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Gender Dependent Flashbulb Memories of Sexual vs. Emotional Infidelity

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Gender Dependent Flashbulb Memories of Sexual vs. Emotional Infidelity

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Christine Therese Fisher

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Abstract

Research has suggested that males are more aroused and upset when their partner commits sexual infidelity and women are more aroused and upset when their partner commits emotional infidelity (Schützwohl, 2005); however, most studies used forced-choice questions and relied on “what if” scenarios, seemingly limiting their application to real-world situations (Buunk, Angleitner, Oubaid, & Buss, 1996). Assessing memory for the discovery of a partner’s actual infidelity provides empirical evidence to support these simulations. In the current study, participants ($N = 149$) were asked to recall the announcement that their partner committed infidelity. Males showed enhanced memory for discovering sexual infidelity, whereas females showed enhanced memory for discovering emotional infidelity.

Background

Infidelity in romantic relationships is a critical problem in reproductive success (Cosmides & Tooby, 1994). From an evolutionary standpoint, a cheating female denies her partner the opportunity to pass on his genes to future generations, while a cheating male potentially diverts his resources to another's kin (Harris, 2003). According to research performed by Schützwohl (2005), an evolved jealousy mechanism is a plausible psychological adaptation to infidelity. As a result, different types of infidelity should affect genders differently – men should be more upset with a partner's sexual infidelity and women more upset with a partner's emotional infidelity. However, most of this research (see Buunk, Angleitner, Oubaid, & Buss, 1996; Penke & Asendorpf, 2008) on infidelity has used forced-choice or imaginative simulations, where a participant speculates how it would feel to be in a committed relationship and discover unfaithfulness. The purpose of this study was to investigate gender-dependent memory mechanisms for discovering infidelity by using participants who have actually experienced infidelity in a committed romantic relationship.

The Danger of Jealousy

Jealousy, as defined by Buss, Larsen, Westen, and Semmelroth (1992), is a “state that is aroused by a perceived threat to a valued relationship or position and motivates behavior aimed at countering the threat.” Other researchers see jealousy as, “a fear and rage reaction filled to protect, maintain, and prolong the intimate association of love,” (Davis, 1948, p. 183). Despite jealousy being one of the noticeably strongest reactions a person can have in a relationship, the emotion has gone relatively unstudied.

Most researchers do not even classify jealousy as a primary emotion but rather a blend of more basic emotions (Frank, 1988). Yet in recent times, jealousy has come to the forefront of interest due to its causal role in wife battering and homicide. According to Daly and Wilson (1988), the two times a woman faces the greatest risk for harm is when her significant other suspects her of infidelity or when she decides to end the relationship. Such a powerful emotion and triggered response certainly has serious consequences and implications, leading more modern scholars to label jealousy as one of the basic human emotions (Buunk, Angleitner, Oubaid, & Buss, 1996). Until recently, no theory had predicted sex differences in response to infidelity, as it was assumed that any form of sexual unfaithfulness would elicit the most distressed responses in both men and women. Within the past few decades, however, evolutionary psychologists predicted that, due to asymmetry between males' and females' reproductive biology, cues that elicit jealousy would differ between the genders (Daly, Wilson, & Weghorst, 1982; Symons, 1979).

Male Responses to Infidelity

According to evolutionary psychology, males and females are presented with very different concerns once a child is conceived. Males can never be completely certain of the paternity of their offspring. Even with advances in DNA testing, probability of fatherhood will never reach 100% because there is always a, albeit miniscule, likelihood that the DNA of child and father were matched by chance (Aickin, 1984). Consequently, a woman's infidelity may saddle the male with years of investment to an unknowingly unrelated offspring (Schützwohl, 2005). These males may exert significant effort toward his female and child in vain while simultaneously missing out on other opportunities for true paternity (Buss et al., 1992). Selection pressure is then extremely high for males.

Since humans display the greatest amount of paternal investment of all primates (Alexander & Noonan, 1979), males must choose to mate with a female who shows the fewest signs of potential cuckoldry.

To compensate for the constant uncertainty of offspring paternity, Symons (1979) suggested that feelings of sexual jealousy evolved. Male sexual jealousy is an adaptive emotional reaction to have in a relationship. Those males who attend to cues of physical infidelity are more likely to have stronger paternity certainty and reproductive success. If the primary threat to a male's relationship is sexual unfaithfulness, then it is reasonable to assume that males will be more distressed over sexual infidelity, and research has supported this notion.

In a series of three studies, Buss et al. (1992) found that when male participants pictured being in a devoted romantic relationship, they imagined that they would become more upset by their partner engaging in sexual intercourse with someone else rather than their partner forming a deep emotional attachment to someone else. These feelings of distress were especially significant for the male participants who had actually been in a committed relationship before, demonstrating that experience with relationships heightened their jealous feelings. Males also showed significantly greater pulse rate and electrodermal activity when exposed to images of sexual infidelity as opposed to images of emotional infidelity.

Female Responses to Infidelity

While paternity for males can never be certain, the opposite is true for females. Maternity over offspring is always guaranteed due to the physical act of carrying a fetus for nine months. Evolutionarily speaking, females are presented with a completely

different problem in terms of raising offspring. In species with biparental care, the greatest risk posed to females is the loss of resources and commitment from a male partner if he chooses to pursue other mates (Buss, 1988; Thornhill & Alcock, 1983). A male's diverted resources to another's kin will prove especially damaging in species where two parents are most beneficial to the survival of offspring. The less investment from a male towards a female indicates less investment towards her kin as well. In order to maintain her male's investment, the female must be keenly aware of signs of deep emotional attachment elsewhere. Females must then be equally as cautious in choosing a mate. She must be sure to select a male who shows the fewest signs of potential abandonment (Buss et al., 1992).

To deal with the threatened loss of resources from males, feelings of emotional jealousy evolved in females. This adaptive reaction allows females to notice signs of emotional infidelity from their partners, an indicator of reduced or complete loss of investment. Females who attend to cues of emotional infidelity are less likely to raise offspring alone and more likely to receive resources and assistance from the paternal father. As such, if the primary threat to females' relationships is emotional straying, then they should become more distraught over and concerned about this specific type of infidelity as opposed to sexual infidelity (Schützwohl, 2005; Buss et al., 1992).

The same series of three studies from Buss et al. (1992) found supporting evidence for females and emotional infidelity. Over 80% of females reported, when imagining a committed relationship they had, have, or desire to have in the future, that they would become more distressed imagining their male partner forming a deep emotional attachment to another woman than their partner enjoying passionate sexual

intercourse with that woman. Females also showed greater electrodermal activity when instructed to imagine their male partner falling in love with someone else.

Further Evidence for Jealousy

In response to research supporting gender differences in response to infidelity types, Schützwohl (2005) suggested that a sex-specific evolved jealousy mechanism (EJM) is a means by which males and females detect unfaithfulness. His research expands upon the finding of distress due to specific infidelities by looking at cognitive assumptions derived from the EJM view. First, the EJM allows for the assumption that, under suspicion of infidelity, males and females will differ in terms of the type of information they will seek out from their partners. By having participants prioritize questions in which they would ask of their partner if they suspected cheating, the top two questions posed by females regarded emotional involvement (Do you love her? / Do you still love me?), while the top question posed by males regarded sexual involvement (Have you slept with him?). The second assumption under the EJM is the amount of thought preoccupation under suspicion of infidelity. Females are significantly less preoccupied with thoughts about a mate having sexual intercourse with another person than males are.

Of all the studies that have predicted infidelity-specific sex differences, almost all have been conducted in the Western Hemisphere. Yet to qualify as an evolutionary hypothesis, cross-cultural findings must also provide support for the theory. In a study completed by Buunk et al., (1996), not only did Americans demonstrate this gender difference, but even in cultures known to have a more relaxed attitude about sexuality, like Germany and The Netherlands, sex differences still emerged. These results offer evidence that the EJM mechanism may be a universal phenomenon, one that has more

influence on our behaviors than originally thought. Jealousy is not just a basic human emotion to have towards a significant other. It is also an adaptive behavioral response that has evolutionary pertinence to the ways in which humans successfully pass on their genes.

The most significant shortcoming regarding sex-specific infidelity differences is the way in which researchers have gone about testing for them. Most studies have used forced-choice or imaginative simulations, where a person speculates how it would feel to be in a committed relationship and discover a partner has cheated (Buunk, Angleitner, Oubaid, & Buss, 1996; Penke & Asendorpf, 2008). The majority do not even separate which participants have actually experienced infidelity and which are simply using hypothetical relationships they desire to have someday when performing analyses. Those studies that actually have separated participants with and without experience have raised important questions about the authenticity of generalizing supposed with actual cheating (Varga, Gee, & Munro, 2011). It may be that those who have been in a committed relationship and experienced cheating will view sexual and emotional infidelity quite differently than those who can only imagine the way it would feel. The notion of whether imagined and real infidelities evoke similar emotions has yet to be explored, so by looking solely at victims of infidelity, this gap in research can be addressed. Testing participants for their memories of unfaithfulness is one route that can be used to resolve these unanswered questions.

Memory and Arousal

Research on memory has suggested that surprising, consequential, or emotionally arousing events tend to be remembered better than events without those characteristics

(Bohannon, 1992; Hirst et al., 2009). Coined flashbulb memories, these events are frequently remembered with superior detail and clarity from the first-person perspective. While many features assist in the formation of a flashbulb memory, such as high consequentiality and surprise at the time of encoding, research has shown that events linked with high emotion are especially favored in memory processing (Brown & Kulik, 1977). Typically flashbulb memories have been thought of as occurring for large-scale, public events, such as discovering the explosion of the space shuttle Challenger. In one of the first studies to examine flashbulb memories, Bohannon (1988) tested participants two and eight weeks following the Challenger explosion and found that those who reported stronger emotions at their time of discovery generated stronger flashbulb memories than those without such emotion.

Enduring and extensively detailed memories are thought to be due to high arousal at encoding. Emotional arousal during encoding consequentially enhances memory at recall, which contributes to why flashbulb memories remain so vivid over time – the greater the affect at the time of encoding results in more memory that is retained at retrieval. Although flashbulb memory research has mainly focused on public emotional occurrences, more recent research has suggested that private, autobiographical memories display these similar arousal-enhancing effects (Bohannon, 2010). Personal flashbulb memories can either be positive or aversive idiosyncratic events, such as one's first kiss, the announcement of parents' divorce, or a marriage proposal. They are believed to be recalled with more detail and elaboration than ordinary memories (Rubin & Kozin, 1984). Discovering a partner's infidelity qualifies as an autobiographical flashbulb memory because it shares many of the same features as other arousing personal

experiences, such as high consequentiality and multiple recounts to outside sources (Conway, 1995; Julian, Bohannon, & Aue, 2009).

Infidelity also meets the criteria of a flashbulb memory by the way in which it threatens evolutionary fitness. When survival is involved in an experience, the memory is enhanced (Nairne, 2008). These benefits arise because human memory has evolved to prioritize survival related information, which has greater adaptive significance (Howe & Otgaar, 2013). Studies by Nairne (2007; 2008) showed that participants remembered significantly more words in a wordlist when the words were related to survival than when they were neutral. Even when tested against highly effective encoding procedures, more survival-related words were retained over time. Howe and Otgaar (2013) believe that this distal advantage in evolution would most likely act through proximal causes, such as arousal. Perhaps, then, when learning a romantic partner has strayed, the ability to pass on one's genes is threatened. That threat, the distal cause, leads to high arousal at the time of discovery, the proximal cause, and thus a lasting and vivid personal flashbulb memory, dependent on infidelity type and gender, has been formed.

Memory and Infidelity

Schützwhol and Koch (2004) hypothesized that the EJM preferentially attends to, encodes, and recalls cues that indicate infidelity. It is a mechanism that allows for domain-, content-, and sex-specific information processing, and research has confirmed this memory bias. When listening to a story about a couple that included cues of sexual and emotional infidelity, one week later males and females recalled more cues specific to their adaptive infidelity type. This provides evidence that sex differences to infidelity go beyond arousal; the higher emotions connected to specific infidelity type influence the

way the brain cognitively processes and stores the information. Retrieval is enhanced when infidelity type corresponds to the EJM's evolutionary predisposition. However, beyond the Schützwhol and Koch research, the link between memory and infidelity has gone relatively unstudied. Thus far no published studies have looked at the overall quality and endurance of memory and how memories preferentially differ based on the type of cheating their partner committed. Certainly such a widely researched and supported evolutionary theory cannot be further upheld unless empirical evidence validates these findings as well. The gender difference in response to infidelity seen from evolutionary research should still hold true in terms of testing for memory.

Because of the dearth of research regarding both actual victims' reactions to infidelity and whether the discovery event has flashbulb memory properties, the present study looked to further explore the link between gender, arousal, and memory. As previously demonstrated, males and females react very differently to emotional and sexual infidelity. If stronger emotional responses to infidelity are gender specific, males and females should in turn remember details surrounding the discovery differently depending on the type of cheating their partner committed. Based on the principles of autobiographical flashbulb memory, they should have greater memory detail when they are more aroused by the event. Two main experimental predictions were made for this study. If men are more upset by a partner's sexual infidelity (becoming physically intimate with another), then they should more accurately remember details of when they discovered sexual infidelity over emotional infidelity. If women are more upset by a partner's emotional infidelity (developing feelings for someone else), then they should more accurately remember details of when they discovered emotional infidelity over

sexual infidelity.

Methods

Participants

149 Butler University undergraduate students, ex-students, and faculty participated in this study. Those students taking psychology courses at the time of test received extra credit in the course of their choice, but for all others, participation was voluntary. Participants' ages ranged from 18 to 56, and the majority was female (77.2%). Only those people who had previously been or currently were in a romantic relationship and discovered their partner's infidelity were allowed to partake in this study.

Procedure

The current study took roughly 30 minutes to complete on a weekday evening. Qualified participants signed up via an online registration website for a specific date and time. Upon arrival, participants gave informed consent and began the memory protocol, which consisted of a free recall narrative and a probed recall. When the protocol was completed, participants were thanked and debriefed as to the nature of the study. They were then provided contact information if they desired any follow-up regarding results of the study.

The free recall narrative required the participants to write down everything they could remember surrounding the official announcement that their partner had committed infidelity. They were asked to detail internal thoughts and feelings as well as external events. It was also specified to indicate if the type of infidelity their partner committed was, in their opinion, sexual or emotional. In addition to the free recall, the ensuing probed recall included both specific questions surrounding the discovery event and

confidence ratings of their answer. Questions on the probed section regarded location of discovery, actions leading up to the event, aftermath of the event, date of discovery, time of day, weather that day, and clothing for both participant and informant. Participants could rate the confidence of their answer from 1-5, with 1 being “Not sure at all” and 5 being “Extremely confident.” Further questions inquired how long the participant was involved with the partner, if the participant was still in a relationship with that partner, and their number of recounts to outside sources. Finally, participants ranked on a 1-5 scale the seriousness of the relationship, then arousal, vividness, and surprise levels when they made the discovery.

Each free recall narrative was then scored in accordance with Brown and Kulik’s (1977) measures for flashbulb memories. Seven features of flashbulb memories were used: activity (leading up to discovery event), location (during or leading up to the announcement), time of day (when the event occurred), others present (any person around narrator other than the partner), author’s affect (mental state before or after the discovery), others’ affect (the emotional of anyone else, including the partner, at the time), and aftermath (any action that occurred after). These seven features were rated on a 0-3 scale, where a 0 indicated no mention of that feature and a 3 indicated an elaborate response (See Appendix B and Appendix C).

Participants’ probed responses were measured in a similar fashion. For six of the probed questions mentioned above, a 0 meant no response given and a 3 meant an elaborate answer, and for the remaining two, a scale of only 0-2 was used (See Appendix D and Appendix E). The final step was to enter participants’ scores into a Microsoft Excel document for later analysis on Stat-View 5.

Results

Inter-rater reliability

Two raters individually scored both the free and probed recall sections of a completed protocol, where they then compared ratings to obtain an agreement percentage. The purpose of inter-rater reliability is to ensure that both raters can agree upon and confirm a standardized scoring method. That way, when future protocols needed scoring, only one rater would be needed to dependably assign numbers to an answer. According to Talarico and Rubin (2003), 80% agreement is sufficient for inter-rater reliability. After ten protocols, the two raters surpassed that number, obtaining a 91% agreement.

Gender Demographics

Demographics were obtained in order to detect differences between the genders in our sample that could be attributed to qualities other than gender itself. Females made up 77.2% of our sample ($N = 115$), whereas males made up the remaining 22.8% ($N = 34$). However, this gender breakdown is representative of the gender distribution at the undergraduate university at which the sample was taken. Analyses found no significant differences between males and females in terms of age, duration of relationship, time delay between discovery and test date, surprise ratings, seriousness of relationship ratings, and number of recounts (See Table 1).

Gender and Infidelity Type on Memory

In order to test the hypothesized gender differences in response to infidelity type, the total amount of memory associated with participants' answers was indicated by averaging their scores for free and probed recall responses. Using a 2 (gender) x 2

(infidelity type) x 2 (memory measure) mixed design ANOVA among gender, type of infidelity, and quantity of memory from the probes, the results showed a two-way interaction between gender and the type of infidelity on memory, $F(1,137) = 10.871, p < .001$. Men had more extensive and elaborate memory for the discovery of sexual infidelity ($M = .78, SD = .15$) than for emotional infidelity ($M = .65, SD = .15$), whereas women had more extensive and elaborate memory for discovering emotional infidelity ($M = .80, SD = .18$) over sexual infidelity ($M = .71, SD = .20$). When using the inclusion criteria “Emotional infidelity victims only,” the difference between men and women still reached significance, $F(1,57) = 8.492, p < .005$. However, when using the inclusion criteria “Sexual infidelity victims only,” men and women’s differences in memory were only marginal, $F(1,80) = 2.785, p < .10$ (See Figure 1).

While as a whole the data supported the hypothesized gender difference on memory by infidelity type, more support could be gained by looking at the differences strictly within gender. When looking only at females, the differences between their memory for emotional and sexual infidelity did indeed reach significance, $F(1,106) = 6.379, p < .01$. Significance was also reached for males, for they had even more pronounced differences between their memory for sexual and emotional infidelity, $F(1,31) = 9.515, p < .004$.

Gender and Infidelity Type on Vividness

Vividness, a critical characteristic of flashbulb memories (Talarico & Rubin, 2003), was assessed to determine the quality of participants’ memory. A factorial ANOVA indicated a two-way interaction between gender and infidelity type on vividness of memory, $F(1,139) = 5.198, p < .02$. However, no within gender comparison attained

significance, $F(1,31) = 2.489$, NS (males), $F(1,108) = 1.747$, NS (females) (See Figure 2).

Gender and Infidelity Type on Arousal

Because arousal is an alleged proximal cause of distal adaptive memory advantages (Howe & Otgaar, 2013), arousal ratings from participants were analyzed in order to see if the ratings varied in the same direction as memory did for the genders and infidelity type. A factorial ANOVA did not indicate a two-way interaction between gender and infidelity type on arousal, $F(1,139) = .058$, $p < .818$. Men and women showed no distinct difference in their arousal ratings at the time of their discovery regardless of the type of infidelity their partner committed.

Arousal and Vividness on Memory

Arousal and vividness seem to vary together such that those who are more aroused typically produce more vivid recollections (Bohannon, 1988; Brown & Kulik, 1977). Participants were assigned to “Calm” (3 or less) and “Upset” (4 or 5) subgroups depending on their rating on a 5-point scale. Indeed, a factorial ANOVA indicated that those participants who were more aroused at the time of discovery reported their memories, regardless of infidelity type, as more vivid, $F(1,131) = 12.628$, $p < .0005$. Those who were calm ($M = 3.76$, $SD = .74$) reported less vivid remembrances than those who were upset ($M = 4.25$, $SD = .81$).

Arousal and Duration of Relationship

Duration of relationship (short = 6 months or less; medium = 7 to 19 months; long = 20 months and longer) was of an element of analytic interest because one might assume that those couples who were dating longer would be more aroused by an infidelity

discovery than those who only dated a short amount of time. Duration of relationship may act as a surrogate for commitment level. A 3 (duration) x 2 (gender) factorial ANOVA of arousal ratings indicated that relationship duration had a nonsignificant overall effect, $F(2,141) = 2.366, p < .098$.

Number of Recounts on Memory

Because Howe and Otgaar (2013) hypothesized that retellings are another candidate of proximal mechanisms for distal memory advantages, and Julian, Bohannon, and Aue (2008) found that they are a significant predictor of flashbulb memory quantity, the number of recounts to outside sources was analyzed to see if it had an effect on infidelity memory. Recounts did not significantly differ between males and females (See Table 1) or predict overall memory quantity for the discovery, $F(1,127) = 2.22, p < .139$. Similarly, there was no interaction between gender, infidelity type, and number of recounts, $F(1,140) = .077, p < .782$.

Discussion

Gender Differences in Response to Infidelity

Our findings confirm our hypotheses regarding gender differences in memory in response to different types of infidelity: men had a more extensive and elaborate memory for discovering sexual infidelity and women had a more extensive and elaborate memory for discovering emotional infidelity. These results provide the missing link between research on different gender responses to infidelity and personal flashbulb memories. Since men have been hypothesized to generate stronger emotions in response to sexual infidelity, and strong emotions are a key aspect in flashbulb memory development, their memory for discovering sexual infidelity was enhanced at recall. In other words,

Schützwohl's (2005) sex-specific evolved jealousy mechanism (EJM), used to detect unfaithfulness, was activated in the males. The EJM consequently provided them with a detailed, more vivid flashbulb memory when they discovered their partner cheated on them sexually as opposed to emotionally. Contrastively, since females have been hypothesized to generate stronger emotions in response to emotional infidelity, and again, high emotionality is critical to flashbulb memory development, their memory for discovering emotional infidelity was enhanced at recall. Females' EJM's were activated and led to more detailed and vivid recollections when they discovered their partner cheated on them emotionally rather than physically.

Not only did the amount of memory change for males and females depending on infidelity type but also their vividness ratings. Vividness ratings for discovering infidelity paralleled the memory differences between genders. This is in indication that both *quantity* of memory and *quality* of memory interacted with gender and infidelity type.

As seen in Table 1, the memory difference we found between the genders can be attributed to gender alone. No other aspect surrounding their discovery event, such as surprise level or relationship length or recounts, affected their recollection differently. Moreover, there was no main effect of gender (See Table 2) and no main effect of infidelity on memory (See Table 3). Neither one gender nor one infidelity type produced a greater quantity of memory. This provides even more supportive evidence for the evolutionary hypothesis, for males and females were equal on all features of flashbulb memory except for infidelity-specific memory quantity. However, this also means that the mechanism behind the increased memory quantity between the genders has not yet

been pinpointed. It is logical to next examine male and female arousal, Howe and Otgaar's (2013) hypothesized proximal mechanism behind adaptive memory.

Arousal

Analyses of arousal ratings in regards to memory showed inconsistent results. Participants who were more aroused at the time of their discovery reported their memories as more vivid regardless of infidelity type. However, the arousal mechanism responsible for memory enhancement was not supported by our results. Arousal did not vary with gender and infidelity type, for males and females showed no difference in their arousal ratings no matter the type of infidelity they were discovering. This result contrasts what previous research should have predicted to occur. Arousal is a critical element to flashbulb memory development (Bohannon, 1992; Hirst et al., 2009), and Harris (2003) found that levels of arousal vary between genders depending on infidelity type. But since our results indicate that arousal does not vary with gender and infidelity type, but memory does vary, adaptive memory may have another way of enhancing recall without needing arousal. The distal advantage of memory enhancement (Howe & Otgaar, 2013) occurred without the hypothesized proximal cause, arousal.

It is possible that the inconsistencies between what previous research has suggested and what our findings lack are due to differences in testing procedure. As mentioned, thus far research on infidelity has used forced-choice or imaginative simulations, where a person envisions how it would feel to be in a devoted relationship and discover a partner has been unfaithful. Since we tested actual victims' memories, their arousal ratings may differ due to the delayed nature of the memory probe. It is also possible that thinking about being cheated on and immediately reporting arousal would

produce more exaggerated differences, especially if the participants in those studies had never truly been cheated on. Because our participants were all victims of infidelity, our obtained arousal ratings could be more accurate reflections of their true state.

Non-Enhancing Effects

Of particular interest are not only what the analyses found from this study but also what the analyses did not indicate. Memory was not predicted by number of recounts, another prognostic cause of flashbulb memory. This demonstrates just how powerful the memory enhancement was for the participants. It is logical to assume the recounts would influence memory quantity, and previous research has confirmed this enhancing effect (more recounts yields greater memory; see Brown & Kulik, 1977; Julian, Bohannon, & Aue, 2008), yet our results do not indicate so. Moreover, arousal ratings at the time of discovery did not vary in terms of how long the couple had been together. No matter the duration of the relationship overall, a supposed surrogate for commitment level, all participants were similarly aroused at the time of discovery. Clearly discovering infidelity is a robust event, as none of these aspects influenced memory, even over the course of several years post-discovery. Memories for infidelity appear to be very resistant to other effects typically associated with flashbulb memories.

Evidence of Veridical Flashbulb Memories

A particular argument raised against flashbulb memories is the accuracy of these memories over time. Critics claim that just because a recalled memory on a protocol is written with great detail does not necessarily mean the discovery event occurred as narrated. In terms of this study, it would seem that the accuracy of each participant's memory for discovering infidelity could never be verified, so our results may not be truly

indicative of an adaptive gender difference. Research by Julian, Bohannon, and Aue (2008) found evidence to lay these claims to rest. To assess subjects' flashbulb memories, data sets were taken after four major global events: the World Trade Center attacks, the death of Princess Diana, the capture of Saddam Hussein, and the destruction of the space shuttle Columbia. A total of 1218 participants' memories for the facts surrounding the event were assessed both within two weeks of the event and again after a three-month to two-year delay. Results indicated that quantity of memory behaved identically to consistency of memory over time with respect to arousal and recounts. This suggests that both measures may provide comparable information. Because the researchers asked for details of the targeted events themselves, quantity of narrative recall at follow-up could be compared to consistency estimates and accuracy for known event facts. Both consistency and quantity of memory correlated with accuracy. Since there is a distinct similarity between assessment for flashbulb memory fact narratives and personal flashbulb memory discovery events (Nachson & Zelig, 2003), accuracy can be presumed to function in much the same way for discovery memory as it does for fact memory. Thus accuracy can be estimated by subjects' quantity of recall, and for this study, quantity of memory for discovering infidelity. The Julian et al. (2008) results may seem contradictory to the findings from this study due to our lack of significant arousal and recount differences between genders. However, arousal and recount effects are not needed to show that simple quantity of memory is as good a measure of accuracy as consistency is.

Limitations and Weaknesses

This study had some limitations and weaknesses that may have influenced the results. First, the wording of certain questions, especially in the probed section, may have affected the participants' resulting answers. When participants were asked to indicate their arousal ratings on a 1-5 scale, it is possible that the term "arousal" was unclear to them, as the word itself could take multiple meanings. This vague wording may have led to a ceiling effect, with most participants reporting high arousal at the time of discovery. To balance this, future research can take different measures of arousal or ask the question in multiple ways to ensure a proper measurement. Also related to the inconsistent arousal finding, it is plausible that errors in scoring led to the indiscernible difference in arousal between males and females. The arousal rating was analyzed using the number circled by participants, which is not typically subject to data entry error. However, scoring memory quantity, which required taking a participant's sentences and encoding them into numbers, is susceptible to much more variability. Third, participants were not split up by sexual preference. There were a few protocols that indicated homosexuality, and with no knowledge if there are differences between heterosexual and homosexual reactions to infidelity, it cannot be assumed that males and females would react in a similar fashion regardless of sexual preference. Future research can either examine only homosexual discoveries of infidelity or more clearly specify that heterosexuality is a requirement to participate. Finally, participants were asked to label their partner's infidelity as either emotional or sexual. This forced dichotomy did not take into account that some participants could perceive their experience with infidelity as both emotional and sexual and not simply a single type (e.g., their partner started dating another person and clearly had been intimate with them as well).

The primordial evolutionary behaviors upon which our ancestors once relied on for survival should be extant in the present day. Sexual selection and the avoiding of someone who cheats is no exception. Humans are unconsciously motivated by the desire to find a faithful partner, and from the results of this study, it was confirmed that the genders differ in the type of infidelity to which they are sensitive and consequently remember. Coupled with the evolution of the complex human memory system, clearly an adaptive memory mechanism has formed and is in the workings of the participants as they recalled their personal discovery events. Although the precise proximal cause of gender-dependent flashbulb infidelity memories has not yet been uncovered, I believe that memory is still enhanced via this adaptive memory mechanism. Arousal may not be the key factor in memory enhancement for the genders, but clearly it, along with other causes, plays a role in making memories of infidelity lasting and vivid. It is also possible that evolutionary adaptability is the proximal cause itself. Identifying and recalling infidelity events may be so critical to survival that the mere presence of an event could trigger enhanced memory without needing the other factors.

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Table 1: Gender Demographics

| Variable | Male (<i>N</i> = 34) | Female (<i>N</i> = 115) | <i>F</i> -Ratio (1,147) |
|---------------------------|------------------------|--------------------------|--------------------------|
| Age | 22.1 years* (7.7)** | 22.1 years (8.8) | <i>F</i> = .003 NS*** |
| Delay to Test | 37.4 months (65.1) | 33.2 months (39.7) | <i>F</i> = .181 NS |
| Arousal Rating | 4.12 (1.19) | 4.25 (.99) | <i>F</i> = .402 NS |
| Number of Recounts | 7.3 (6.9) | 11.6 (16.6) | <i>F</i> = 2.16 NS |
| Length of Relationship | 23.4 months (44.1) | 23.8 months (38.0) | <i>F</i> = .002 NS |
| Surprise Rating | 3.7 (1.04) | 3.7 (1.11) | <i>F</i> = .056 NS |
| Seriousness Rating | 4.03 (.91) | 3.81 (1.24) | <i>F</i> = .888 NS |

* Mean

** Standard Deviation

*** Not Significant, $p > .05$

Table 2: Memory Quantity Between Genders

| Variable | Male (<i>N</i> = 34) | Female (<i>N</i> = 115) | <i>F</i> -Ratio (1,145) |
|----------------------|-----------------------|--------------------------|--------------------------|
| Gender Group | .735* (.16)** | .751 (.20) | <i>F</i> = 1.28 NS |
| Sexual Infidelity | .780 (.02) | .718 (.20) | <i>F</i> = 10.002 *** |
| Emotional Infidelity | .661 (.15) | .793 (.18) | <i>F</i> = 10.002 *** |

* Mean

** Standard Deviation

*** Significant, $p < .001$

Table 3: Memory Quantity for Infidelity Type

| Variable | Sexual Infidelity (<i>N</i> = 85) | Emotional Infidelity (<i>N</i> = 64) | <i>F</i> -Ratio (1,145) |
|-----------------|---------------------------------------|--|--------------------------|
| Infidelity Type | .733* (.19)** | .766 (.19) | <i>F</i> = .501 NS |
| Males | .780 (.02) | .718 (.20) | <i>F</i> = 10.002 *** |
| Females | .661 (.15) | .793 (.18) | <i>F</i> = 10.002 *** |

* Mean

** Standard Deviation

*** Significant, $p < .001$

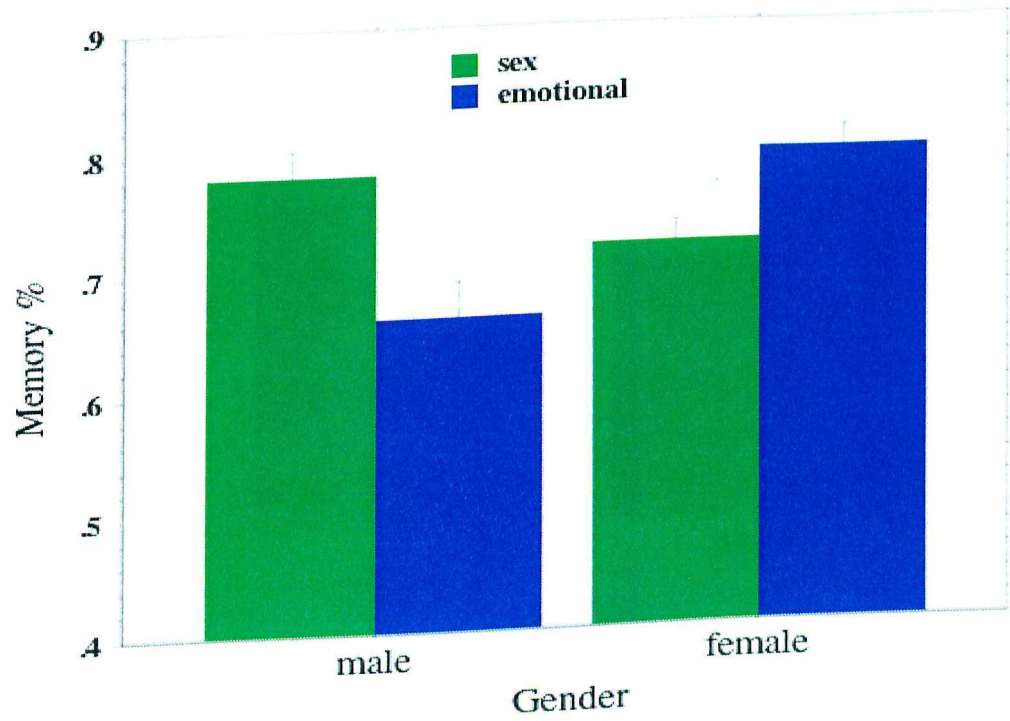


Figure 1: Memory Quantity for Infidelity Type by Gender, $F(1, 137) = 10.9, p < .0012$.

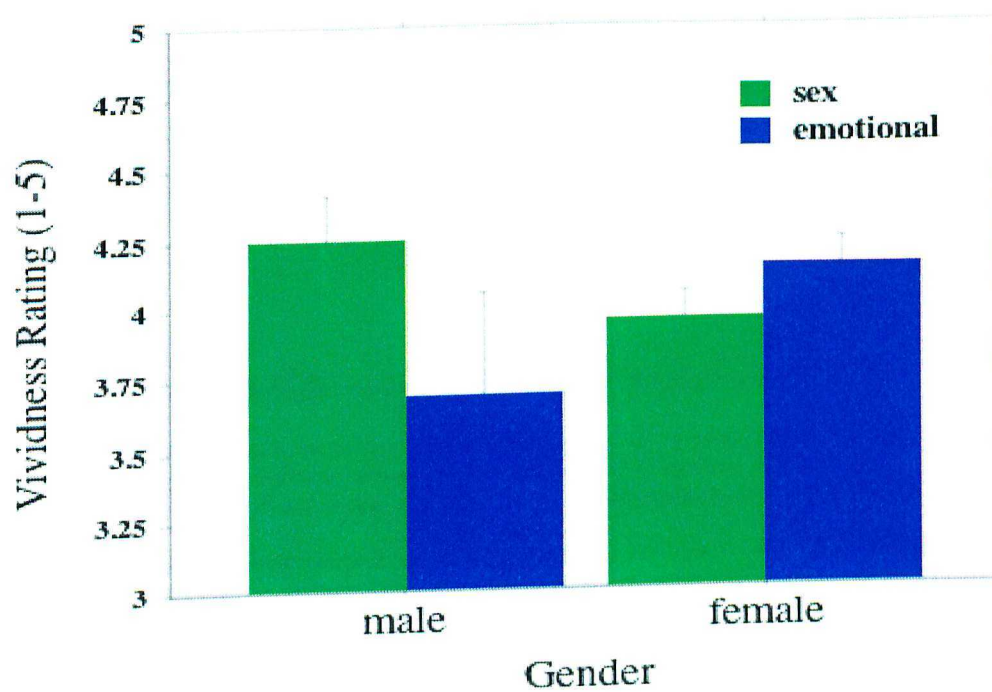


Figure 2: Vividness Ratings for Infidelity Type by Gender, $F(1,139) = 5.2, p < .02$.

Female differences, $F(1,108) = 1.747, p < .19$.

Male differences, $F(1,31) = 2.489, p < .12$.

Appendix A: Protocol for Discovering Infidelity

Participant # _____

Statement of Informed Consent

I have read the below statement, understand my rights, and agree to these conditions.

Name _____ Signature _____

Date _____

Current Age: _____

Male: _____ Female: _____ (please check)

Race: _____

Tear along the above line and keep the bottom portion for your records.

This study examines people's memories for discovering a romantic partner's infidelity. The responses will be kept confidential and will be used only for the purpose of this experiment. Group averages and tendencies will be analyzed with a code for each subject maintaining the confidentiality of all individual memories.

To take part in the experiment you will fill out a questionnaire that should take approximately 20 minutes. Participation in this study is voluntary and you will not be penalized or lose any previously entitled benefits should you choose not to participate. You may also discontinue your participation in this experiment at any time, and any information that you provided will not be used. We may try to contact you next year for a follow-up.

Please do not discuss this study with anyone during or after the experiment. At your request, we will fully inform you as to the nature of this experiment no later than one month from your participation.

If you have any questions please feel free to contact:

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Dr. Neil Bohannon 317-940-9240
nbohanno@butler.edu

Thank you for your participation!

Participant #: _____ (leave blank)

Part 1: Discovering of Infidelity Open Recall

Please write a detailed account of the exact moment you discovered that your partner was cheating on you. Include all vivid, memorable details surrounding the event. Please detail internal thoughts and feelings as well as external events, such as things you saw and heard at the time and the actions of the other person. In your narrative, please detail whether your partner sexually cheated on you or emotionally cheated on you.

Part 2: Probed Recall Questions

Please answer the following questions as specifically as possible to the best of your recollection. Further, please rate your confidence in each answer according to the below scale:

| 1 | 2 | 3 | 4 | 5 |
|--------------------|-----------------------|-------------------------|-------------------|------------------------|
| Not sure at all | Somewhat Confident | Moderately Confident | Very Confident | Extremely Confident |

1. Where were you when you discovered your partner's infidelity? _____
 _____ Confidence Rating _____
2. What were you doing just prior to discovering your partner's infidelity? _____
 _____ Confidence Rating _____
3. What happened immediately following your discovery? _____
 _____ Confidence Rating _____
4. What was the exact date of the discovery? _____ Confidence Rating _____
5. What day of the week was the discovery? _____ Confidence Rating _____
6. What time of day did the discovery occur? _____ Confidence Rating _____
7. What was the weather like that day? _____
 _____ Confidence Rating _____
8. What were you wearing when you discovered the infidelity? _____
 _____ Confidence Rating _____
9. What was your partner/informant wearing? (if applicable) _____
 _____ Confidence Rating _____
10. How long (in months) were you involved in a relationship with this person? _____

11. Are you still in a relationship with this person? Yes or No (circle one)
12. Approximately how many times have you related this story to an outside source (another person, diary, blog, etc)? _____
13. Approximately how many relationships have you been in? _____
14. Please rank the seriousness of this relationship on the scale provided below.

1 _____ 2 _____ 3 _____ 4 _____ 5
 Casual Pretty serious Very serious

Please circle your arousal level when you found out your partner had cheated on you.

1 _____ 2 _____ 3 _____ 4 _____ 5
 Couldn't have Somewhat Moderately Very Extremely
 cared less aroused/agitated aroused/agitated aroused/agitated aroused/agitated

Please circle the vividness of your memory of when you found out your partner had cheated on you.

1 _____ 2 _____ 3 _____ 4 _____ 5
 Extremely Somewhat Moderately Very Extremely
 vague/hazy vague vivid vivid vivid

Please circle the level of surprise you experiences after you found out your partner was cheating on you.

1 _____ 2 _____ 3 _____ 4 _____ 5
 Couldn't have Somewhat Moderately Very Extremely
 cared less surprised surprised shocked shocked/amazed

Appendix B: Free Recall Scoring

| Canonical Feature | Description | Quantity Score |
|-------------------|---|----------------|
| Activity | Actions leading up to the discovery | 0-3 |
| Location | Location at the time of discovery | 0-3 |
| Time | Time when the discovery took place | 0-3 |
| Others Present | Anyone around the author during the discovery | 0-3 |
| Author's Affect | Emotional state of the author at time of discovery | 0-3 |
| Other's Affect | Emotional state of anyone around the subject at time of discovery | 0-3 |
| Aftermath | Actions that occurred after the discovery | 0-3 |

Appendix C: How to Score Free Recall Responses

| Canonical Feature | Scoring Rules | Example (for "Location") |
|--|---|--|
| Activity Location Time Others Present Author's Affect Other's Affect Aftermath | Score of 0 – Canonical feature is not present | Nothing written |
| | Score of 1 – Canonical feature is implied | "My roommate woke me up" |
| | Score of 2 – Canonical feature is explicitly mentioned | "I was in my dorm room" |
| | Score of 3 – Canonical feature is further specified or mentioned more than once | "I was in my dorm room in Ross Hall, Room 338" |

Appendix D: Probed Recall Scoring

| Canonical Feature | Description | Quantity Score |
|-------------------|---|----------------|
| Activity | Actions leading up to the discovery | 0-3 |
| Location | Location at the time of discovery | 0-3 |
| Time | Time when the discovery took place | 0-3 |
| Aftermath | Actions that occurred after the discovery | 0-3 |
| Author's Clothing | Clothing author was wearing at the time of discovery | 0-3 |
| Other's Clothing | Clothing informant was wearing at the time of discovery (if applicable) | 0-3 or N/A |
| Day of Week | Day of the week that author discovered the infidelity | 0-2 |
| Weather | Weather of the day the author discovered the infidelity | 0-2 |

Appendix E: How to Score Probed Recall Responses

| Probed Features | Scoring Rules | Example (for "Weather") |
|-------------------|---|--|
| Activity | Score of 0 – Probed response is not present | No response given |
| Location | | |
| Time | Score 1 – Probed response is generic | "It was hot" |
| Aftermath | | |
| Author's Clothing | Score of 2 – Probed response is elaborate and has more than two descriptors | "It was a crisp fall day. Late in the afternoon it rained" |
| Other's Clothing | | |
| Day of Week | | |
| Weather | | |