above 0.40. Thus, they were averaged to create a hunger index ($\alpha = 0.88$; $M = 3.65$, $SD = 1.86$; skewness: 0.33, kurtosis: -1.04). Using the same response format, participants then indicated their impulsiveness on a single-item scale (“I am a relatively impulsive person” cf. Krank et al., 2011) and specified their relationship status (1 = *I am single*; 7 = *I am married*) on a measure from Janssens et al. (2011). These two items were included because both impulse control and relationship status have been shown to impact people's financial decisions (e.g., Cavanaugh, 2014; Chiou et al., 2015).

3.2. Manipulation check

We conducted an independent samples *t*-test to assess whether ratings of ad sexiness differed between ad conditions. Indeed, participants in the sexual ads condition ($M = 4.44$, $SD = 1.71$) rated the ads as significantly sexier than participants in the neutral ads condition ($M = 1.43$, $SD = 1.04$; $t(199) = 12.74$, $p < .001$, $\eta^2 = 0.45$). Thus, our ad manipulation was successful.

4. Results

Participants in the no ads condition ($M = 3.63$, $SD = 1.71$) did not differ in their monetary choices from participants in the neutral ads condition ($M = 3.97$, $SD = 1.76$; $F(1, 120) = 1.08$, $p = .30$) and these conditions did not interact with participant sex to influence financial impatience ($F < 1$). Therefore, we combined them into a *control condition* to facilitate parsimonious analyses. Next, we conducted a moderated moderation analysis (PROCESS Model 3; Hayes, 2013), in which ad condition (control, sexual ads) was the predictor, participant sex (female, male) was the first moderator, participants' hunger levels (continuous) was the additional moderator, and financial impatience was the outcome variable. Supporting our main hypothesis, the ad condition \times participant sex interaction emerged ($b = 1.22$, $t = 2.93$, $p = .004$), indicating that male participants were more financially impatient than female participants in the sexual ads (vs. control) condition.² However, this two-way interaction was further moderated by

¹ We did not expect participants' financial impatience to differ in the neutral and no ads conditions, and hence perceived these two conditions as a joint control condition, consistent with previous related research (e.g., Li & Zhang, 2014). Therefore, to get a large number of participants in the sexy ads condition, we tried to get a similar share of responses in the sexy ads condition (53%; $n = 140$) as in the neutral and no ads conditions combined (47%; $n = 124$).

² It should be noted, however, that financial impatience did not differ

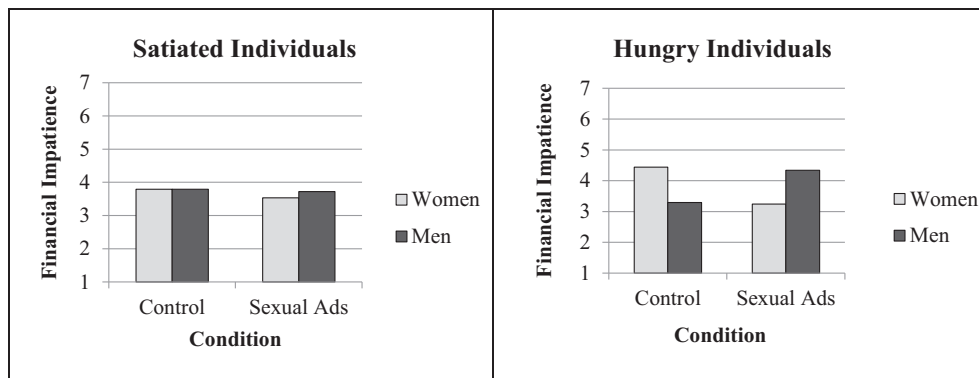


Fig. 1. Financial impatience as a function of condition, participant sex, and hunger.

participants' hunger levels ($b = 0.55$, $t = 2.41$, $p = .017$). All other effects were non-significant.

Because our hunger index was a continuous variable, we performed a "floodlight analysis" to better understand the nature of the interaction (Spiller, Fitzsimons, Lynch Jr, & McClelland, 2013). The moderator value at which the two-way interaction becomes significant, known as the Johnson-Neyman point, was a mean-centered value of -0.63 ($Z = 1.96$; $p = .050$). This means that the ad condition \times participant sex interaction was significant only for those 53.79% of participants whose mean-centered value on the hunger index was equal to or above -0.63 (corresponding to a mean value of 3.02). Using a bootstrap sample of 5000, the results of 95% confidence intervals (CIs) further showed that the conditional effect of the ad condition \times participant sex interaction was significantly different from zero for hungry, but not satiated participants (i.e., only for participants scoring one standard deviation above, but not below, the mean on our hunger index). Interestingly, the direction of this effect was different for male ($CI = [0.19; 1.90]$) and female ($CI = [-2.00; -0.40]$) participants. As depicted in Fig. 1, hungry men were *more* financially impatient in the sexual ads (vs. control) condition, whereas hungry women were *less* financially impatient in the sexual ads (vs. control) condition. Among satiated participants, the conditional effect contained zero for both men ($CI = [-0.94; 0.82]$) and women ($CI = [-1.04; 0.52]$).

Including relationship status and impulse control as covariates did not change the nature and significance of these findings, although impulse control ($b = 0.14$, $t = 2.28$, $p = .023$), but not relationship status ($b = -0.06$, $t = -1.20$, $p = .23$), was associated with financial impatience, consistent with previous research (Kirby & Finch, 2010; Reimers, Maylor, Stewart, & Chater, 2009).

5. Discussion

Many companies use sex cues in their marketing campaigns. The present research suggests that visual sexual stimuli can have an impact on people's financial decisions under certain circumstances. As far as we can ascertain, this is the first study examining the interactive effect of sex cue exposure and hunger on people's financial impatience. First, we documented that exposure to sexual (vs. neutral or no) ads makes men more financially impatient than women. These results are consistent with prior work on "Lonely Hearts" advertisements, for example, in which men have been shown to offer resources to women in exchange

for attractiveness, whereas women rather offer attractiveness in exchange for resources (Thiessen, Young, & Burroughs, 1993; see also Baumeister & Vohs, 2004). Further, we documented that hunger moderates this effect, such that monetary choices do not differ across conditions for satiated individuals, whereas hungry men (women) become more financially impatient (patient) after viewing sexually arousing ads.

To our knowledge, this is the first demonstration that sexual stimuli can lead to financial patience among individuals in certain states. Specifically, our findings indicate that hungry women become less financially impatient (preferring larger-later over smaller-sooner monetary rewards) after visual exposure to sex cues. Previous studies have typically reported that sex cues prompt context-specific impatience (e.g., Chiou et al., 2015; Kim & Zauberman, 2013; Van den Bergh et al., 2008; Wilson & Daly, 2004). While this may be true for men, the present research reveals that hungry women respond differently to such cues and become more financially patient when exposed to sexual stimuli. Historically, women have faced greater pressure than men to inhibit potentially maladaptive sexual responses because pregnancy has a much higher biological cost for women in terms of parental investment (Bjorklund & Kipp, 1996; Trivers, 1972). Our findings suggest that exposure to sex cues not only enhances women's inhibitory responses in the sexual domain, but may also improve their ability to exert self-control in other domains and make patient financial decisions. In ancestral times, it should have been more harmful for women to engage in uncommitted sex when the availability of nutritious foods was scarce, given the vast metabolic costs associated with a pregnancy. Conversely, resource scarcity has been shown to trigger more shortsighted behaviors in men, presumably in a response designed to increase the chances of passing their genes on before it is too late (Wilson & Daly, 1985). These sex differences may explain why sex cues make hungry men more motivated to forego financial resources, whereas such cues make hungry women more financially patient.

5.1. Limitations and future research

The present study has certain limitations. Similar to the majority of previous related research, we did not collect information regarding participants' sexual orientation. Given that the proportion of heterosexuals in most Western countries is around 97% (e.g., Gates & Newport, 2012; Geary et al., 2018), it is unlikely that > 10 participants, distributed across the different conditions, would have identified as something other than heterosexual. As such, their responses should arguably not have had a substantial impact on the results. Nevertheless, future research would benefit from testing the effect that hunger and exposure to sex cues has on financial impatience in participants with varied sexual orientations.

The use of undergraduates limits the generalizability of our findings and it is unclear whether our hypothetical choices related to financial

(footnote continued)

significantly between men in the sexual ads (vs. control) condition, although the direction was as expected ($t(128) = 1.63$, $p = .105$, $d = 0.28$). This effect size is similar to a recent large-sampled study on risk taking using the pre-registration format (Bonnier, Dreber, Hederö, Eriksson, & Sandberg, 2018), where men exposed to ads with half-naked (vs. no) women were marginally more risk taking in the financial domain ($d = 0.26$).

impatience will predict behavioral impulsivity. Reimers et al. (2009) documented that financial impatience is associated with demographic variables such as younger age, lower income, and lower education, as well as with impulsive behaviors, including earlier age of first sexual activity, smoking, and higher body mass index. Thus, although recent multi-lab replications (Klein et al., 2018) have shown more similarities than differences in the replication rates of studies with participants from WEIRD (Western, educated, industrialized, rich, and democratic) and non-WEIRD societies, future research should examine the representativeness of our findings using older, less educated, or financially deprived individuals (Griskevicius, Tybur, Delton, & Robertson, 2011; Moeini-Jazani, Albalooshi, & Seljeseth, 2019).

While we investigated the moderating roles of participant sex and hunger in the association between sex cue exposure and financial decisions, other potentially important factors may also exist. For instance, sociosexual orientation (the degree to which an individual is interested in short-term mating and uncommitted sexual relationships; Bailey, Kirk, Zhu, Dunne, & Martin, 2000) has been shown to influence both mating preferences (Simpson & Gangestad, 1992) and consumption preferences (Sundie et al., 2011). Thus, future research may fruitfully examine whether sociosexual orientation and other individual differences moderate the impact of sex cue exposure on people's financial impatience.

The current study is a conceptual replication and extension of previous work (Cheng & Chiou, 2018; Chiou et al., 2015; Kim & Zauberman, 2013; Li et al., 2012; Van den Bergh et al., 2008; Wilson & Daly, 2004). We documented that people's financial impatience changes as a function of both hunger and sex cue exposure, such that hungry, but not satiated, men (women) became more (less) financially impatient after exposure to sexual (vs. neutral or no) ads. Given the exploratory nature of this three-way interaction, the results should be interpreted with appropriate caution, and future studies on this topic are warranted.

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