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Forgiving the Unforgivable: Couples' Forgiveness and Expected Forgiveness of Emotional and Sexual Infidelity from an Error Management Theory Perspective

DOI: 10.1037/ebs0000110

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Running head: Couples' Forgiveness and Expected Forgiveness of Infidelity

Keywords: error management, bias, forgiveness, couples, infidelity, jealousy

Acknowledgements:

The authors thanks Kyrre Svarva at the IT-section at Norwegian University of Science and Technology (NTNU) for formatting machine-readable questionnaires and for his assistance in scanning the data, and Joy P. Wyckoff for valuable comments on the manuscript. We also acknowledge the assistance of students at the Bachelor Program in Psychology at NTNU for their recruitment of participants and scanning of data. Preliminary findings from this study were presented at the Annual HBES conference in Vancouver, July 2016.

Introduction

Based on signal detection theory (Green & Swets, 1966; Swets, Dawes, & Monahan, 2000), Error Management Theory (EMT) (Haselton & Buss, 2000; Haselton & Nettle, 2006) describes how natural selection may have designed psychological adaptations for judgment under uncertainty. In addition to making correct judgments (true positives and true negatives), two types of judgmental errors can be committed: a person may adopt a belief that is in fact not true (false positive), or fail to adopt a belief that is in fact true (false negative). Within domains in which the costs of errors have been asymmetrical over deep evolutionary time, selection may have favored designs that tended to make the less costly error of the two.

Natural selection would produce adaptively biased systems that exist in the present because they led to survival and reproductive advantages for humans in the past. Several protective biases have been identified within the perception, attention and learning domains, and within social- and person perception domains (Haselton & Nettle, 2006). Within domains where the asymmetry of cost of errors have been similar for women and men, no sex difference in bias is predicted by EMT (Haselton & Buss, 2000; Haselton & Nettle, 2006). However, within domains where asymmetry of cost of errors have been different for the two sexes, EMT predicts sex differences in adaptive biases. For example, in human mating, signals of sexual interest may be subject to one of two forms of mind-reading biases; overperception or underperception. Overperception bias would lead a person to infer there is some sexual interest when there is none (false positive). An underperception bias would lead a person to infer there is no sexual interest albeit some sexual interest being present (false negative). Behavioral outcomes of sexual overperception would be pursuing disinterested potential mates, an activity that is time consuming and potentially risky in terms of social embarrassment, rejection and violent confrontations. Similarly, for sexual underperception it would be missed sexual (and potential reproductive) opportunities. Due to the abundance of

males willing to mate, the costs of missed opportunities for women is assumed to have been low over deep time relative to the costs of pursuing disinterested men (Buss, 2012; Buss & Schmitt, 1993). Comparably, due to the higher number of potential offspring a man can leave behind, the costs of misses relative to pursuing disinterested women have presumably been higher for men. EMT suggests that selection has favored designs that, though they may produce more errors overall, minimize the costlier error, reducing the overall costs in the long run. This would produce a biased system that leads men, but not women to overperceive signals of sexual interest in potentials mates (Haselton & Nettle, 2006). With few exceptions (Perilloux & Kurzban, 2015; Perilloux, Muñoz-Reyes, Turiegano, Kurzban, & Pita, 2015), studies using various methods and samples attest to this male sexual overperception bias (Bendixen, 2014; Galperin & Haselton, 2012; Haselton, 2003; Koenig, Kirkpatrick, & Ketelaar, 2007; Perilloux, Easton, & Buss, 2012). Disagreements have arisen, however, regarding whether the nature of the sexual overperception bias is a cognitive or a behavioral one (Galperin & Haselton, 2012; McKay & Efferson, 2010; Perilloux, 2014).

Signals of relationship commitment may also be subject overperception and underperception biases, leading a person to infer that a partner is committed when they are not (false positive) or to infer that there is no commitment even though the partner is (false negative). Due to women's substantially higher obligatory investment in their offspring compared to men's (Trivers, 1972), the cost for ancestral women to assume commitment when there was none was particularly high in terms of loss of recourses allocated to the child and lost future mating opportunities. Hence, EMT suggests that selection has favored designs that lead women, but not men, to err on the safe side and underperceive signals of commitment (Haselton & Buss, 2000; Henningsen & Henningsen, 2010).

Humans are one of few mammalian species where both parents invest heavily in the offspring, and where paternal investment is strongly linked to increased offspring survival.

Long-term pair-bonding, which is the predominant mating strategy in humans, is considered an adaptation to recurring problems related to child rearing (Neuberg, Kenrick, & Schaller, 2010). Negative emotional (and physical) reactions to romantic breakups are generally strong. Evidently, grief intensity is equally strong in women and men, but the expression of grief appears to be sex differentiated (Morris & Reiber, 2011). One particular adaptive problem for long-term relationships is mate retention. Betrayal represents a serious threat, and any form of infidelity or unfaithfulness from either party may instigate a breakup. In an ethnographic study of 160 cultures Betzig (1989) found that out of 43 causes of breakups, a spouse's infidelity was the single most frequently cited.

There is evidence that the degree of forgiveness and likelihood of breakup depend upon the nature of the infidelity: emotional vs. sexual. Using hypothetical forced choice scenarios, Shackelford, Buss, and Bennett (2002) found that relative to women, more men reported they would breakup due to their partner's sexual infidelity than due to emotional infidelity, and more men than women found it more difficult to forgive sexual infidelity than emotional infidelity. This was further sustained by Confer and Cloud (2011) who found that more men (68%) than women (47%) reported that they actually discontinued their relationship following their partner's sexual infidelity, and by Wade (2012) who found men were more likely to expel a mate due to lack of sexual access while women were more likely to expel a mate due to lack of emotional access.

The unfaithful party may receive signals of forgiveness of the transgression, and breakup may be prevented or delayed. However, interpreting these signals is particularly challenging as there are two conceptual levels of forgiveness: (1) The inner, intrapsychic dimension involving emotional state and cognitive and behavioral accompaniments, and (2) the interpersonal dimension involving the ongoing relationship within which forgiveness takes place (Baumeister, Exline, & Sommer, 1998). It is important to consider both

dimensions, as there may a difference in what people communicate that they have forgiven and how they really feel; silent forgiveness is characterized by internal forgiveness without any behavioral expression, hollow forgiveness is characterized by expressed forgiveness without any internal transformation (Baumeister et al., 1998).

EMT maintains that following relationship misbehavior, the reproductive costs for the transgressor of failing to detect genuine negative evaluation signals (false negative) are higher than *assuming* negative evaluation when there is no signal of such (false positive) (Haselton & Nettle, 2006). Transgressions may or may not be forgiven, but selection has favored designs that lead to the tendency *not to believe* one's transgressions are forgiven. This tendency is known as negative forgiveness bias (Friesen, Fletcher, & Overall, 2005; Haselton & Nettle, 2006). The evolved function of this biased belief is to guide the organism toward reparative behavior securing that the transgressions are fully mended. Because men and women have faced similar recurrent problems regarding mate retention, this bias is expected in both sexes. In a study of 39 university student couples Friesen et al. (2005) found support for the existence of a general negative forgiveness bias for transgressions that had occurred at some time in the relationship recalled by both parties. Both men and women strongly underestimated their partner's forgiveness regardless of this being internal (intrapsychic) or expressed (communicated).

The Current Study

In the current study, we examine relationship threat, likelihood of initiating a breakup, expressed forgiveness, need for keeping distance and revenge in a sample of couples responding to imagined infidelity transgressions. In particular, we want to examine negative forgiveness bias following imagined infidelity transgression. Scenarios covered emotional as well as sexual infidelity, and one's own as well as one's partner's hypothetical transgressions. In a recent study on jealousy using hypothetical scenarios, (Bendixen, Kennair, & Buss, 2015)

found that sex differences in jealousy for continuous measures and forced choice measures were equally strong ($d \approx .80 - .90$) in a large sample of Norwegian students. This finding supports previous findings in Scandinavia using the forced choice method (Bendixen, Kennair, Ringheim, et al., 2015; Kennair, Nordeide, Andreassen, Strønen, & Pallesen, 2011; Wiederman & Kendall, 1999). These large sex differences were predicted by Buss, Larsen, Westen, and Semmelroth (1992), who suggested that in cultures where fathers invest more, one might expect larger sex differences in jealousy. Norway has for several years been ranked among the top nations of the Global Gender Gap Report (World Economic Forum, 2016) with explicit expectations of paternal involvement in children (Bendixen, 2014; Bendixen, Kennair, & Buss, 2015; Grøntvedt & Kennair, 2013).

Bendixen, Kennair, and Buss (2015) analyses of continuous measures suggest that while men and women did not differ much in their level of distress/jealousy to sexual infidelity, relative to men, women found emotional infidelity far more distressing. As predicted, within each sex women responded with more distress to emotional infidelity than to sexual infidelity and men responded with more distress to sexual infidelity. This sex differentiated pattern of responses was evident for single and for partnered respondents. Studies of forgiveness largely reflect these patterns, where more distress results in less forgiveness (Confer & Cloud, 2011; Shackelford et al., 2002) and increased likelihood of expelling a mate or breaking up (Shackelford et al., 2002; Wade, 2012).

Hypotheses and Predictions

H1: In general, regardless of sex and type of infidelity, negative forgiveness bias is expected following one's own transgression (Haselton & Nettle, 2006; Friesen et al., 2005).

• H1a: Relative to the transgressor's *own reports* of how likely it is that their romantic partner would expresses (communicates) forgiveness (upper left, Figure 1),

transgressors are less likely to report that they believe that their partner would forgive their cheating (lower left, Figure 1).

• H1b: Relative to their *partners' reports* of the likelihood of expressing forgiveness (Upper right, Figure 1), transgressors are less likely to report that their partner would forgive their cheating (lower left, Figure 1).



Figure 1. Variables included in testing negative forgiveness bias

H1_Moderation: For the above, we expect participant sex and type of imagined infidelity transgression to moderate the negative forgiveness bias. Relative to men, women are expected to be more distressed – hence less forgiving of – their partner's emotional relative to their partner's sexual infidelity (Bendixen, Kennair, & Buss, 2015; Confer & Cloud, 2011; Shackelford et al., 2002; Wade, 2012). Because unfaithful respondents are likely to use their own reaction to their partner's unfaithfulness as an 'anchor' when imagining their partner's reaction, we expect diminished negative forgiveness bias in (1) men imagining being emotionally (compared to being sexually) unfaithful. Further, and more explorative, any negative forgiveness bias may in part be due to a general disbelief of the other party's

beliefs following your expressed forgiveness (lower right, Figure 1). Still, we would expect negative forgiveness bias even when accounting for this general disbelief.

H2: In general, relative to women, men will find sexual infidelity more distressing than emotional infidelity, and vice versa relative to men, women will find emotional infidelity more distressing than sexual infidelity aspect (Bendixen, Kennair, & Buss, 2015; Buss, 2013; Sagarin et al., 2012). For specific indicators of distress, we predict the following:

- H2a: Relative to women, men will report more threat to the relationship imagining their partner's sexual infidelity than imagining their partner's emotional infidelity, and vice versa, relative to men, women will report more threat to the relationship imagining their partner's emotional infidelity than imagining their partner's sexual infidelity (Bendixen, Kennair, & Buss, 2015; Buss, 2013; Confer & Cloud, 2011; Shackelford et al., 2002; Symons, 1979).
- H2b: Relative to women, men will less likely express forgiveness due to their partner's sexual infidelity than due to their partner's emotional infidelity, and vice versa, relative to men, women will be less likely to express forgiveness due to their partner's emotional infidelity than due to their partner's sexual infidelity (Bendixen, Kennair, & Buss, 2015; Buss, 2013; Confer & Cloud, 2011; Symons, 1979).
- H2c: Relative to women, men will more likely keep their distance due to their partner's sexual infidelity than due to their partner's emotional infidelity, and vice versa, relative to men, women more likely keep their distance due to their partner's emotional infidelity than due to their partner's sexual infidelity (Bendixen, Kennair, & Buss, 2015; Buss, 2013; Confer & Cloud, 2011; Symons, 1979).
- H2d: Relative to women, men will more likely seek revenge due to their partner's sexual infidelity than due to their partner's emotional infidelity, and vice versa, relative to men, women will be more likely seek revenge due to their partner's

emotional infidelity than due to their partner's sexual infidelity (Bendixen, Kennair, & Buss, 2015; Buss, 2013; Confer & Cloud, 2011; Symons, 1979).

H2e: Relative to women, men will more likely break up due to their partner's sexual infidelity than to their partner's emotional infidelity, and vice versa, relative to men, women will more likely break up due to their partner's emotional infidelity than due to their partner's sexual infidelity (Bendixen, Kennair, & Buss, 2015; Confer & Cloud, 2011; Shackelford et al., 2002; Wade, 2012).

Method

Participants

A total of 92 heterosexual couples studying at the Norwegian University of Science and Technology partook in this study. Their age ranged from 19-30 years (women: M = 22.0; SD = 1.8; men: M = 22.9; SD = 2.2). Mean length of current relationships was reported to be 21 months (ranging from 1 month to 9 years, SD=19 months) by both parties (r = .988).

Procedure

Participants were recruited by research assistants on the university campus. Flyers including a short description of the study were handed out during lecture breaks and oral information was given at lectures. To partake, participants had to be in a relationship and bring their partner to a designated lab. At arrival, they received written information about the task, and were informed that the questionnaires included several hypothetical scenarios concerning infidelity. They filled out questionnaires in separate rooms. After the questionnaire was completed, put in a sealed envelope and handed in to the research assistants, the couples were rejoined and received two movie tickets in exchange for their participation. The research assistants were available for questions during and after completing the questionnaire.

Measurements

Outcome variables. Based on our prior application of jealousy scenarios (Bendixen, Kennair, & Buss, 2015), we developed a total of four scenarios for one's own and one's partner's infidelity respectively. Two of the scenarios reflected exclusively sexually unfaithful behavior, the other two reflected exclusively emotionally unfaithful behavior (for a full description of the four scenarios, see Appendix).

Following each of the scenarios describing the respondent being unfaithful, participants first rated the level of threat/severity of the incidents. Response alternatives ranged from *not at all* (1) to *extremely* (7). Each participant then rated the likelihood that their partner would express (communicate) that they were forgiven; *very unlikely* (1) *to very likely* (7) and immediately after, they rated the likelihood that they would believe that they were forgiven; *very unlikely* (1) *to very likely* (7). Finally, participants rated the likelihood they themselves (or their partner) would be breaking up; *very unlikely* (1) *to very likely* (7). All questions were translations of items used by Friesen et al. (2005).

Following each of the scenarios describing their partner being unfaithful, each participant first rated the level of threat/severity of the incidents as described above followed by a rating of (1) the likelihood that they would express (communicate) forgiveness to their partner, and (2) the likelihood their partner would believe he/she was forgiven. Participants then rated the likelihood that they themselves or their partner would end the relationship. All items were translated items used by Friesen et al. (2005). For measuring *internal motivational* aspects of forgiveness, we applied four items reflecting *keeping distance* and three items reflecting *revenge* from the modified and translated version of the Transgression-Related Interpersonal Motivations (TRIM) inventory (McCullough et al., 1998) as described by Friesen et al. (2005). Internal consistency (Cronbach's Alpha) for keeping distance was excellent for both sexual infidelity (females: $\alpha = .85$; males: $\alpha = .90$) and emotional infidelity

(females: $\alpha = .89$; males: $\alpha = .93$). Alpha's for the three revenge items were acceptable for both sexual infidelity (females: $\alpha = .66$; males: $\alpha = .66$) and emotional infidelity (females: α = .75; males: $\alpha = .64$). Item scores were summed and averaged. High scores reflected more distance and higher levels of revenge.¹

Question order manipulation. Responding to questions regarding one's own or one's partner's (hypothetical) infidelity may provide a mental context or frame for subsequent infidelity judgments. This alludes to studies on the effect of people reporting about themselves first, versus reporting about others first (Bless & Schwarz, 2010; Kruger, 1999), but the specificity of this potential contextual effect is not known. To control for possible effects of responding to own infidelity on judgments of partner's infidelity, we balanced the question order. Half of the couples were randomly assigned to respond to partner's infidelity scenarios first, and the second half to one's own infidelity scenarios first.

Ethics statement

The study was carried out in line with the American Psychological Association's ethical principles of psychologists and code of conduct. Prior to the data collection, the Norwegian Data Protection Official for Research (Personvernombudet, NSD) was consulted. Any formal notification of the research was deemed unnecessary. All project assistants signed a confidentiality form.

Results

In testing Hypothesis 1a, we performed a four-way $(2 \times 2 \times 2 \times 2)$ Mixed Model (Profile) Analysis (Tabachnick & Fidell, 2014) with Bias (transgressor's likelihood of

¹ The single item measuring cheated partner's expressed forgiveness correlated substantially with the scales keeping distance and revenge across scenarios and respondent sex (mean r's = -.47, ranging from r = -.31 to r = -.62). The average correlation for keeping distance and revenge was r = .43.

believing vs. transgressor's reports of likelihood that partner express) × Infidelity type (sexual vs. emotional) × Couple Sex (she vs. he) as within subject factors, and Question order (transgressor first vs. victim first) as between subject factor. See Table 1 for means and standard deviations for relevant variables.

	As Transgressor				As Cheated partner			
	Sexual (SC 1)		Emotional (SC 2)		Sexual (SC 3)		Emotional (SC 4)	
Variable	Women	Men	Women	Men	Women	Men	Women	Men
Threat/Severity	6.4	6.4	6.1 (1.2)	5.8 (1.2)	6.3	6.3 (1.1)	6.3 (1.0)	5.8(1.2)
LH you Break up	(****)	(***)	()	()	(***)	()	()	()
	3.7	3.6	4.4	3.8	5.5	5.3	5.2	4.7
LH Partner Express	(1.8)	(1.9)	(1.7)	(1.8)	(1.6)	(1.7)	(1.6)	(1.7)
Forgiveness	2.6 (1.4)	2.8 (1.5)	3.2 (17)	3.2 (17)				
LH you Express Forgiveness	()	()	()	()	2.9 (1.6)	2.7 (1.7)	2.9 (1.7)	3.5 (1.8)
LH Believe Forgiveness	1.9 (1.3)	2.1(1.3)	2.3 (1.4)	2.6(1.5)				
LH Partner	()	()			2.8 (1.4)	2.4 (1.3)	2.8 (1.6)	3.0 (1.7)
Forgiveness					5.1 (1.2)	4.9 (1.5)	5.2 (1.3)	4.5 (1.6)
TRIM-Distance					3.1	3.2	2.9	2.8
TRIM-Revenge					(1.1)	(1.3)	(1.4)	(1.3)

Table 1. Response means (and standard deviations) across the four infidelity scenarios

Note. SC=Scenario, LH=Likelihood. All means and standard deviation are based on a 7-point scale. The forgiveness scores were reversed (high scores = more forgiveness). TRIM=Transgression-Related Interpersonal Motivation

Relative to the transgressor's reports of likelihood that their cheated partner would express forgiveness (i.e., what they say) (M = 2.9), transgressors had a strong negative bias toward not believing in the expressed forgiveness (M = 2.2), F(1,90) = 79.49, p < .001, $\eta_p^2 = 0.469$. This bias was not moderated by Sex, F(1,90) = 2.17, by Infidelity type, F(1,90) = 0.26, or by the combined effect of Sex by Infidelity type, F(1,90) = 1.24. Also, the overall bias was not affected by question order, F(1,90) = 0.13.

In testing Hypothesis 1b, we re-ran the analyses for Hypothesis 1a substituting only the Bias factor (transgressor's likelihood of believing vs. cheated partner's likelihood of expressing forgiveness; see Figure 1). Relative to the likelihood that their cheated partner would express forgiveness (M = 3.0), unfaithful respondents had a strong bias toward not believing the expressed forgiveness (M = 2.2), F(1,90) = 49.26, p < .001, $\eta_p^2 = 0.354$. This bias was partly moderated by Sex, F(1,90) = 3.21, p = .077 (somewhat stronger bias for women), and by Sex of transgressor × Infidelity type, F(1,90) = 5.28, p < .05. A closer inspection of the scores for each group suggest that this three-way interaction was due to cheated men's elevated likelihood of forgiving their partner's emotional relative to sexual infidelity in combination with unfaithful men's relatively stronger belief in being forgiven for their emotional transgression. Post-hoc analyses evinced weak and nonsignificant bias for emotionally (d = .31, p = .136) relative to sexually (d = .77) unfaithful men. The bias for sexually unfaithful women was as strong as for men (d = .83). The strongest bias was found for emotionally unfaithful women (d = 1.14). In this analysis, question order moderated the overall bias, F(1,90) = 5.57, p < .05.²

² The bias was relatively stronger for participants who responded to victim scenarios following transgressor scenarios ($\eta_p^2 = 0.470$) than for respondents responding to victim scenarios before transgressor scenarios ($\eta_p^2 = 0.211$). A closer inspection of the mean scores suggest that the transgressors' beliefs were not affected by question order (M = 2.2 vs. M = 2.3), but the likelihood that

To examine whether or not the negative forgiveness bias reported above may in part be due to a general disbelief of the other party's beliefs following your expressed forgiveness, we performed a five-way $(2 \times 2 \times 2 \times 2 \times 2)$ Mixed Model (Profile) Analysis (Tabachnick & Fidell, 2014) with Actor (transgressor vs. cheated partner) × Bias (believe vs. express) × Infidelity type (sexual vs. emotional) × Respondent Sex (she vs. he) as within subject factors, and Question order (transgressor first vs. victim first) as between subject factor. See Figure 1 for an illustration. The essential finding from this complex model (see Figure 2) was that the transgressor *believed* their cheated partner's expressed forgiveness less, compared to their estimates of how likely their partner would *express* forgiveness (i.e., Transgressor's bias).





cheated partners expressed forgiveness was lower if the couple responded as transgressors first (M = 2.7) rather than as victims first (M = 3.3).

In comparison, the cheated party's estimates of forgiving the transgressor did not differ much from their disbelief; their estimates of how likely it was that their partner believed in their forgiveness (Actor × Bias interaction effect, F(1,90) = 18.74, p < .001, $\eta_p^2 = 0.172$). Hence, the negative forgiveness bias for the transgressor was evident even when accounting for general disbelief of the cheated partner. This pattern was not moderated by type of infidelity, nor by question order manipulation, but the pattern tended to differ somewhat for women and men, F(1,90)=3.03, p= .085. Relative to men, the bias appeared to be stronger for women when they responded as transgressors, and less when they responded as cheated partners (men reported more disbelief than women as cheated partner).

In testing Hypothesis 2a through 2e (see Figure 3) that, relative to women, men will find the sexual infidelity aspect more distressing than the emotional infidelity aspect, and vice versa relative to men, women will find the emotional infidelity aspect more distressing than the sexual infidelity aspect, we performed a five separate three-way ($2 \times 2 \times 2$) (Profile) Analysis with Infidelity type (sexual vs. emotional) × Couple sex (she vs. he) as within subject factors, and Question order (transgressor first vs. victim first) as between subject factor. For Hypothesis 2a (Level of threat) we found that a partner's sexual infidelity was more threatening than a partner's emotional infidelity, F(1,90) = 8.89, p < .01, $\eta_p^2 = 0.090$ and that infidelity was generally more threatening for women than for men, F(1,90) = 4.49, p< .05, $\eta_p^2 = 0.048$. As evident from Figure 3, Panel 2a, the level of threat for sexual infidelity did not differ for women and men (M = 6.3 for both sexes), but men (M = 5.8) found their partner's emotional infidelity more threatening than did women (M = 6.3), producing a significant Sex × Infidelity type interaction, F(1,90) = 4.48, p < .05, $\eta_p^2 = 0.047$.







For Hypothesis 2b (Expressed forgiveness) we found that respondents imagining their partner's unfaithfulness reported higher levels of expressed forgiveness for emotional compared to sexual infidelity, F(1,90) = 11.31, p < .001, $\eta_p^2 = 0.112$. This effect was qualified by a Sex × Infidelity type interaction, F(1,90) = 7.63, p < .01, $\eta_p^2 = 0.078$ suggesting that relative to women, men were more likely to forgive emotional infidelity than sexual infidelity.

For Hypothesis 2c (Keeping distance), we found no effect for Infidelity type, F(1,90)=2.21, p = 14, but men kept less distance than women (M = 4.7), $F(1,90) = 8.63, p < .01, \eta_p^2 = 0.088$. This effect was qualified by a Sex × Infidelity type interaction, $F(1,90) = 6.58, p < .05, \eta_p^2 = 0.068$, suggesting that relative to women, men kept their distance less for emotional infidelity than for sexual infidelity.

For Hypothesis 2d (Revenge), we found no sex difference, F(1,89) = 0.18, but higher levels of revenge were reported for sexual compared to emotional infidelity, F(1,89) = 13.91, p < .001, $\eta_p^2 = 0.135$. However, respondent sex did not moderate the above type of infidelity effect.

Finally, in testing Hypothesis 2e (Likelihood of breakup) we found that partner's sexual infidelity was more likely to result in breakup than partner's emotional infidelity,

 $F(1,90) = 6.80, p < .05, \eta_p^2 = 0.070$, and that women were marginally more likely to break up than men, F(1,90) = 3.45, p = .067. However, the likelihood of breakup for sexual over emotional infidelity was not significantly different for women and men (p = .147).

Discussion

Hypothesis 1 was strongly supported: We found a robust negative forgiveness bias following one's own imagined infidelity for both male and female transgressors. Relative to the likelihood of being forgiven, transgressors reported that they believed less that their partner would forgive their cheating This bias was evident for analyses using two different criteria: the transgressor's reports only (Hypothesis 1a, and for analyses comparing the transgressor's reports with their partner's external forgiveness (Hypothesis 1b). The moderation part of Hypothesis 1 was supported for emotional, but not for sexual unfaithfulness. We found diminished negative forgiveness bias for emotionally unfaithful men, but not for sexually unfaithful women. Emotionally unfaithful men evinced less bias in the analyses of their partner's expressed forgiveness. Relative to women, men not only seem to be more willing to forgive emotional infidelity by their partner, they also tend to believe more that their emotional infidelity will be forgiven. It is not that they are naïve about emotional infidelity; men do understand this is a transgression and that it might negatively affect their relationship, but the sex difference in response to both one's own and one's partner's emotional infidelity is striking. This supports the evolutionary perspective on infidelity from the jealousy literature that women are more distressed than men by emotional infidelity (Bendixen, Kennair, & Buss, 2015). The similarity of findings across the two tests of negative forgiveness bias suggest that this bias can be relatively accurately estimated even without any response from the respondent's partner. Friesen et al. (2005) considered their findings of a forgiveness bias consistent with Error Management Theory preliminary until

replicated. The current findings lend support to negative forgiveness bias being a functional response to relationship uncertainty. Further evidence of a true forgiveness bias is found when controlling for cheated partner's belief in transgressor believing in being forgiven. This general disbelief did not account for the negative forgiveness bias, which remains strong. The overall function of the negative forgiveness bias seems to be at least partly dependent upon subjective insight into the seriousness of the transgression. There are sex-differentiated perceptions of transgressions. In the current study, men understand that emotional infidelity is a problem, they just do not have insight into how great a problem their partner finds it to be. Perhaps in a more ecologically valid setting, their partner's distress would be more clearly communicated, resulting in better grounds for assessing the need for a forgiveness bias also for emotional infidelity for men.

In support of Hypothesis 2a we found that relative to women, men reported more threat imagining a partner's sexual infidelity compared to emotional infidelity. While level of threat to the relationship for sexual infidelity did not differ for women and men, women reported emotional infidelity to be more threatening than men did. In support of Hypothesis 2b and 2c, expressed and internal (keeping distance) forgiveness of partner's infidelity mirrors findings of sex differences in jealousy responses for continuous measures (Bendixen, Kennair, & Buss, 2015) and forced choice (Bendixen, Kennair, & Buss, 2015; Confer & Cloud, 2011; Shackelford et al., 2002). As predicted, relative to women, men found it harder to express forgiveness and internally forgive sexual infidelity compared to emotional infidelity. Bendixen, Kennair, and Buss (2015) suggested, in line with previous predictions by Buss et al. (1992), that this may be due to greater expectancy and variability in father investment in more gender egalitarian nations and cultures.

Parts d and e of Hypothesis 2 (revenge and breaking up) were not supported. The responses to a partner's hypothetical sexual or emotional infidelity were not significantly

different for women and men. It may be that any transgression of this kind is largely unforgiveable; at least as a deterrent. Our participating couples were aware of their partner simultaneously answering the same questionnaire as they were. Maybe some of their responses reflect a hypothetical a priori deterrent effect to questions like "what did you answer to …" when meeting up afterwards. Despite this, we found no evidence of a ceiling effect for breakup or revenge. It is possible that actual post hoc behavior would be less vengeful. Further, deterring threats of breakup a priori might work as retention tactics (Buss & Shackelford, 1997), but for emotional infidelity actually breaking up would be an ineffective tactic. Our results for breakup thus dovetail with the findings of Shackelford et al. (2002) who did not find a robust effect of sex. As such, breakup differs somewhat from threat, distress, jealousy, and forgiveness.

We did not anticipate that men should underestimate the severity of emotional infidelity to such a degree. In Bendixen, Kennair, and Buss (2015) it seemed that the large sex differences in jealousy responses were due to women's increased distress after emotional infidelity. The current finding may reflect men's lack of awareness of how upset their female partner would be following men's emotional infidelity. Alternatively, men were more selfcentered in their beliefs when estimating their partner's reaction to emotional infidelity. However, as forgiveness bias is the difference between transgressor's and victim's evaluation, any one or both of these evaluations will influence the strength of the bias. As such, it is worth noting that for sexual infidelity the bias was similar for men and women, while men evaluated emotional infidelity as less severe.

Limitations, Implications and Future Research

There were generally low levels of expressed forgiveness and internal forgiveness in terms of keeping distance in our hypothetical infidelity scenarios. Transgressions involving sexual or emotional infidelity were generally not forgiven by our participants (mean scores between 2.6 and 3.5, all well below the scale midpoints). That is perhaps the nature of infidelity; forgiveness is rare. However, it is important to note that these are hypothetical cases of infidelity. It is possible that one in real life would be more forgiving, as shown by Friesen et al. (2005) for the internal aspect of forgiveness. The responses predicted by our participants may be their moral and emotional ideal responses. Possibly, respondents fail to consider various relationship factors when imagining transgressions (McCullough & Hoyt, 2002). Also, the effect of religiosity, attributions, and negative emotions are shown to be stronger in hypothetical forgiveness compared to actual forgiveness (Riek & Mania, 2012). Hence, findings from studies of forgiveness using hypothetical scenarios may not always inform real life forgiveness. Future research needs to consider the extent the current findings reflect actual forgiveness of sexual and emotional infidelity. Further, future research might benefit from investigating differences in negative forgiveness bias and sex differences based on transgression descriptions (as in this study) versus transgression displays.

Although we believe that our scenarios have captured the essence of sexual and emotional infidelity – the former describing a one shot encounter, future research would benefit from using descriptions of sexual infidelity scenarios that involve numerous sexual interactions to increase equivalence to the emotional infidelity scenarios. Our study might also suffer from an *a priori* mate guarding, deterrent effect: Possible future infidelity might be met with clearer communication of ultimatums, where the severity of reaction and drama is intensified. Despite answering the questionnaires in separate rooms, the participants might have considered the hypothetical transgressions from a communicative perspective where they attempted to deter any future infidelity.

We note that for only one of the hypotheses (H1b) question order showed a significant effect; victims who answered as transgressors first *express* less forgiveness resulting in a stronger forgiveness bias. This is maybe counterintuitive; one might have thought that if

anything, one was more forgiving. Responding as victims first may reflect thoughts about what one ideally ought to do, while responding after one's own transgression reduced this benign effect. Some indirect support for this is found in Kruger (1999) and Bless and Schwarz (2010). They suggest that when people report about themselves first (self-other) their responses become egocentrically biased (increasing self-other differences), while reporting about others first may attenuate self-other differences. Possibly, responding as transgressor is more similar to responding as "self," and responding as victim is more similar to responding about "others," and that the reduced bias observed in our study may be attributed to more egocentric biased responses for those who responded as transgressors first (they were less likely to express forgiveness when responding as victims). This might prove not to be a robust finding, but future research needs to consider the effects of whether answering questions about own transgressions before considering partner's infidelity may affect results.

We did not ask women whether they were using hormonal contraception, which could influence the response to infidelity. As Geary, DeSoto, Hoard, Sheldon, and Cooper (2001) suggested, women using hormonal contraceptives tend to be more distressed by partners sexual infidelity than women who did not use such contraceptives. A recent student sample collected by the authors shows that, in a comparative sample of female students (n=439) in relationships, 82% of mated women used hormonal contraceptives (Grøntvedt & Kennair, unpublished data). Given that the majority of women the current sample are likely contraceptive users, the effects reported are likely to be slightly underestimated. Sex differences from samples with naturally cyclic women are expected to be larger. Also, a recent study by Grøntvedt, Grebe, Kennair, and Gangestad (2017) suggests that there are important differences with regards to the specific type of hormonal contraception and relative relationship investment that might led to other outcomes than suggested by Geary et al. (2001).

There is a practical and clinical implication of the current findings that might be relevant for couple counselors to be aware of: The significant difference in how the two sexes perceive this specific class of acts. Even though both men and women perceive both emotional and sexual infidelity as relationship threats, they have very different appreciations of the severity of especially emotional infidelity. This is true for both own and partner's transgressions. This may potentially be a source of misunderstanding, conflict and miscommunication in couples, and maybe a topic that couple counselors need to address.

Conclusions

The current study, combines forgiveness bias (EMT) with theory on evolved sex differences in jealousy. By testing the current predictions with couples' reports of both own and partners' transgressions and forgiveness, the current study provides novel and deeper insights into how men and women perceive and react to the distress of emotional and sexual infidelity.

The general finding suggests that negative forgiveness bias following infidelity transgressions is robust across multiple comparisons. Regardless of whether one compares the transgressor's beliefs with his or her own estimates of likelihood of being forgiven, or their partner's expressed or internal likelihood of forgiving them, the bias is strong. However, when making comparisons with partner's scores, the bias appears to be less pronounced for emotionally unfaithful men. Forgiveness bias appears to be an adaptive response predicted by EMT with the function to maintain reparative behavior to secure the relationship after relationship threatening transgressions. It is hard to consider forgiveness bias as anything but a cognitive bias. It is the biased belief that may influence adaptive restorative behavior rather than the accurate belief (Haselton & Nettle, 2006).

The hypothetical acts of infidelity committed in the current scenarios were in general not forgiven. Infidelity, whether emotional or sexual, is not easily forgiven; it is probably one

of the most severe transgressions one may commit toward one's partner. What is most striking with our results is how men do not quite understand how serious women perceive and deem emotional infidelity to be; while men cannot be described as naïve about this aspect of their relationship, they certainly are not as concerned with emotional infidelity as women are.

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Appendix

Scenario 1. Your sexual infidelity:

Imagine that you met someone at a party. You felt a strong attraction to this person and you danced intimately and flirted throughout the evening. Your partner was not present, but learnt through mutual friends a few weeks later that you slept with this person that night. Your partner gets very upset and confronts you with this. After being pressured and cornered you admit that you had sex that night, *but that you were not in love*. You show remorse, apologize, and promise that it will never happen again.

Scenario 2. Your emotional infidelity:

Imagine that you met someone at a party. You felt a strong attraction to this person and you danced intimately and flirted throughout the evening. Your partner was not present, but learnt through mutual friends a few weeks later that you have met this person several times since the party, and that it looks like you have fallen in love. Your partner gets very upset and confronts you with this. After being pressured and cornered you admit that you have met this person secretly, *but that you have not had sex*. You show remorse, apologize, and promise to break all contact.

Scenario 3. Your partner's sexual infidelity:

Imagine that your partner met someone at a party. S/he felt a strong attraction to this person and they danced intimately and flirted throughout the evening. You were not present, but learnt through mutual friends a few weeks later that your partner slept with this person that night. This makes you very upset and you confront your partner with this. After being pressured and cornered your partner admits that s/he had sex that night, *but that s/he were not in love*. Your partner shows remorse, apologizes, and promises that it will never happen again.

Scenario 4. Your partner's emotional infidelity:

Imagine that your partner met someone at a party. S/he felt a strong attraction to this person and they danced intimately and flirted throughout the evening. You were not present, but learnt through mutual friends a few weeks later that your partner has met this person several times since the party, and that it looks like s/he has fallen in love. This makes you very upset and you confront your partner with this. After being pressured and cornered your partner admits that s/he has met this person secretly, *but that they have not had sex*. Your partner shows remorse, apologizes, and promises to break all contact.