

Introduction

The 21st century has witnessed prodigious technological advancements. With regards to communication, modern life is virtually inconceivable without ownership of and constant access to a mobile phone. 82% of the world's adult population currently uses a mobile phone, 84% of whom report being unable to go a single day without its usage with 1 in 4 checking their phone every 30 minutes.¹ Such technology presents us with a convenient opportunity to communicate which includes the ability to form enduring friendships and romantic relationships. Conversely, relationships can potentially be irreparably damaged or dissolved. It has been shown that mobile phones have the potential to facilitate extra-marital affairs. A recent study investigating 'snooping' in relationships found that two thirds of the respondents confessed to 'snooping' through their partner's private life, including, checking mobile messages and logging onto social networking sites.² A poll conducted in 2013 questioning 2,400 UK adults who had been unfaithful, or who had discovered that their partner had been unfaithful, revealed that 41% admitted that the infidelity was exposed through checking for evidence on a partner's phone.³

Arguably, '*snooping*' or checking one's partner's text messages reveals that often maligned and insidious universal human emotion, jealousy. Over recent years disparate fields within psychology have benefitted considerably from applying a Darwinian-based perspective to certain modern phenomena⁴ with new forms of technological communication revealing important features of human nature.⁵ Evolutionary theorists posit the existence of an evolved, sex-specific, jealousy mechanism (JM) that manifests as an emotional state.⁶ This evolved as infidelity in reproductive relationships was a recurrent problem over evolutionary history.^{7,8} A widely accepted conclusion is that male and female jealousy is evoked by different threats; specifically sex differences in 'sexual' and 'romantic' jealousy respectively.⁹ Males risked lower paternity certainty and investment in rival gametes if their

mates had sexual contact with other males. Compromises in paternity probability come at a substantial reproductive cost to males such as the loss of mating effort expended including time, energy, risk, nuptial gifts and mating opportunities. Crucially, a woman's sexual infidelity may leave him investing in genetically unrelated children. These costs result in pressure to defend against cuckoldry, and thus males evolved an inclination towards sexual jealousy. Although females do not risk maternity uncertainty from a mate's infidelity, they do risk the potential loss of time, resources and commitment if he channels investment to alternative mates. Hence, it would be more adaptive for women to evolve an inclination towards emotional jealousy.⁷ In the US, Buss⁷ presented forced choice scenarios to undergraduates depicting either sexual or emotional infidelity and found that the majority of men selected the sexual scenario, whereas the majority of women chose the emotional infidelity scenario as most distressing a finding corroborated by measures of physiological arousal at the time⁷ and subsequently.⁹ Similar findings using imagined scenarios have been replicated in the Netherlands and Germany¹⁰, Sweden¹¹ and also in response to actual infidelity.¹²

Having established that cell phones have the potential to reveal partner infidelity the current study, using an experimental procedure targeting young adults, aimed to discover if the sexes differ in the extent to which they focus their attention on imagined text messages (emotionally or sexually explicit content) sent from a third party, discovered on their partner's phone. Previous studies using both psychological and physiological measures have demonstrated that participants can with ease respond as potently to imagined fear or stress-evoking scenarios as they can to actual threatening events.^{13, 14, 15} In the current study, participants were presented simultaneously with 4 imagined mobile text messages (2 emotional and 2 sexual) and fitted with an eye-tracker to monitor the duration and number of fixations each participant made to the jealousy-eliciting messages. It is known that our

attention is drawn to stimuli that are perceptually salient or task relevant.¹⁶ Where someone directs their attention reveals that that aspect of the stimuli attended to is preferentially processed and encoded.¹⁷ Clearly we focus on what we regard as being important to us personally. Previous studies have used eye-tracker procedures to explore sex differences.¹⁸ although none have made use of this methodology to explore sex differences in jealousy, especially in relation to modern forms of communication. In support of research outlining the differences between the sexes in terms of how jealousy manifests, the current study predicted that men would devote more attention to the sexual whereas women would focus more intently on the emotional mobile phone messages.

Materials and Methods

Study design, participants and procedures

An opportunity sample of $N = 42$, single, undergraduate students ($n = 20$ male; $n = 22$ female) $M_{age} = 21.2$, $SD = 4.07$ participated in the study. As the study focused on heterosexual jealousy, only participants who in accordance to Kinsey's Heterosexual-Homosexual Rating Scale reported as being exclusively heterosexual were used.¹⁹ A mixed experimental design was employed with between subject's factors of sex, and within subject's factors of simultaneously presented, imagined text messages (emotional and sexual). Using a static eye-tracker, two dependent variables were measured; the total number of eye-fixations directed at each message, and the overall time focused on each message. The wording of the messages was constructed in order to fulfil two important criteria, these being; **1)** The messages were either emotional or sexual in content **2)** the messages comprised an equal number of words.

The emotional messages read,

- 1) *'I'm so glad we're taking things slow, I think I'm falling in love with you! Can't wait to see you again and,*

2) *'I've never felt this close to someone so soon, thanks for being there for me, you really mean a lot! Xxx'*.

The sexual messages read

1) *'I love the way you go down on me, can't wait to fuck you again. Send me another dirty picture ;)'* and,

2) *'I enjoyed last night, still up for another shag next week? I wanna hear you moan louder this time'*.

Having signed a consent form, participants were seated directly in front of a computer screen and calibrated with a Tobii Eye-Tracker. Once successfully calibrated the study began. Instructions appeared on the computer screen asking them to imagine a heterosexual relationship they were currently in, had had in the past or would like to have, (see⁷). They were then informed that 4 text messages would appear simultaneously on the next slide for 40 seconds and their task was to indicate which 1 of the 4 messages they would find most distressing having discovered any one of them on their partner's mobile phone. They were able to read over the messages as many times as they liked in the given time period. However, the participants were unaware of the fact that the real focus was on the total number of fixations and the amount of time focused on each message. On conclusion participants were thanked and debriefed.

Results

Mean number and duration of fixations were recorded from 42 participants using an eye-tracker (see Figs. 1a & b below) and imported in to SPSS 20 from a Tobii Studio programme. For analysis, the results from the 2 sexual messages were combined to create one value, and the results from the 2 emotional messages were combined to make a second value.

Mean number of fixations

Deployment of a 2x2 mixed ANOVA with a between-subjects factor of sex (male/female) and a within-subjects factor of message (emotional/sexual) showed no main effect of sex [$F_{1,40} = .43, p > 0.05, \text{partial } \eta^2 = .01$] or message [$F_{1,40} = 2.9, p > 0.05, \text{partial } \eta^2 = .07$].

However, analysis revealed a statistically significant interaction between sex of participant and type of message [$F_{1,40} = 6.2, p < 0.05, \text{partial } \eta^2 = .14$]. Simple main effect analyses showed that compared to males, females made significantly more fixations on the emotional messages [$F_{1,40} = 6.3, p < 0.05, \text{partial } \eta^2 = .13$], however no differences were evident for the sexual messages [$F_{1,40} = 1.2, p > 0.05, \text{partial } \eta^2 = .03$]. Further analysis showed a significantly greater number of fixations on sexual messages compared to emotional messages by males [$F_{1,40} = 8.4, p < 0.01, \text{partial } \eta^2 = .17$] however no differences between messages were found for females [$F_{1,40} = .33, p > 0.05, \text{partial } \eta^2 = .008$].

Mean duration of fixations

Another 2x2 mixed ANOVA revealed no main effect of sex [$F_{1,40} = .7, p > 0.05, \text{partial } \eta^2 = .01$] or message [$F_{1,40} = 3.21, p > 0.05, \text{partial } \eta^2 = .07$], but once again a statistically significant interaction between sex and message type was reported [$F_{1,40} = 8.94, p = 0.05, \text{partial } \eta^2 = .18$]. Simple main effect analyses revealed that females spent significantly more time reading the emotional messages compared to males [$F_{1,40} = 7.9, p < 0.05, \text{partial } \eta^2 = .16$], and males spent significantly longer reading the sexual messages than females [$F_{1,40} = 8.7, p < 0.05, \text{partial } \eta^2 = .18$]. Further analysis revealed a significantly greater amount of time was spent reading the sexual messages compared to the emotional messages for males [$F_{1,40} = 10.9, p < 0.05, \text{partial } \eta^2 = .21$], however no differences were evident between messages for females [$F_{1,40} = .75, p > 0.05, \text{partial } \eta^2 = .02$].

Discussion

Results showed that females fixated more often than males on the imagined emotional text message however differences between the sexes were not statistically significant with regards

to the sexual message. That said males did fixate more often on the sexual message than they themselves did at the emotional messages. Females did not differ across text message type. With regards to the amount of time spent looking at each message type, females fixated for longer at the emotional message compared to males and males longer at the sexual message compared to females. As was the case for the number of fixations females did not bias their attention in favour of emotionally charged messages however males spent longer directing their gaze at the sexual compared to the emotional message. Males showed significantly less interest in the emotional message. These results provide mixed support for the hypothesis regarding sex differences in human jealousy proposed by researchers well versed in evolutionary theory^{7,9,11,20,21}, however see for example rival interpretations of previous findings.^{22,23} Male bias towards the sexual messages in this study clearly supports the evolutionary theory of jealousy and even though men focus more intently on certain visual aspects of sexual stimuli as previous studies have shown¹⁸ it is unlikely to be explained by the fact that their attention was drawn to the sexually explicit wording *per se* (irrespective of a jealousy component). This is due to the fact that men's recall of cues to sexual infidelity has been shown to increase markedly to a personally more threatening ('you and your girlfriend'), compared to a personally less threatening ('another couple') scenario despite identical levels of sexual content in both conditions.⁶ Also, a recent systematic literature review reported mixed findings regarding the prevalence of '*adult sexting*' when comparing the sexes²⁴. Thus, both sexes are likely to be equally exposed to and knowledgeable about sexually explicit text messages.

Using an experimental procedure, the current study did show sex differences in reactions to imagined jealousy evoking text messages, especially sexually explicit messages for males. We often take for granted that modern technology changes the way in which we think and behave but we often overlook the fact that new technological modes of communication may

capture and reveal more sinister aspects of human behaviour as the current study has that may contribute to relationship disharmony and breakdown. Future studies will explore sex differences in jealousy in physiological arousal to imagined text messages. These findings have important implications for general mobile phone usage even though the sample was restricted to undergraduates and an experimental method was adhered to. Consequently, it omitted to explore if; jealousy differs between those inclined to promiscuity/sexual compulsivity compared to those more monogamously inclined, jealousy differs across age, differences are evident between homosexual and heterosexual samples, responses to imagined jealousy evoking phone messages differ across the erotophobia-erotophilia dimension. (see²⁵) These intriguing avenues for research using both experimental and survey-based procedures are currently being undertaken in our laboratories.

Author Disclosure Statement

No competing financial interests exist.

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