Jealousy in Opposite-Sex Friendships: The Threat of Being Replaced

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Author Note

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Abstract

When people are asked to imagine the loss of their best same-sex friend, a same-sex interloper (versus an opposite-sex friend interloper or romantic partner interloper) elicits the most jealousy (Krems et al., 2021). In the context of being asked to imagine their best opposite-sex friend starting three new types of relationships (same-sex friendship, opposite-sex friendship, romantic relationship), I predicted that a same-sex friend interloper would elicit less jealousy than an opposite-sex friend interloper or romantic partner interloper would, because opposite-sex friends can serve as friends or potential romantic partners. In addition, because men (compared to women) are more likely to perceive their opposite-sex friend as a potential sexual partner and women (compared to men) are more likely to perceive their opposite-sex friend as a platonic friend. I predicted that men would be more jealous of the romantic partner interloper than women, and women would be more jealous of the opposite-sex friend interloper than men. In the current study (n = 158, 51% female), I found that when participants are asked to imagine a best opposite-sex friend starting new relationships, a same-sex friend interloper evoked less jealousy than an opposite-sex friend interloper or romantic partner interloper did. Contrary to expectations men and women were similarly jealous of the opposite-sex friend interloper and romantic partner interloper. One direction for future research is to separate romantic jealousy from friendship jealousy in the opposite-sex friendship context.

Keywords: jealousy, opposite-sex friendship, evolutionary theory

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1. Introduction

People consider friends an integral part of their lives, and friends have a considerable impact on people's quality of life (Dunbar, 2018). For example, friendship has implications for remaining healthy (Reblin & Uchino, 2008) and recovering from mental and physical illnesses (Min et al., 2007; Pinquart & Duberstein, 2010). Previous research suggests that people primarily have same-sex friends (McPherson et al., 2001). However, they also have opposite-sex friends, and these friendships are viewed as beneficial (Sapadin, 1988). Having a strong social network can bring a wide range of benefits but people have a limited amount of time and resources to invest into friendships (Dunbar, 2018). Additionally, friendships are non-exclusive, allowing people to form friendships with other people at any time. Over time some friendships dissolve or become less close. Lost connection can happen for several reasons, including physical distance – one friend moves away– or a third-party interference with the friendship. In the latter scenario, when a third-party interferes with a friendship, jealousy is likely to be elicited.

Jealousy is defined as a mix of insecurity and anger that occurs when someone feels their relationship is threatened (Sharpsteen, 1993). Jealousy is commonly referred to in the context of romantic relationships where a partner feels their romantic relationship could be lost to a third-party. Evolutionary scientists have predicted that romantic jealousy evolved as a tool to help people retain their romantic partners (Buss, 2000; Buss, 2013; Buss & Haselton, 2005). Indeed, romantic jealousy leads to several behavioral tendencies known as "mate guarding." These mate guarding tactics range from "love and care;" (displaying greater affection toward one's partner), to "violence against rivals," (physically slapping or hitting someone who was interested in one's partner; Buss et al., 2008). If jealousy is relevant for protecting romantic relationships from

third-party threats, jealousy could also be relevant for protecting friends from third-party threats. But friendships are non-exclusive and over evolutionary history friends haven't faced the same problems, (such as paternity uncertainty) as romantic partners do (Edlund et al., 2019). So, what functions do friends serve and why might we want to protect our friends from third-party threats?

It has been theorized that friends, in part, function as a form of insurance in times of dire need (Tooby & Cosmides, 1996). For example, in times of severe illness or injury a friend may provide the support needed that a stranger would be unlikely to provide. This creates a unique situation for people because they must determine who they will invest their time into, and more importantly, who will invest in them in times of need. If friends do function as a form of insurance, we would expect people to seek friendships with individuals who perceive them as irreplaceable. If what we offer as a friend is easily replaced by someone else, our friends could easily make a new friend instead of undertaking the large cost to help us when we are in need. But, if our friendship is valued highly, for whatever reason, then that friend will be inclined to help us because someone else might not be able to offer what we offer. If we assume that it is impossible for people to be completely irreplaceable, it follows that people will need another method to retain their friendships. Thus, if friends function as a form of insurance, friendship jealousy (like romantic jealousy) might be designed to alert individuals to friendship "poachers" and help us protect valuable friendships from third parties.

Recent research has found support for the hypothesis that, indeed friendship jealousy is evoked by threats from a third party (Krems et al., 2021). Additionally, friendship jealousy is moderated by how much people perceive the third party to be replacing them and is not clearly impacted by the prospective loss of time with the friend. Specifically, Krems et al. asked people to imagine how jealous they would be if their same-sex best friend formed four types of new

relationships: a new same-sex friendship, a new opposite-sex friendship, a new short-term romantic partnership, and a new long-term romantic partnership. They predicted that the same-sex interloper would invoke the greatest jealousy because they are the person who is most directly replacing the friend. If the prospective loss of time was moderating friendship jealousy, we would expect the romantic partner to evoke similar, if not higher levels of friendship jealousy compared to the same-sex friend because romantic partners are also a large time commitment (Johnson & Leslie, 1982). Krems et al. (2021) found support for the former prediction; the four conditions all differed from each other, with the same-sex interloper evoking the most jealousy, followed by the opposite-sex friend, the long-term romantic partner, and then the short-term romantic partner. Krems et al. also measured friend-guarding intentions and found that friendship jealousy was an integral emotion in this process because it uniquely predicted friend-guarding intentions (sadness and anger did not predict friend-guarding intentions). In sum, Krems et al. found support for the insurance hypothesis of friendship. However, that set of studies asked people about their same-sex friends. I am interested in how people respond when asked to imagine their best opposite-sex friend starting several types of relationships.

O'Meara (1989) proposed that opposite-sex friends face a unique set of challenges. One of these challenges is determining whether the relationship is platonic or if it has potential to be "something more." Colloquially, opposite sex friends must answer the question: "What are we?". Research suggests that this challenge is a genuine one, because romantic and sexual attraction are a common theme in opposite-sex friendships (Bleske-Rechek et al., 2012; Halatsis & Christakis, 2009; Kaplan & Keys, 1997; Szymkow & Frankowska, 2022). People also perceive their opposite-sex friends as potential romantic or sexual partners (Bleske & Buss, 2000). One study found that about half of heterosexual college students have engaged in sexual activity with

an opposite-sex friend who was "platonic" (Afifi & Faulkner, 2000). Further, research suggests that people more frequently start a romantic relationship with someone they are friends with, compared to with a stranger (Stinson et al., 2022). Although opposite-sex friendships often involve sexual or romantic undertones (Bleske-Rechek et al., 2012), many people still have opposite-sex friends (Altmann, 2021), and believe it is possible for them to remain platonic (Felmlee et al., 2012). Because opposite-sex friends can serve both romantic and friendship functions, I predict the following:

(1) Individuals will be less jealous of a same-sex friend interloper than of a romantic partner interloper or opposite-sex friend interloper.

We also might expect men's and women's responses to differ when considering the romantic partner interloper and opposite-sex friend interloper. This is because opposite-sex friends serve somewhat different functions for men and women. For example, men (more than women) prioritize attraction in an opposite-sex friend (Lewis et al., 2011; Lewis et al., 2012); start friendships because of sex or mating potential and dissolve them because of a lack of sex or mating potential (Bleske-Rechek & Buss, 2001); and want to date their opposite-sex friend (Bleske-Rechek et al., 2012). These findings suggest that men, more than women, see their friend as a potential romantic or sexual partner. In addition, Krems et al. (2021) found that participants reported more jealousy when their romantic relationship was threatened than when their best same-sex friendship was threatened. Women (more than men) report the *lack* of sexual and romantic potential in their opposite-sex friend as a benefit of the friendship (Bleske & Buss, 2000), which suggests that women may view opposite-sex friendships through a more platonic lens than men do. Together, these findings lead to the following secondary predictions and one replication prediction:

(1) Men, compared to women, will be more jealous of their opposite-sex friend starting a new romantic relationship.

(2) Men will be more jealous of their opposite-sex friend starting a new romantic relationship than starting a new platonic opposite-sex friendship.

(3) Women, compared to men, will be more jealous of their opposite-sex friend starting a new opposite-sex friendship.

Replication Prediction (Bleske-Rechek et al., 2012):

(1) Men, compared to women, will be more romantically and physically attracted to their opposite-sex friend.

It is hard to predict whether women will be more jealous of their opposite-sex friend starting a new romantic relationship or a new opposite-sex friendship. On one hand, women tend to view the lack of romantic interest as a benefit of opposite-sex (Bleske & Buss, 2000), lending credence to the new opposite-sex friend eliciting more jealousy than a new romantic because the opposite-sex friend would be replacing them. On the other hand, for women, it is possible that a male friend values them for a potential romantic relationship, and even if women do not reciprocate, a romantic interloper could be a cue to them that they are being replaced. Thus, I leave the prediction pertaining to female participants reactions to an opposite-sex friend interloper and romantic partner interloper as an exploratory research question.

In addition to these predictions, I explored several other variables, such as how close participants are to their opposite-sex friend. I also explore the association between jealousy and friendship duration, and between jealousy and participants' romantic and physical attraction to their best opposite-sex friend. Finally, because jealousy partially overlaps with several other emotions, I will explore if there is a similar pattern of responses for emotions other than jealousy.

The current study was evaluated and approved by the institutional review board at the University of Wisconsin-Eau Claire. I followed standard consent and debriefing procedures. All study materials, datasets, and supplementary tables are available on the Open Science Framework at https://osf.io/79y6m/?view_only=d83f98fa37444aedbe4aac30255eae94

Method

Participants

I conducted a priori power analysis using G*Power version 3.1.9.7. (Faul et al., 2007) to determine the minimum sample size needed. This analysis revealed that 150 participants were needed to detect small effects ($f \sim .15$) with 80% power at $\alpha = .05$. Participants in the original sample were 168 college students from a public university in the Midwestern United States. I obtained participants by walking up to people at a student center on campus and asking them if they would like to participate in a 5–10-minute independent paper-and-pencil study on jealousy in friendships. After completing the study, participants were debriefed and offered a sticker for completing the study. A total of 10 participants were removed from the final data set because they either didn't complete the focal dependent variables ($n = 5$), they indicated that they were not male or female ($n = 4$), or they were older than 24 years old ($n = 1$). The final sample included 158 (81 female) undergraduate students between the ages of 18 and 24. The average friendship duration was 142 weeks (SD = 182 weeks) and most participants reported being in contact with their friend once a day or more (57%) or several times a week (26%). The majority of participants reported that their best opposite-sex friend was *not* as close of a friend as their best same-sex friend (80%). Most participants reported that they were heterosexual (86%) and that their opposite-sex friend in question was heterosexual (81%). Most participants were single or casually dating (66%) compared to being in a committed relationship, engaged, or married.

Design

The study was a 3x2 mixed subjects factorial design. The first factor, interloper type was within-subjects and contained three levels: same-sex friend interloper, opposite-sex friend interloper, and romantic partner interloper. The second factor, participant gender was between-subjects: men and women.

Because this study includes both men and women, it can be unclear what the gender is of the "same-sex friend interloper" and "opposite-sex friend interloper." For clarity, when referring to the "same-sex friend interloper" or "opposite-sex friend interloper" the interloper gender is always relative to the gender of the participants' opposite-sex friend. For example, if it is a female participant being asked about their best male friend, the same-sex interloper would be a male friend, and in the "opposite-sex friend interloper" condition, women would be imagining their male friend with a new female friend.

Materials and Procedure

On the first page of the paper-and-pencil questionnaire, participants were asked to provide the first names of three people: a family member, best female friend, and best male friend. Participants were asked to indicate the family member "who you are closest with at this time in your life." Following the methods of Krems et al. (2021), when indicating best male and female friends, participants were asked to consider the friend they are closest to and "a person who would help you in dire times." Further, they were asked to not choose a friend they do not see on a regular basis "such as a hometown friend or online friend." When handing out the questionnaires, the lead author verbally reinforced these directions and added the statement, "please do not choose a romantic partner as a best friend." To obscure focal predictions, the

bottom of the first page stated that participants would be asked about "one" of the people they had indicated. In reality, all participants were asked about their best opposite-sex friend.

The next pages of the questionnaire contained three scenarios (counterbalanced) in which their best opposite sex friend starts a new same-sex friendship, a new opposite-sex friendship, and a new romantic relationship. Each scenario was similar to each other but different in important ways. The scenarios all noted that the opposite-sex friend and the new person "have clearly become close," and "are hanging out together a lot." All scenarios ask participants to imagine asking their friend about their new friend; depending on the scenario participants were told they learned different things. In the same-sex interloper condition, participants learned that their opposite-sex friend and the new friend "met in a class and have become close friends." In the opposite-sex interloper condition, participants learned that their opposite-sex friend and the new friend "met in a class and are just friends," and that their opposite-sex friend does not have any romantic interest in the new friend. Last, in the romantic partner interloper condition, participants learned that their opposite-sex friend and the new friend "are sleeping together…and are dating now." To reinforce the gender of the interloper in question, separate questionnaires were created for male and female participants. This allowed for the same-sex interloper to be described for male participants as a "girl," and for female participants as a "guy," and vice versa for the opposite-sex friend and romantic partner.

After reading each scenario, participants reported the extent they would feel eight different emotions about the new relationship their friend hypothetically started: surprised, upset, angry, jealous, happy, threatened, relieved, and sad. Surprised and relieved were embedded as distractor emotions and were not included in analysis. Several emotions were combined into composites for each interloper condition. Jealousy and threatened were combined into a

composite variable labeled "Jealousy" (all $\alpha \geq .71$). Upset and angry were combined into a composite variable labeled "Anger" (all $\alpha \geq .89$). Happy and Sad were analyzed separately. Each emotion was measured on a five-point likert rating scale (1 = not at all, 2 = a little, 3 = somewhat, 4 = very, 5 = extremely). After reading and reacting to one scenario, participants flipped the page, read, and responded to the second scenario, and then flipped the page, read, and responded to the third scenario.

After responding to the three scenarios, participants were asked a few demographic questions about themselves. Participants reported their age, current relationship status, gender, and sexual orientation. Next, participants reported their friend's age, how long they had been friends (weeks), how often they were in contact with their friend, and their friend's sexual orientation. To complete the questionnaire, participants reported how physically attractive their friend is compared to peers their age, how romantically attracted they were to their friend, and how sexually attracted they were to their friend. These final questions were rated on a seven-point likert scale (1 = not all, 4 = moderately attracted, 7 = extremely attracted). A composite variable, "Attraction," was created for how sexually and romantically attracted participants were to their friend (α =.93).

Results

Primary and Secondary Predictions

To test my primary and secondary predictions, I ran a 3 (Interloper: romantic, opposite-sex friend, same-sex friend) x 2 (Participant gender: male, female) mixed-factors ANOVA. This analysis revealed a significant main effect of Interloper. Then, I conducted a follow-up analysis using Fisher's least significant difference (LSD). This analysis revealed that, as predicted, the same sex friend interloper elicited less jealousy and was perceived as less threatening than the

opposite-sex friend interloper (p <.001) and romantic partner interloper (p < .001). The opposite-sex friend interloper and romantic partner interloper did not differ from one another (p = .552). Men and women did not differ in overall reported jealousy and contrary to predictions, men and women did not differ in reported jealousy to any interloper. Table 1 displays ANOVA summary statistics and Table 2 displays means and standard deviations. Figure 1 shows the results for the primary prediction and secondary predictions.

Table 1

ANOVA Summary Statistics for Dependent Variables

Source of Variance by DV	***F***	**df**	***p***	η_p^2
Jealousy				
Interloper	27.90	(2, 312)	< .001	.15
Gender	0.01	(1, 156)	.939	.00
Interloper x Gender	0.90	(2, 312)	.408	.01
Anger				
Interloper	26.85	(2, 312)	< .001	.00
Gender	0.20	(1, 156)	.659	.01
Interloper x Gender	0.43	(2, 312)	.651	.00
Sadness				
Interloper	20.74	(2, 312)	< .001	.12
Gender	0.72	(1, 156)	.399	.01
Interloper x Gender	1.37	(2, 312)	.257	.01
Happiness				
Interloper	13.12	(2, 308)	< .001	.08
Gender	0.32	(1, 154)	.575	.00
Interloper x Gender	1.30	(2, 308)	.275	.01

Replication Prediction

Replicating previous research, men (M = 3.05, SD = 2.02) were significantly more romantically/sexually attracted to their opposite-sex friend than women (M = 1.74, SD = 1.44), $t(155) = 4.67$ $p < .001$, $d = .75$.

Table 2

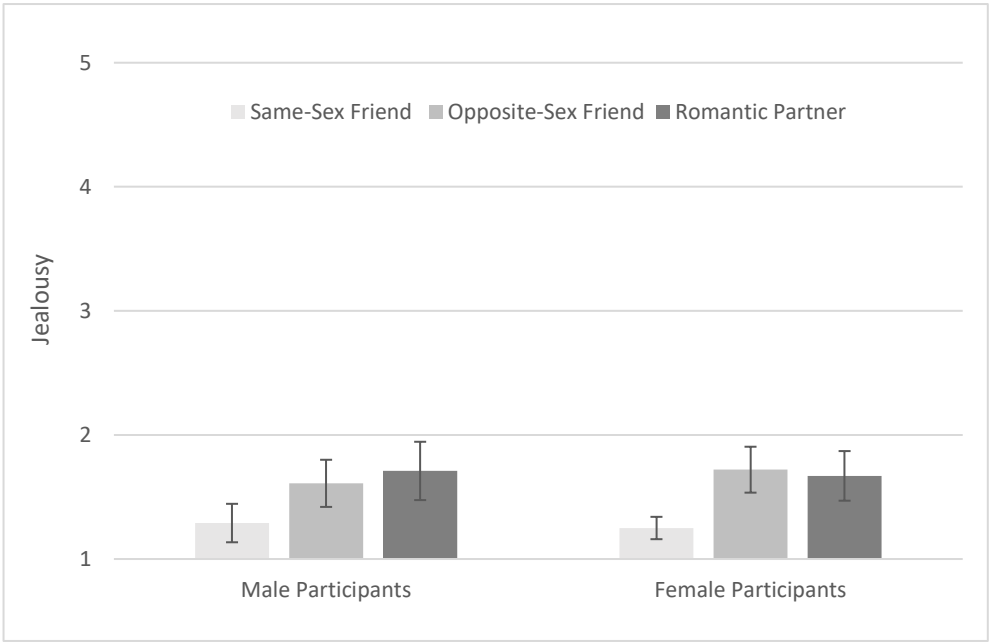
Means and Standard Deviations of Dependent Variables by Three Interlopers and Participant Gender

Emotional Reaction	Same-Sex Friend		Opposite-Sex Friend		Romantic Partner	
	Men	Women	Men	Women	Men	Women
Jealous	1.29 (0.70)	1.25 (0.42)	1.61 (0.83)	1.72 (0.86)	1.71 (1.05)	1.67 (0.92)
Anger	1.11 (0.45)	1.08 (0.33)	1.36 (0.72)	1.42 (0.82)	1.57 (1.05)	1.67 (1.10)
Sad	1.22 (0.68)	1.25 (0.60)	1.38 (0.76)	1.62 (0.90)	1.70 (1.20)	1.73 (1.13)
Happy	3.74 (1.02)	3.66 (0.97)	3.22 (1.15)	3.28 (1.04)	3.16 (1.26)	3.40 (1.15)

Note. 95% CI's are displayed in Supplementary Table 2

Figure 1

Jealousy in Reaction to Three Hypothetical Interlopers as a Function of Participant Gender



Other Relevant Emotions

To determine if sadness, happiness, and anger displayed a similar pattern of results, I ran additional mixed-factors ANOVAs, switching out the emotion as the dependent variable. Overall, the pattern of results was similar for other emotions. Tables 1 and 2 display the results.

Anger. There was a main effect of interloper on anger. LSD follow-up analysis revealed that the same sex interloper elicited less anger than the opposite sex interloper ($p < .001$) and romantic interloper ($p < .001$). Further, the opposite-sex friend interloper elicited less anger than the romantic partner ($p < .001$). Men and women did not differ in reported anger, either across or by interloper condition.

Sadness. There a main effect of interloper on sadness. LSD follow-up analysis revealed that the same sex interloper elicited less sadness than the opposite sex interloper ($p < .001$) and romantic interloper ($p < .001$). Further, the opposite-sex friend interloper elicited less sadness than the romantic partner ($p < .001$). Men and women did not differ in reported sadness, either across or by interloper condition.

Happiness. There was a main effect of interloper on happiness. LSD follow-up analysis revealed that the same sex interloper was perceived by participants as eliciting more happiness than the opposite sex interloper ($p < .001$) and romantic interloper ($p < .001$). The opposite sex interloper and romantic interloper did not differ from one another ($p = .697$). Men and women did not differ in reported happiness, either across or by interloper condition.

Attraction and Jealousy

Attraction was moderately to strongly positively correlated with jealousy toward the romantic interloper $r(155) = .54$, $p < .001$, 95% CI [.42, .64], and opposite-sex interloper, $r(155) = .44$, $p < .001$, 95% CI [.31, .56]. There was also a weak positive correlation between attraction and jealousy toward the same-sex friend, $r(155) = .26$, $p < .001$, 95% CI [.11, .40]. Notably, this

link between attraction and jealousy was consistent when split by gender, relationship status, and whether their opposite-sex friend was a closer friend than their same-sex friend.

Friendship Duration and Jealousy

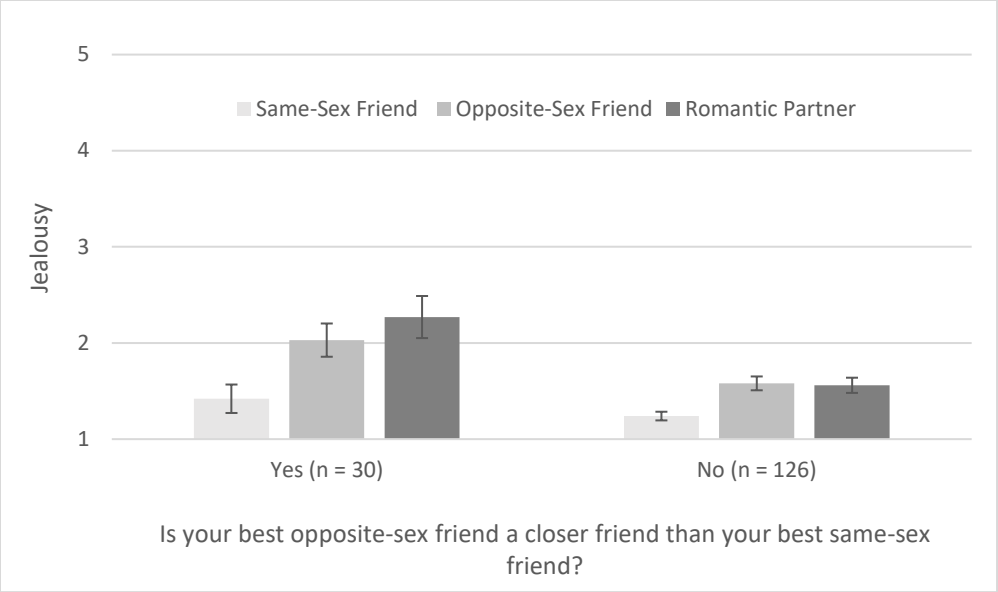
Friendship duration was not associated with jealousy in any interloper condition ($p \geq .19$). This held true when split by gender ($p \geq .31$) and relationship status ($p \geq .25$).

Participants' Rating of Their Best Opposite-Sex Friend as a Closer Friend Than Their Best Same-Sex Friend Associated with Jealousy

A small number of participants (n = 30) reported that their best opposite-sex friend was a closer friend than their best same-sex friend. To explore if jealousy reactions differed between groups, I ran a 3 (Interloper: romantic, opposite-sex friend, same-sex friend) x 2 (Was participants best opposite-sex friend a closer friend than their best same-sex friend: yes, no) mixed-factors ANOVA. This analysis revealed no significant main effect of Interloper, $F(2, 310) = 2.38$, $p = .094$, $\eta_p^2 = .02$. There was a main effect of participant opposite-sex friend closeness status $F(2, 155) = 5.69$, $p = .004$, $\eta_p^2 = .07$, participants were more jealous when the opposite-sex friend was closer (M = 1.91, SD = 0.85) than the same-sex friend (M = 1.46 , SD = 0.61). Additionally, there was an interaction between interloper and participants' opposite-sex friend closeness status $F(4, 310) = 2.93$, $p = .021$, $\eta_p^2 = .04$. Participants who rated their opposite-sex friend as a closer friend than their same-sex friend were more jealous of the opposite-sex friend interloper and romantic partner interloper, but not of the same-sex friend interloper. Figure 2 displays these results.

Figure 2

Jealousy in reaction to three hypothetical interlopers as a function of whether participants' best opposite-sex friend was a closer friend than their best same-sex friend or not



Discussion

I designed this study to test the hypothesis that people will be less jealous of an opposite-sex friend starting a same-sex friendship than either an opposite-sex friendship or romantic relationship. I found support for this hypothesis, the same-sex friend interloper evoked lower levels of jealousy than the opposite-sex friend interloper or romantic partner interloper, with the latter two not different. With this finding, I have extended jealousy in response to the loss of a same-sex friend (Krems et al., 2021) to the opposite-sex friendship context. In addition, two secondary predictions were made about sex differences in evoked jealousy to the opposite-sex friend interloper and romantic partner interloper and one secondary prediction about men's unique responses to the opposite-sex friend interloper and romantic partner interloper. Contrary to expectations, I did not find support for any of these secondary predictions. Men and women were equally jealous of their opposite-sex friend starting a new romantic relationship and a new opposite-sex friendship. Further, men were equally jealous of the romantic partner interloper and opposite-sex friend interloper. Although support was not found for these novel secondary

predictions, I did find strong support replicating the finding that men, compared to women, are more attracted to their opposite-sex friends.

How does this study help determine if jealousy is calibrated towards the threat of being replaced and not the potential loss of time spent with a friend? First, to minimize differences in time threat, all situations described participants' opposite-sex friend as "spending a lot of time" with the interloper in question. Despite this, it is possible that people naturally assume that certain relationships, such as a romantic partner, will take up more time than others; in other words, this control might not have been effective. However, regardless of whether controlling for time threat was effective, results were not as expected if time threat was relevant. If time threat was relevant, I would predict that the romantic partner and same-sex friend would have evoked the most jealousy because people generally spend more time with their same-sex friends and romantic partners than with their opposite-sex friends (Burton-Chellew & Dunbar, 2015; Dunbar, 2018; Johnson & Leslie, 1982). The current findings support the insurance hypothesis of friendship, that jealousy might be designed to protect friendships from third-party threats.

A secondary question of this study was whether men and women differ in how much they view their best opposite-sex friend as a friend versus a romantic partner. Although I did not find evidence that men and women differ, I did find evidence to suggest that men and women both might view their opposite-sex friends as potential romantic partners. This is because if opposite-sex friends do serve as potential mates, we would expect people (at minimum) to be more jealous of the romantic partner interloper than the same-sex friend interloper. This contrasts with Krems et al. (2021) where they asked participants to imagine the potential loss of a same-sex friend and they found that short-term romantic interlopers and long-term romantic interlopers elicited less jealousy than a same-sex friend interloper and opposite-sex friend interloper. Here it was found

that a romantic partner interloper elicited a similar level of jealousy as an opposite-sex friend interloper and more jealousy than a same-sex friend interloper. In addition, participants' attraction to their opposite-sex friend was strongly associated with jealousy toward the romantic partner interloper, slightly less so with the opposite-sex friend interloper and only weakly with the same-sex friend interloper. Thus, the current findings suggest that opposite-sex friends are not perceived solely as friends. But I did not find the differences in responses between men and women and thus offer a few possible post hoc explanations for this lack of difference.

First, the expected between group differences might have been obscured because jealousy was overall very low in the sample. It is unsurprising that jealousy was low because most people did not perceive their opposite-sex friend as their best-friend, and friendship closeness has been shown to moderate friendship jealousy (Krems et al., 2021). Along with this, research suggests that when people are asked to consider how close their top 10 friends are and split up points for closeness between them, the top three friends receive vastly more points than the following seven friends (DeScioli & Kurzban, 2009). In addition, the top friend received more points than the second friend and the second friend received more points than the third friend. This shows that people are very close to their primary best friend and continually less close to all other friends. As 80% of participants in the current sample reported their best same-sex friend was closer than their best opposite-sex friend, it is likely this played a role in friendship jealousy being lower. Indeed, an exploratory analysis revealed that people who reported their opposite-sex friend as closer (compared to their best same-sex friend) were on average, more jealous of the opposite-sex friend interloper and romantic partner interloper. This finding should be interpreted with caution, because I did not have an adequate number of people reporting that their opposite-sex friend was closer than their same-sex friend to properly test this. Another

possible way to measure friendship closeness might be friendship duration, but in the current study duration was not associated with jealousy in any condition. Future research could ask people to report the perceived closeness of their friendship on a continuous scale or ask people about their friend's location in their friend hierarchy.

One limitation of the current study is that jealousy could not be distinguished from other relevant emotions. I found the same pattern of results for angry/upset, sad, and happy (reversed). Because jealousy is typically defined as a mix of these emotions in the context of a third-party threat (Sharpsteen, 1993), it is not surprising that the same pattern of responses occurred because all the scenarios contained a third-party. Previous research (Krems et al., 2021) demonstrated that jealousy (compared to anger and sadness) was more strongly evoked by situations containing a third-party and that sadness and anger (compared to jealousy) were more strongly evoked at losses of a friend not involving a third-party. Future research could test this in the opposite-sex friendship context by comparing a loss scenario in which a friend moves away for a job, to an interloper scenario, in which a friend forms a new friendship. Further, Krems et al. also measured friend-guarding intentions and found that jealousy uniquely predicted friend-guarding intentions. Future research in the opposite-sex friend context could also measure friend-guarding intentions to parse out the differences in jealousy, anger, sadness, and more. Future work may need to distinguish friend-guarding intentions from mate-guarding intentions, especially when both are relevant.

This points to a large problem in opposite-sex friendship literature: defining an opposite-sex "friend" is notoriously difficult. Many people consider their current romantic/sexual partners, past romantic/sexual partners, potential sexual/romantic partners, and platonic friends as friends. These friendship categories can also overlap. For instance, a past romantic partner can be

considered as a potential sexual partner. Future research should take careful precautions in how they are defining an opposite-sex friend and include the relevant questions to determine the nature of the friendships in question. Specific predictions can be made depending on whether the "friend" is considered as just a platonic friend or if the friend is a past sexual partner or is seen as a potential romantic partner. For instance, we know that many people start romantic relationships with someone who was a friend (Stinson et al., 2022), but it is relatively unclear how many opposite-sex friendships start because of a failed romantic interest (although research points to that possibility; Bleske-Rechek, & Buss, 2001). This is important because there is research that suggests that opposite-sex friends who were past dating partners have qualitatively different friendships compared to people who didn't date (Schneider & Kenny, 2000). We might expect a similar finding for friends who have never dated but have had sexual contact versus those who have remained entirely platonic. Delineating the differences in jealousy between how people see their opposite-sex "friend" would be a constructive avenue of research to highlight the complexities of opposite-sex friendships.

Considering that, future research should focus on determining how friendship jealousy and relationship jealousy are similar and different in how they relate to efforts to protect the relationship. Relationship jealousy has been measured using the Mate Retention Inventory-Short Form (Buss et al., 2008). Krem's et al., (2021) adapted this scale to measure friend-guarding intentions. Both scales are measuring tactics people use to protect their valued relationships and the only difference is that one considers the person in question a "romantic partner" and the other considers the person in question a "best friend." If we were to ask participants about an opposite-sex friend and how they might guard their friendship it would be awkward to ask them to consider how they guard their "romantic partner." Because of the lack of difference between the

current measurement tools, a different conceptualization will be needed to distinguish between friendship jealousy and romantic partner jealousy. Future research might consider specific tactics that people use in the friendship context versus the romantic relationship context. If no tactics are found to be unique to either context, more detailed information might be required to distinguish the two. For example, one tactic that appears to overlap between friendship and romantic jealousy is the derogation of the rival. The type of jealousy can't be identified at the tactic level, but it might be identified by the specific information that is shared about the rival. Previous research has found that women's transmission of social information about romantic rivals is cued for threats against their romantic relationship (Reynolds, Baumeister, & Maner, 2018). It is possible that people will selectively share specific information about a rival to their opposite-sex friend depending on if they view the opposite-sex individual as a romantic partner or friend. For instance, if someone is sharing information about a rival to their opposite-sex friend who they are romantically interested in, they might be more likely to share derogating information about that person as a mate, such as their physical attractiveness, versus derogating information about that person as a friend, such as how little they care about their friends. This work will likely highlight the large overlap between being a friend and a romantic partner but there is likely some useful way to partially distinguish between the two. If we can determine how to separate out romantic jealousy and friendship jealousy it will allow researchers to have a more reliable way to determine the nature of the relationship in question.

A final limitation of the current study is that it was conducted on undergraduate students in the United States. Despite this, friendship is a cross-cultural phenomenon (Hruschka, 2010). Some research has been done on opposite-sex friendships in European countries (Altmann, 2020; Altmann, 2021) but I am not aware of any research that explores evolutionary hypotheses of

opposite-sex friends in different cultures. Thus, future research examining jealousy in opposite-sex friendships could highlight important differences. In addition, future work needs to explore jealousy in opposite-sex friends in adults. I am aware of only a single study that examines opposite-sex friendships in adults (Bleske-Rechek et al., 2012) and important differences were found between college students and middle-aged adults. Because adults tend to be in qualitatively more serious romantic relationships than college students, experiencing jealousy toward an opposite-sex friend might be associated with more negative consequences, (such as higher rates of divorce) than in emerging adulthood.

Conclusion

This study was designed to test the hypothesis that friendship jealousy is cued for threats of replacement in the context of opposite-sex friendships. The findings suggest that jealousy is primarily evoked by third-party threats of replacement and that both men and women may view their opposite-sex friend as a potential romantic or sexual partner. However, it is possible that even if people do not consider their opposite-sex friend a potential dating partner, they realize their opposite-sex friend viewed them as a dating partner and regardless of how they feel towards their friend, know they are being replaced. Thus, opposite-sex friends are valued but we can't determine exactly what they are valued for, friendship or a potential romantic relationship. As previous studies have suggested, so do this one: opposite-sex friendships have important ties to both friendship and romantic partnerships.

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