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RESEARCH ARTICLE

Affective Modification of the Startle Eyeblink Response During Sexual and Emotional Infidelity Scripts

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Abstract The sex difference in jealousy has been demonstrated to occur in response to actual experiences with infidelity, continuous measures of jealousy, as well as cross-culturally. However, to date, the evidence for physiological correlates of jealousy has been limited and mixed. As such, the purpose of this study was to explore the sex difference in jealousy using multiple physiological measures of jealousy. In our study, we demonstrate that the sex difference in jealousy occurs using self-report measures of jealousy in addition to occurring with the affective modification of startle response (but not in response to facial electromyography (EMG), skin conductance, or heart rate). As such, this study demonstrates that the sex difference in jealousy is a replicable finding that occurs when using self-report measures of jealousy in addition to manifesting itself in physiological correlates.

Keywords Jealousy · Sex differences · Startle eyeblink reflex

Introduction

According to the theory of evolved sex differences in jealousy (Buss et al. 1992; Daly et al. 1982; Symons 1979), ancestral women's challenge of ensuring paternal investment exerted selective pressures that increased women's jealousy in response to emotional infidelity, whereas ancestral men's challenge of paternal uncertainty exerted selective pressures that increased men's jealousy in response to sexual infidelity. Initial studies of this effect demonstrated that the sex difference in jealousy occurred in response to an imagined infidelity when using a forced choice methodology (Buss et al. 1992). Studies have since demonstrated that this effect occurs in a representative sample of adults in the USA (Zengel et al. 2013), cross-culturally (Buss et al. 1999), in individuals who have experienced an actual infidelity (Edlund et al. 2006), and is not driven by differential interpretations of the questions (Buss et al 1999). Further, other studies have demonstrated that the sex difference in jealousy occurs when using continuous response scales (Edlund and Sagarin 2009) and is sensitive to the relevant evolutionary context (Scherer et al. 2013). It is also important to mention that there exists a discussion in the field about what the relevant effect/s are to test. The original Buss et al (1992) study focused on a gender main effect. However, in responses to critiques raised by critics of the field (DeSteno et al 2002; DeSteno and Salovey 1996; Harris 2000, 2002), many in the field have moved to looking at a more nuanced view of the effect (primarily focused on the interaction). This focus on the interaction can be seen in a number of more recent publications (Pietrzak et al 2002; Shackelford et al 2002) and is more thoroughly explained in Edlund and Sagarin (2009). In line with this shift in the field, this study takes the interaction approach.

Given the theory, one would expect that there would be physiological correlates of this increased response to ancestrally relevant threats. Buss et al (1992) initially demonstrated that men did show an increased sensitivity to the sex infidelity threat (using heart rate, blood pressure, skin conductance, and corrugator activity); however, Harris (2000) rightfully critiqued the methods used by Buss et al suggesting that a sexual control condition needed to be included. In the replication, Harris found men displaying increased physiological reactivity to sexual infidelity compared to emotional infidelity;

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however, this increase was similar to reactivity during a sex control condition. This led Harris to claim that the sex difference as assessed by physiology was not related to jealousy but simply to arousal. In one other study, Pietrzak et al. (2002) found that men had higher physiological reactions (skin conductance, heart rate, corrugator electromyography (EMG), and skin temperature) to sexual infidelity imagery compared to emotional infidelity, whereas females showed the opposite pattern. Pietrzak et al. found similar results as Buss et al. and included a female comparison, but did not include a sex control comparison.

Heart rate, blood pressure, and skin conductance are useful measures for assessing general autonomic arousal but typically tell us little about the valance of the individual's emotional state, something that was missing in Buss et al. (1992) and Harris (2000). Therefore, in addition to assessing these general arousal measures, we employed additional physiological measures that are typically used to assess emotion. The main dependent variable of interest in this study is the startle eyeblink response. The startle response is a whole body protective response elicited by intense, sudden-onset stimuli. The eyeblink component of this response is the most reliable and resistant to habituation (Landis and Hunt 1939). The startle eyeblink response has been shown to be sensitive to the emotional state of the individual, with larger magnitude responses elicited when participants are experiencing a negative mood state compared to smaller magnitude responses during positive mood states (Lang et al. 1990). This effect, known as affective modulation of the startle reflex, is seen when the mood states are elicited by various experimental manipulations such as pictures (Lang et al. 1990), threat of shock (Grillon and Ameli 1998), and imagery (Miller et al. 2002). To date, no study on jealousy has utilized this affective modulation of startle to assess sex differences in emotional experience to emotional and sexual infidelity.

In addition to the startle response measure, we also include facial EMG data from the corrugator muscle and the levator muscle. Increased activity of the corrugator muscle is associated with negative mood states (Bradley et al. 2001) and increased activity of the levator is associated with disgust responses (Yartz and Hawk 2002).

Given the theory and previous work in the field, we hypothesized that men would report higher levels of jealousy to sexual infidelity than emotional infidelity and to the extent that the sexual infidelity scripts would be experienced as more distressing they would lead to larger startle responses and greater general physiological arousal compared to emotional infidelity scripts. We predicted the opposite for women, with emotional infidelity being rated as more jealousy provoking and leading to increases in the physiological measures.

Method

Participants

Participants consisted of 83 undergraduate students (36 women) recruited from psychology courses at the Rochester Institute of Technology. Mean age of the sample was 20.7 years (SD = 4.3, range 18–53). The sample was 69 % Caucasian, 7 % African-American, 6 % Hispanic, 5 % Asian American, and 13 % other. All participants provided informed consent and earned course credit for participation.

Measures and Stimuli

Eighteen scripts covering nine different scenario conditions were created. The script conditions depicted the following scenario types: sexual infidelity, emotional infidelity, sex control, loss of opportunity/loss of certainty, loss of opportunity, negative control, positive control, neutral control, and non-romantic jealousy. This report only focuses on the main variables related to the classic jealousy effect and thus only focuses on the first three conditions. See Appendix A for text of scripts. Scripts were presented on a computer screen in front of the participant with Superlab 4.5 software (Cedrus Corporation, San Pedro, CA). Each scenario condition was presented twice over a course of two blocks (once per block) in a pseudo-random order. Six different script orders were utilized across participants. Analyses indicated that there was no order effect on the sex × jealousy condition interaction, $Fs < 1.5$, $ps > 0.17$.

Self-report ratings of jealousy, degree to which the participant would feel hurt and angry in the scenario, and how vivid the participant found the scenario to be were assessed on a 7-point Likert scale with the anchors 1 = not at all, 4 = moderately, and 7 = extremely. Ratings were made on a keypad and collected by Superlab software.

Psychophysiological recordings were made using Biopac MP150 System (Biopac, Inc., Goleta, CA) and collected and analyzed with Acqknowledge 3.9.1 software (Biopac, Inc., Goleta, CA). Electrodes (Ag/AgCl) were taped to the skin to assess startle eyeblink (bilaterally), skin conductance, heart rate (derived from a modified lead II electrocardiogram, EKG), and facial electromyography (EMG: corrugator supercilii and levator labii) responses. Sampling rate for all measures was set at 2000 Hz. Filtering of signals was based on Biopac recommendations and Blumenthal et al. 2005. EMG channels were notch filtered at 60 Hz and bandpass filtered from 35 to 500 Hz. EKG signal was bandpass filtered from 0.5 to 35 Hz.

The startle probe consisted of a 50-ms burst of white noise with instantaneous rise/fall times presented at 97 dB over headphones. Two startle probes were presented during one of each script condition trial during the 12-s imagining period

(similar to Miller et al. 2002) at the following SOA pairs, 2- and 6-s, 4- and 6-s, 2- and 8-s, and 4- and 8-s post-script presentation.

Procedure

All procedures were approved by RIT's Institutional Review Board. Participants came to the laboratory and provided informed consent. Participants then had electrodes taped to their skin for assessing the psychophysiological measures. After electrode hook-up, participants were instructed to read each script to themselves as it was presented on the screen for 10 s then to continue imagining the scene for 12 s after the script was removed from the computer screen. The startle probe was presented during the imagining period on half the trials. Each trial was preceded by a 5-s intertrial interval and started with a 6-s baseline period before the script was presented. After each imagining period, participants were prompted on the computer screen to rate the scenario. After the script presentation period, the electrodes were removed and participants completed a demographic questionnaire before being debriefed.

Data Analysis

Means were created for each self-report rating. Eyeblink startle responses were scored from onset to peak if the onset fell within the 21–150-ms period post-startle probe. For startle data, 14 participants' data were excluded because of a programming error (which left out startle probes for one order) or file error and 4 participants were excluded for failing to show clear startle responses. Individual startle trials for each eye were excluded for excessive baseline range if the startle magnitude fell below 3 standard deviations of the baseline mean for that trial. This lead to 8.3 % of the right eye and 7.5 % of the left eye startle trials to be excluded. Eyeblink scores were averaged across eyes, and mean startle magnitude was then calculated for each script condition. Change from baseline means were created for log-transformed skin conductance level, heart rate in beats per minute (BPM), and corrugator and levator responses for each script condition from non-startle trials. For all psychophysiological measures, data points were considered outliers and excluded if they fell below 1.5 times the interquartile range above the 25 percentile or above 1.5 times the interquartile range above the 75 percentile for all trials. This lead to the exclusion of 3.5 % of the startle trials, 12.1 % of the SCL trials, 27.9 % of the corrugator trials 29.5 % of the levator trials, and 6.3 % of the heart rate trials. Final ns for each comparison are mentioned in the results section. In line with the shift toward using the "new" statistics (Cumming 2014), effect sizes and 95 % confidence intervals are given for mean differences. We also provide NHST values for the main interactions of interest (i.e., jealousy × sex) that were significant, to be consistent with the previously published literature in this field.

Results

Self-Report Ratings

Eighty-one participants (46 men) had complete ratings data. Mean ratings with 95 % confidence intervals for each ratings question are presented in Table 1. The 2 sex × 2 jealousy script condition (sexual, emotional) interaction for jealousy ratings was significant, $F(1.79) = 4.96$, $p = 0.029$, $\eta p2 = 0.059$. Men gave higher jealousy ratings for sexual infidelity scripts than for emotional infidelity scripts with a mean difference of 0.7, 95 % CI (0.17, 1.23), Cohen's $d = 0.47$. Women gave higher ratings for the emotional infidelity scripts compared to the sexual infidelity scripts. The mean difference was 0.21, 95 % CI (−0.42, 0.84), Cohen's $d = 0.14$. For ratings of how hurt one would feel, both men and women rated sexual infidelity as more hurtful than emotional infidelity, mean differences −1.47, 95 % CI (0.97, 1.97) and −1.02, 95 % CI (0.56, 1.48), Cohen's ds = 1.0 and 0.81, respectively. Both men and women rated sexual infidelity as being more anger provoking

Table 1 Mean ratings data for sexual infidelity, emotional infidelity, and sex control script conditions

	Males $n = 46$			Females $n = 35$		
	M	SD	95 % CI	*M*	SD	95 % CI
Sexual infidelity						
Jealousy	4.46	1.56	4.00, 4.92	4.40	1.62	3.84, 4.96
Hurt	5.13	1.36	4.73, 5.53	5.79	0.92	5.47, 6.12
Angry	5.00	1.24	4.63, 5.37	5.74	1.24	5.31, 6.17
Vivid	4.38	1.23	4.01, 4.75	4.97	1.19	4.56, 5.38
Emotional infidelity						
Jealousy	3.76	1.39	3.35, 4.17	4.61	1.43	4.12, 5.10
Hurt	3.66	1.49	3.22, 4.10	4.77	1.53	4.24, 5.30
Angry	3.16	1.58	2.69, 3.63	4.07	1.70	3.49, 4.65
Vivid	4.95	1.12	4.62, 5.28	5.11	1.16	4.71, 5.51
Sex control						
Jealousy	1.63	1.02	1.33, 1.93	1.34	0.77	1.08, 1.60
Hurt	1.80	1.06	1.49, 2.11	2.07	1.35	1.61, 2.53
Angry	1.95	1.16	1.61, 2.29	1.89	1.16	1.49, 2.29
Vivid	5.23	1.19	4.88, 5.58	5.24	1.20	4.83, 5.65

than emotional infidelity, mean differences 1.84, 95 % CI (1.38, 2.30) and 1.67, 95 % CI (1.17, 2.17), Cohen's ds = 1.34 and 1.12, respectively.

Affective Modification of Startle

Mean startle eyeblink data is presented in Fig. 1. The 2 sex × 3 script condition interaction was marginally significant, $F(1, 53) = 3.98$, $p = 0.051$, $\eta p2 = 0.07$. Men ($n = 34$) had larger startle magnitudes during sexual infidelity scripts compared to emotional infidelity scripts, mean difference was 32.03 μV, 95 % CI (−3.01, 67.07), Cohen's $d = 0.18$. Men showed larger startle magnitudes during both emotional and sexual infidelity scripts compared to the sex control script, 8.98 μV, 95 % CI (−20.30, 38.26) and 41.01 μV, 95 % CI (−1.89, 83.91), Cohen's ds 0.05 and 0.22, respectively. Women ($n = 21$) had a much smaller mean difference, 4.1 μV, 95 % CI (−84.53, 92.76), Cohen's $d = 0.03$, with slightly larger startle responses to emotional infidelity scripts compared to sexual infidelity scripts. Opposite of what was seen with men, women showed a small increase in startle magnitudes on average to the sex control scripts than both the emotional and sexual infidelity scripts, 18.51 μV, 95 % CI (−27.17, 64.17) and 22.61 μV, 95 % CI (−22.90, 68.11), Cohen's ds 0.12 and 0.14, respectively.

Facial EMG

Mean change from baseline facial EMG data are presented in Table 2. For men ($n = 30$), the mean change from baseline difference of corrugator activity between emotional and sexual infidelity scripts was 0.03 μV 95 % CI (−0.77, 0.83), Cohen's $d = 0.02$. The differences between the sex control condition and the emotional and sexual infidelity conditions were 0.05 μV 95 % CI (−0.67, 0.57), Cohen's $d = 0.04$. and 0.08 μV 95 % CI (−0.67, 0.83), Cohen's $d = 0.05$, respectively. For women ($n = 20$), the mean change from baseline difference in corrugator activity between emotional and sexual infidelity scripts was 0.49 μV 95 % CI (−0.25, 1.23), Cohen's $d = 0.42$. The differences between the sex control condition and the emotional and sexual infidelity conditions were 0.48 μV 95 % CI (−1.33, 0.37), Cohen's $d = 0.36$ and 0.97 μV 95 % CI (−1.90,−0.04), Cohen's $d = 0.67$, respectively.

For levator activity, the mean change from baseline difference between emotional and sexual infidelity conditions for men ($n = 33$) was 0.03 μV 95 % CI (−0.25, 0.30), Cohen's $d = 0.05$. The differences between the sex control condition and the emotional and sexual infidelity conditions were 0.05 μV 95 % CI (−0.29, 0.19), Cohen's $d = 0.11$. and 0.08 μV 95 % CI (−0.19, 0.35), Cohen's $d = 0.15$, respectively. For women, the difference between emotional and sexual infidelity conditions was 0.08 μV 95 % CI (−0.31, 0.47), Cohen's $d = 0.13$. The differences between the sex control condition and the emotional and sexual infidelity conditions were 0.03 μV 95 % CI (−0.42, 0.48), Cohen's $d = 0.04$. and 0.05 μV 95 % CI (−0.51, 0.41), Cohen's $d = 0.08$, respectively.

Heart Rate

Mean change from baseline heart rate data is presented in Table 2. For men ($n = 40$), heart rate decreased slightly from baseline in all three conditions with small mean differences between the conditions; emotional infidelity and sexual infidelity mean difference was 0.58 BPM 95 % CI (−2.93, 1.96), Cohen's $d = 0.09$. The differences between the sex control condition and the emotional and sexual infidelity conditions were 0.98 BPM 95 % CI (−3.14, 1.18), Cohen's $d = 0.20$ and 0.50 BPM 95 % CI (−2.73, 1.73), Cohen's $d = 0.10$, respectively.

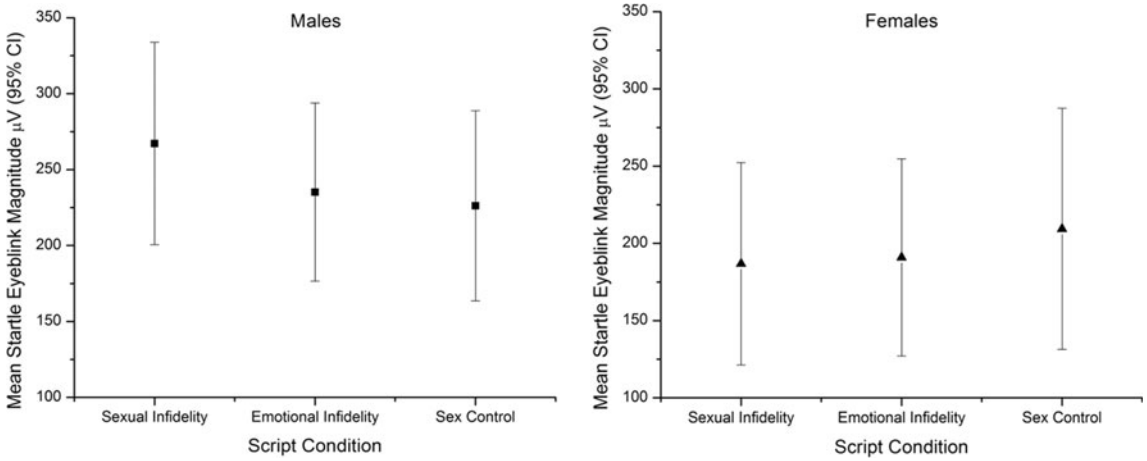

Fig. 1 Mean startle eyeblink magnitude with 95 % confidence intervals for males and females

Table 2 Mean change from baseline reactions for non-startle physiological measures for sexual infidelity, emotional infidelity, and sex control script conditions

	Sexual infidelity			Emotional infidelity			Sex control		
	Mean	SD	95 % CI	Mean	SD	95 % CI	Mean	SD	95 % CI
Corrugator (μV)									
Male ($n=30$)	0.03	1.74	−0.62, 0.68	0.00	1.32	−0.49, 0.49	−0.05	1.07	−0.45, 0.35
Female ($n=20$)	0.30	1.30	−0.31, 0.91	−0.19	0.99	−0.65, 0.27	−0.67	1.59	−1.41, 0.08
Levator (μV)									
Male ($n=33$)	0.06	0.60	−0.15, 0.28	0.04	0.50	−0.14, 0.22	−0.02	0.48	−0.18, 0.15
Female ($n=18$)	−0.17	0.63	−0.49, 0.14	−0.10	0.52	−0.35, 0.16	−0.15	0.80	−0.55, 0.25
Heart rate (BPM)									
Male ($n=40$)	−0.09	5.35	−1.80, 1.62	−0.58	5.62	−2.38, 1.22	−1.08	4.29	−2.45, 0.29
Female ($n=31$)	0.27	3.83	−1.14, 1.68	−0.01	4.66	−1.72, 1.70	−1.27	5.21	−3.18, 0.64
Skin conductance level (μmhos)									
Male ($n=41$)	−0.01	0.03	−0.02, 0.00	−0.01	0.03	−0.02, 0.00	−0.01	0.02	−0.02, 0.00
Female ($n=22$)	−0.02	0.03	−0.03, −0.01	−0.02	0.03	−0.04, −0.01	−0.03	0.03	−0.04, −0.01

For women ($n=31$), heart rate slightly increased from baseline during the sexual infidelity scripts and slightly decreased from baseline for the other two conditions. The mean difference between emotional infidelity and sexual infidelity was 0.27 BPM 95 % CI (−2.44, 1.90), Cohen's $d=0.06$. The differences between the sex control condition and the emotional and sexual infidelity conditions were 1.54 BPM 95 % CI (−3.87, 0.79), Cohen's $d=0.34$ and 1.27 BPM 95 % CI (−3.78, 1.25), Cohen's $d=0.26$, respectively.

Skin Conductance

Mean change from baseline skin conductance data for each condition is presented in Table 2. There were very small changes from baseline observed. Mean difference between emotional infidelity and sexual infidelity conditions for men ($n=41$) was 0.002 μmhos 95 % CI (−0.012, 0.016), Cohen's $d=0.06$. The differences between the sex control condition and the emotional and sexual infidelity conditions were 0.0003 μmhos 95 % CI (−0.012, 0.011), Cohen's $d=0$ and 0.002 μmhos 95 % CI (−0.009, 0.016), Cohen's $d=0.07$, respectively.

For women ($n=22$), the mean difference between emotional infidelity and sexual infidelity conditions was 0.006 μmhos 95 % CI (−0.013, 0.024), Cohen's $d=0.17$. The differences between the sex control condition and the emotional and sexual infidelity conditions were 0.003 μmhos 95 % CI (−0.013, 0.019), Cohen's $d=0.10$ and 0.009 μmhos 95 % CI (−0.006, 0.023), Cohen's $d=0.27$, respectively.

Discussion

In our study, we explored the sex difference in jealousy using both self-report methods in addition to multiple physiological measures. Similar to the existing literature using continuous self-report methods (e.g., Sagarin et al. 2012), we found an interaction in men's and women's responses to sexual and emotional infidelity. Additionally, after controlling for men's greater physiological responses to sexual stimuli (e.g., Harris 2000), we found the sex difference in jealousy to occur using the startle measure, whereas we did not find the sex difference reflected in the facial EMG, heart rate, or skin conductance measures (similar to the results found by Harris 2000).

Our study advances the literature as limited numbers of studies have explored the sex difference in jealousy using physiological measures, and the results have been inconsistent to date. We show evidence that the sex difference is reflected in our main dependent variable of interest, the affective modification of the startle eyeblink response, a robust psychophysiological measure of a protective reflex (Dawson et al. 1999). The Sex × Jealousy condition interaction accounted for 7 % of the variance in the analysis. The mean difference measurements between the jealousy conditions show a startle pattern that suggests that sexual infidelity is experienced as more aversive (evidenced by larger startle responses) compared to the emotional infidelity condition, while the smallest mean startle responses were seen in the sex control condition, suggesting this condition was experienced as more positive in valence. This

finding is in line with research showing greater startle responses to aversive compared to pleasant stimuli (i.e., Lang et al 1990; Miller et al 2002). More importantly, this pattern of startle responses in men mirrors that of the self-report data. The response pattern for men also suggest that men's greater physiological reactions in response to the sexual components of an infidelity is not caused by men's greater ability to imagine the sexual scenes, which has been interpreted as a simple arousal effect (e.g., Harris 2000; Kato 2014). For women, the means were in the expected direction (i.e., greater mean startle magnitude to emotional infidelity compared to sexual infidelity); however, the very small effect size suggests that this difference is not very meaningful.

Our findings for the other physiological measures indicated very little differences between the jealousy conditions for males and females. We did not see an increase in general arousal as measured by skin conductance and heart rate measures in males in any of the three different script conditions as seen in previous work (Buss et al 1992; Harris 2000; Pietrzak et al 2002). Looking at the mean differences for heart rate, though the effect sizes are small, both men and women showed a larger decrease in heart rate during the sex control condition compared to both jealousy conditions. This may reflect greater attentional processing (Bradley and Lang 2007) being engaged during the sexual control script compared to the jealousy scripts. Mean difference data for the facial EMG measures indicated very small differences as well, with the strongest difference shown in the corrugator activity for females. The effect sizes for these differences suggest that females show a moderate decrease in mean corrugator activity during the sex control condition compared to the two jealousy conditions, which may be interpreted as a decrease in negative affect during this condition. We also see a small to moderate increase in corrugator activity for females during the sexual infidelity compared to the emotional infidelity, suggesting that they found this condition to be somewhat more negative.

Future research should continue to explore the sex difference in jealousy using physiological measures. Using a paradigm that incorporates stimuli that have a higher level of arousal may help to elicit more reliable changes in facial EMG measures and the basic measures of arousal (i.e., skin conductance and heart rate). For instance, researchers could explore the sex difference in jealousy using physiological measures looking at people who have experienced an actual infidelity, where scripts describing the participants' actual infidelity experience would likely elicit greater arousal and demonstrate that these differences are not limited to imagined infidelities (although it is worth reiterating that studies using self-report measures have demonstrated that the sex difference in jealousy occurs in retrospective self-reports (e.g., Edlund et al. 2006). Beyond this, if the ethical issues could be resolved, the best way to demonstrate this would be to look at in vivo jealousy responses (e.g., Kuhle 2011). Additionally, other physiological measures may exist that have been demonstrated to be useful in socially monogamous mammals that have not been explored in the context of the sex difference in jealousy. For instance, prairie voles (*Microtus ochrogaster*) have been demonstrated to have changes in oxytocin and vasopressors in response to infidelity (e.g., Ophir et al 2008; Ophir et al 2007).

In conclusion, we found that, at least in men, the sex difference in jealousy is not limited to self-report measures of jealousy; we found that when controlling for sexual imagination, men (relative to women) were more reactive to the sexual components of an infidelity as assessed by a reflexive response.

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Appendix A

Stimulus Materials

Participant instructions (read to participants verbatim): For this task you will be given a series of scenarios which you will be asked to imagine. Each scenario will display on the screen for several seconds. Read through the scenario description. Following the scenario description you will be prompted to imagine the scene. Please do your best to imagine the scene as vividly as you can. During the imagination periods you will be wearing these head phones and you will occasionally hear some loud noises through them. You should do your best to ignore the noises and concentrate on imagining the scenes.

After a short time of imagining the scene you will be prompted to answer questions about how it made you feel. You will make ratings on how jealous, hurt, and

angry the scenario made you feel and how vivid the scenario was to you. You will use the keypad to make your rating. You would press the 1 button for not at all jealous, hurt, angry or vivid. You would press the 4 button for moderately jealous, hurt, angry or vivid. You would press the 7 button for extremely jealous, hurt, angry or vivid. During the experiment please use your dominant hand to press the buttons. Try to keep the hand with the sensors on it still as best you can.

I'm going to be in the other room and lights will be dimmed in the room. But if you have any questions or concerns just speak up as I can hear you over the intercom. Do you have any questions at this time?

Imagery Scripts: (*Indicates scripts for trials focused on in this report)

***Sexual Jealousy Only**

Imagine that your romantic partner confesses to you that during a bachelor/bachelorette party things got out of control and they ended up having sex with one of the strippers.

Imagine that you are in a sexual relationship with your partner. Your partner confesses that he or she recently had a one-night stand, which they assure you was a one-time occurrence and will never happen again.

***Emotional Jealousy Only**

Imagine that your partner confesses that they are in love with someone else. Your partner tells you that it is not sexual, nor could it ever be, and that they simply care deeply for the other person.

Imagine that you notice that your romantic partner has formed a deep emotional attachment to another person. You ask your partner about it, and your partner acknowledges that they care very deeply for this other person.

***Sexual Control**

Imagine that you are having sexual intercourse for the first time. Imagine the details of the experience and how you would feel.

Imagine that you are having sexual intercourse. Imagine the details of the experience and how you would feel.

Lost Opportunities and Lost Certainty

Imagine that you and your romantic partner have a sexual relationship. You discover that your romantic partner has been having a sexual affair with someone else and they recently informed you that they are in love with the other person.

Imagine that you mistakenly receive an email from your romantic partner meant for his or her coworker. It talks about the flowers and gifts that have been exchanged and how much your partner cares for the other individual. Your partner also comments on how good the sex was.

Lost Opportunities/No Loss of Certainty

Imagine that you desire a sexual relationship with someone. However, you find out that this person has begun a sexual relationship with someone else.

Imagine that before you ever had sex with your romantic partner, he or she breaks off the relationship. This partner then becomes involved with someone else whom you have never met.

Non-romantic Jealousy

Imagine that you are working at a job. You are your boss' favorite worker. However, your boss recently hired a new worker that seems eager to succeed. The new worker seems to be trying to gain favor with your boss, perhaps to try to gain a promotion.

Imagine that you just returned from Christmas vacation from your first year at college. You discover that your best friend from high school has a new friend and that they are spending all their time together.

Negative Control

Imagine that you have had a bad car crash. Imagine your vehicle has been completely destroyed and that nothing that was in the vehicle was salvageable

Imagine that your favorite aunt (or uncle) has died. What kind of emotions would you be experiencing?

Neutral Control

Imagine that you have to change a light bulb. Please imagine all of the steps you would go through in order to accomplish that task.

Imagine that you have to brush your teeth. Please imagine all of the steps you would go through in order to accomplish that task.

Positive Control

Imagine that you have won the lottery. Imagine the first thing(s) you would do once you have gotten the payment

Imagine falling in love. Please think of the various emotions you would experience during this time.

After each script participants made the following ratings:

After each script participants made the following ratings:

How happy would you feel?

1 2 3 4 5 6 7

Not at all happy Extremely happy

How emotional would you be?

1 2 3 4 5 6 7

Not at all emotional Extremely emotional

How angry would you be?

1 2 3 4 5 6 7

Not at all angry Extremely angry

How angry would you be?

1 2 3 4 5 6 7

Not at all angry Extremely angry

How vivid was the scene you just imagined in your mind?

1 2 3 4 5 6 7

Not at all vivid Extremely vivid

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