



Articles

Friendship Characteristics, Threat Appraisals, and Varieties of Jealousy About Romantic Partners' Friendships

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Abstract

This study examined the role of friendship sex composition, friendship history, and threat appraisals in the experience of jealousy about a romantic partner's involvement in extradyadic friendships. Using a survey, 201 individuals responded to scenarios describing a romantic partner's involvement in a significant friendship outside the romantic dyad. A partner's involvement in a cross-sex friendship was associated with greater perceptions of threat to both the existence and quality of the romantic relationship than was a partner's involvement in a same-sex friendship. Further, the specific forms of jealousy experienced about partners' friendships were dependent on the threat appraisals individuals associated with the friendships. Appraisals of relational existence threat mediated the influence of friendship characteristics (i.e., sex composition and history) on sexual jealousy and companionship jealousy, while appraisals of relational quality threat mediated the influence of friendship characteristics on intimacy jealousy, power jealousy, and companionship jealousy. This study points toward the central role of threat appraisals in mediating associations between rival characteristics and various forms of jealousy about a partner's friendships.

Keywords: jealousy, friendship, threat appraisals, cross-sex friendships

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Romantic relationships serve as one of the central sources of interpersonal rewards, such as affection, intimacy and belonging (Baumeister & Leary, 1995). Nevertheless, research on the “dark side” of interpersonal relationships highlights that close relational partners may at times experience troubling relational phenomena, such as conflict, deception and jealousy (Spitzberg & Cupach, 2007). Jealousy refers to “a reaction to a perceived threat to a valued relationship or its quality” (Pines, 1992, p. 3). In this study, we explore the ways in which appraisals of threat due to a romantic partner's involvement in a close friendship may be associated with distinct experiences of jealousy.

Examinations of jealousy in close relationships commonly focus on moments of jealousy arising from perceived or actual sexual infidelity (e.g., Buss, 2000; Buunk, 1995). In some cases, jealousy arises from direct evidence of a partner's infidelity, as, for example, being told about or witnessing a partner engaged in sexual activity with a rival. In many instances, however, jealousy arises not from any direct evidence of infidelity, but instead from more general suspicions about the nature of a partner's relationship with a rival (Pogrebin, 1987; White & Mullen, 1989). As jealousy is a relatively frequent experience in close relationships (White, 1988, as cited in White & Mullen, 1989), it is not surprising that people experience jealousy that is not an artifact of sexual acts, but still

challenges the status quo of a relationship. For instance, research has documented that jealousy may at times arise from a friend's (Bevan & Samter, 2004) or romantic partner's (Kennedy-Lightsey & Booth-Butterfield, 2011) "extradyadic" friendship with a person outside of the dyad.

Accordingly, the current study examines a romantic partner's relationship with an extradyadic friend as a potential source of jealousy. In this context, Worley and Samp (2011) observed that romantic partners may experience four different types of jealousy due to a partner's extradyadic friendship: (a) *sexual jealousy*, which reflects the concern that a partner may become sexually involved with the friend, (b) *intimacy jealousy*, defined by concerns about emotional and communicative intimacy between a romantic partner and the friend, (c) *power jealousy*, which reflects the belief that the friend may gain unwanted power or influence over one's partner, and (d) *companionship jealousy*, which relates to the concern that a partner's friendship may detract from the time and activities experienced with one's partner. While these forms of jealousy are considered conceptually distinct, they are not mutually exclusive, but may co-occur in close relationships.

Worley and Samp (2011) observed that that the perception that a partner's friend interfered with one's relational goals was associated with increased sexual, intimacy, power, and companionship jealousy. As well, relationship uncertainty provoked by romantic partners' friendship involvement has been associated with increased sexual, power and companionship jealousy (Worley & Samp, 2014). While the constructs of goal interference and relational uncertainty (Solomon & Knobloch, 2004) have been shown useful in predicting jealousy about partners' friendships, what is less clear is why individuals experience the *particular* forms of jealousy about friendships that they do. While direct evidence of sexual infidelity is apt to evoke sexual jealousy (as well as intimacy jealousy; Parker, 1997), the other forms of jealousy are not necessarily rooted in knowledge of sexual infidelity. Further, sexual jealousy may appear even without direct evidence of sexual infidelity (Buss, 2000). Accordingly, we argue that the experience of jealousy is best understood as rooted in individuals' cognitive and affective perceptions of a partner's relationship with a rival. Given that jealousy springs from appraisals of threat to a valued relationship (Pines, 1992), we considered the specific content of threat appraisals underlying different forms of jealousy about friendships.

Appraisals of Threat

The nature of jealousy-inducing threats may vary. Pines (1992) distinguished two types of threat appraisals: (a) *existence threats*, which involve the belief that the very existence of a valued relationship is in jeopardy, as when one believes a rival may "steal" one's partner, and (b) *quality threats*, which encompass the appraisal that the partner's or rival's action is in some way detrimental to the rewardingness (though not necessarily the existence) of the relationship.

Societal ideologies generally frame friendship as prototypically same-sex (Rawlins, 1982), while non-familial cross-sex relationships are normatively framed as potentially romantic (Lampe, 1985). Further, expressions of closeness and affection are generally viewed as more expected in platonic cross-sex relationships, compared to same-sex relationships (Floyd & Morman, 1997). In light of these considerations, we propose that in heterosexual relationships, individuals will appraise a partner's involvement with a cross-sex friend as more threatening than involvement with a same-sex friend. These heightened perceptions of threat will, in turn, be associated with greater jealousy about partners' cross-sex friendships than same-sex friendships. Accordingly, we predict (H1) that individuals will appraise a partner's cross-sex friendship involvement as more threatening (in terms of both existence and quality) than a partner's same-sex friendship involvement. We further predict (H2) that individuals will report greater

sexual, intimacy, power, and companionship jealousy in response to a partner's cross-sex friendship involvement than to a partner's same-sex friendship involvement.

A related factor which may be associated with threat appraisals and jealousy concerns the history of a partner's extradyadic friendship. While friendships of any sort may serve as a source of jealousy for individuals in romantic relationships (Bevan & Samter, 2004; Kennedy-Lightsey & Booth-Butterfield, 2011), the "newness" of a partner's friendship may also serve a signaling feature regard the threat potential of the extradyadic relationship. Individuals whose partners are involved in long-term friendships with an individual outside the romantic dyad may be more accepting of the friend's presence, compared to those whose partners develop a significant friendship with a new individual after the initiation of the romantic relationship. For instance, research on "mate poaching" suggests that some individuals may initiate cross-sex friendships as a covert strategy for romantic or sexual initiation with individuals who are currently attached to another romantic partner (Schmitt & Buss, 2001; Schmitt & Shackelford, 2003). Individuals for whom the partner's friend was already "on the scene" when the romantic relationship began may feel less threatened than those whose partners develop a new friendship after the romantic relationship has already begun. A partner's initiation of a new, significant friendship is likely to be more disruptive to the status quo of the romantic relationship, whereas a partner's involvement in a long-term friendship is part of the status quo. For this reason, we predict that a partner's newly-developed extradyadic friendship will be perceived as more threatening (in terms of existence and relational quality) (H3) and associated with greater jealousy (H4) than a partner's long-term friendship. Further, based on the logic implied in H1-H4, we anticipate that the most threatening (H5) and jealousy-evoking situation (H6) is one in which a romantic partner develops a new, cross-sex friendship.

While we propose that friendship characteristics (i.e., sex composition and history) will influence jealousy about partners' friendship involvement, we believe the specific form of this influence will depend, at least in part, on the specific threat appraisals individuals associate with friendship involvement. Parker (1997) observed that sexual jealousy was associated more strongly with appraisals of threat to the existence of a relationship, while emotional (i.e., intimacy) jealousy was associated more strongly with threats to individuals' self-esteem (though sexual jealousy had an even stronger association with self-esteem threats than did emotional jealousy). Our focus is slightly different than Parker's (1997), who compared threats to a relationship (i.e., existence) with threats to self (i.e., self-esteem). Following Pines (1992), we compare threats to a relationship's *existence* with threats to its *quality*.

We posit that jealousy about partners' friendships will be predicted by the types of threat appraisals individuals associate with the friendship (i.e., *existence* and/or *quality* threats). Furthermore, we believe the effects of friendship characteristics (i.e., sex composition and history) on jealousy will be mediated by these threat appraisals, which is a dynamic Parker's (1997) work did not explore. The influence of social situations (in this case, rival characteristics) on individuals' affective states is rarely a direct influence; instead, the influence of social factors on these outcomes is generally determined by the manner in which individuals appraise features of social situations (Delia, 1977; Lazarus & Smith, 1988; Solomon & Theiss, 2007). In light of this consideration, we propose that specific threat appraisals will be associated with specific forms of jealousy about friendships. In other words, prior work on jealousy (e.g., Hupka, 1984; Pines, 1992) would suggest that it is not anything inherent in partners' friendships *themselves* that leads to jealousy; rather, individuals experience jealousy in light of their *appraisals* of a partner's friendship as threatening to the existence or quality of the romantic association. As we are examining a wider variety of jealousy types than Parker (1997), we recognize that her results may not be directly replicable in our study, and thus we do not believe ourselves in a position to advance predictions about the form of these medi-

ational relationships. Therefore, we offer the following hypothesis as partially exploratory in nature. H7: a) Threat appraisals will be positively associated with jealousy about partners' friendships; and b) threat appraisals will mediate the associations between friendship characteristics and jealousy about partners' friendships.

Finally, in light of the limited research to date on friendship-specific jealousies (e.g., Bevan & Samter, 2004; Worley & Samp, 2011, 2014), there is little information on potential sex-specific patterns of appraisals and jealousy about a partner's extradyadic friendships. The literature on sex differences in jealousy is somewhat controversial. Numerous studies have observed men to be more concerned about sexual threats to a relationship than emotional threats, and women to be more bothered by emotional rather than sexual threats (e.g., Buss et al., 1992; Edlund & Sagarin, 2009; Kuhle, 2011; Sagarin et al., 2012; Tagler & Jeffers, 2013). On the other hand, a number of other studies have found no or few sex differences in response to sexual and/or emotional threats (e.g., Carpenter, 2012; DeSteno, Bartlett, Braverman, & Salovey, 2002; DeSteno & Salovey, 1996; Harris, 2003). Due to the mixed record of past research on this issue, and because of the limited work to date on jealousy about partners' friendships, we queried whether appraisals of threat and jealousy about partners' friendships differed by sex (RQ).

Method

Participants

Two hundred and eight (134 female, 74 male) students enrolled in communication courses at a large university in the southeastern U.S. received credit toward a course research requirement for their participation in this study; other research and non-research alternatives were available. Participants ranged in age from 18 to 24 years old ($M = 19.8$, $SD = 1.28$). Several participants reported themselves as engaged ($n = 4$) or married ($n = 4$); however, due to the small size of the engaged and married subsamples relative to the dating sample, we focused our analyses only on those in dating relationships ($n = 201$). Participants did not report sexual orientation.

Procedures

All instruments and procedures were approved by our institution's Institutional Review Board, and conducted in line with their guidelines. Using a paper and pencil survey completed in group sessions, participants responded to hypothetical scenarios (adapted from Bevan, 1999) describing a romantic partner's involvement in a close extradyadic friendship. Hypothetical scenarios of the type presented here have been employed in a number of prior investigations of jealousy (Bevan & Samter, 2004; Buss et al., 1992; Edlund & Sagarin, 2009; Hansen, 1991). Scenarios varied by both friendship sex composition (i.e., cross-sex or same-sex) and history (i.e., newly-developed versus long-term friendship); other than these variations, scenarios were identical. The scenario presented below reflects a newly-developed same-sex friendship. Information in brackets represents variations in the basic scenario based on history of the friendship (i.e., newly-developed versus long-standing) and sex of the friend (i.e., same-sex versus cross-sex friend):

You and your romantic partner have been dating for a while. Recently [*Before you began dating your romantic partner*], your partner has developed a close friendship with a person of the same [*opposite*] sex. Your partner and his or her [*cross-sex*] friend often spend time together. In fact, your romantic partner has been roller-blading every Saturday for the past month with their [*cross-sex*] friend. This Saturday you decide to meet your romantic partner for coffee, at which time you discover your partner's [*cross-sex*] friend is a very nice person. They seem to have a closer relationship than you previously thought. In fact, your partner's friend seems to know things about him or her that your partner has never shared with you,

and the two share some inside jokes. All in all, their closeness makes you feel a little left out when you are with them.

Scenario assignment was randomly determined (104 cross-sex, 97 same-sex); groups were slightly imbalanced due to exclusion from the final sample of several participants in the original sample who reported a relationship status other than “dating.”

Measures

Threat appraisals — Appraisal of threat were measured using a four-item composite scale developed by the authors, inspired by Sharpsteen (1995) ($M = 3.54$, $SD = 1.09$, $\alpha = .89$), with the following subscales: *existence threat*: (a) how threatening would this situation be to the continuation of your romantic relationship?, and (b) how threatening would this situation be to the existence of your romantic relationship? ($M = 3.38$, $SD = 1.30$, $\alpha = .89$); and *quality threat*: (a) how threatening would this situation be to the quality of your romantic relationship?, and (b) how threatening would this situation be to the benefits you receive from your romantic relationship? ($M = 3.60$, $SD = 1.15$, $\alpha = .71$).

Jealousy about Friendships — Jealousy about friendships was measured using 11 items developed by Worley & Samp (2011) on a 6-point Likert-type scale (1 = strongly disagree; 6 = strongly agree). Confirmatory factor analysis indicated adequate fit to the data, $\chi^2(38) = 92.90$, $p < .01$, RMSEA = .08, NNFI = .97, CFI = 0.98, overall $\alpha = .88$. The *sexual jealousy* subscale had three items: 1) I would worry about my partner being sexually unfaithful to me; 2) I would suspect there is something going on sexually between my partner and their friend; and 3) I would suspect sexual attraction between my partner and their friend ($M = 2.99$, $SD = 1.39$, $\alpha = .88$). The *intimacy jealousy* subscale contained three items: 1) I would worry that my partner and their friend will keep secrets from me; 2) I would be afraid that my partner will turn to their friend instead of me to meet emotional needs; and 3) I would be concerned that my partner will share things with their friend that they wouldn't share with me ($M = 4.46$, $SD = 1.09$, $\alpha = .86$). The *power jealousy* subscale was composed of two items: 1) I would be concerned that my partner's friend would influence their decisions more than me; and 2) I would be concerned about the friend's influence on my partner ($M = 3.89$, $SD = 1.28$, $\alpha = .86$). Finally, the *companionship jealousy* subscale involved three items: 1) I would be upset by the amount of time my partner spent with their friend; 2) I would be bothered by the fact that my partner shared so many activities with their friend; and 3) I would feel upset about the importance my partner placed on their friendship ($M = 3.73$, $SD = 1.19$, $\alpha = .86$). Bivariate correlations between all dependent measures are reported in Table 1.

Table 1

Bivariate Correlations Among Threat Appraisal and Jealousy Variables

	1	2	3	4	5	6
1. Existence Threat	—					
2. Quality Threat	.78***	—				
3. Sexual Jealousy	.59***	.48***	—			
4. Intimacy Jealousy	.46***	.57***	.45***	—		
5. Power Jealousy	.42***	.46***	.29***	.62***	—	
6. Companionship Jealousy	.59***	.59***	.47***	.49***	.50***	—

*** $p < .001$.

Results

Preliminary Analyses

Because our scenarios included variations in both friendship sex composition and history we first assessed the potential for interactions between sex composition and history on our mediators and outcomes. We conducted a series of 2 (sex composition) x 2 (history) ANOVAs for each of the threat and jealousy variables. Results indicated no significant main effects of friendship history on any of the threat or jealousy variables. However, there was a significant two-way interaction between sex composition and history for power jealousy, $F(1, 197) = 8.18, p < .01$. Post-hoc Bonferroni comparisons indicated that the interaction was driven by the difference in power jealousy between long-term same-sex friendships ($M = 4.28, SD = 1.22$) and newly-developed same-sex friendships ($M = 3.54, SD = 1.27$), Bonferroni-adjusted $p = .01$. There was also a near-significant interaction of sex composition and history on sexual jealousy, $F(1, 196) = 3.27, p = .07$. Post-hoc comparisons suggested this was rooted in differences in sexual jealousy between newly-developed cross-sex ($M = 3.43, SD = 1.13$) and same-sex ($M = 2.52, SD = 1.48$) friendships, Bonferroni-adjusted $p = .02$. Finally, there was a near-significant interaction between sex composition and history for existence threat, $F(1, 197) = 3.74, p = .054$. Post-hoc comparisons suggested this near-significant interaction was driven by the difference in existence threat for newly-developed cross-sex ($M = 3.86, SD = 1.18$) and same-sex ($M = 2.98, SD = 1.13$) friendships, Bonferroni-adjusted $p = .003$. In light of these significant and near-significant interactions, we included friendship history as a moderator of the effect of sex composition on threat appraisals and jealousy in subsequent analyses.

Substantive Analyses

Following these preliminary analyses, we examined our hypotheses and research question using conditional process analysis procedures described by Hayes (2013). We utilized the PROCESS program for SPSS which allows for testing models with multiple mediators simultaneously, while reducing the risk of Type I errors associated with multiple tests. Including all theoretically relevant mediators simultaneously also provides estimates of the specific indirect effect of each mediator, i.e., the indirect effect through a specific mediator when other mediators are also accounted for. Further, PROCESS allows for the simultaneous inclusion of moderators (in this case, friendship history) alongside predictors and/or mediators. Thus, in addition to our mediation analyses, we also examined possible conditional effects (i.e., moderation and/or moderated mediation; Hayes, 2013) of friendship history on the associations between sex composition, threat appraisals, and jealousy. Finally, in light of our research question about possible sex differences in threat appraisals and jealousy about friendships, we included sex as a covariate in all models.

In contrast to traditional regression techniques which infer the presence of the indirect effect via a series of causal steps (e.g., Baron & Kenny, 1986), PROCESS explicitly quantifies the magnitude and significance of the indirect effect by means of bootstrapped confidence intervals. Confidence intervals for indirect effects in our analyses were calculated at the .95 level, on the basis of 1,000 bootstrapped samples. Direct effect estimates were based on ordinary least squares regression. All direct effects are reported as unstandardized coefficients. Sex composition was effect-coded (same-sex = -1, cross-sex = 1), such that positive coefficients represent greater perceptions of threat and/or jealousy for cross-sex friendships, whereas negative coefficients indicate greater perceptions of threat and/or jealousy for same-sex friendships. Friendship history was also effect-coded (long-term = -1, newly-developed = 1), such that positive coefficients would represent greater perceptions of threat and/or jealousy for newly-developed friendships, with negative coefficients reflecting greater threat and/or jealousy

for long-term friendships. As threat appraisals were measured as continuous variables, the coefficients relating appraisals to jealousy should be interpreted as normal regression coefficients. Because the PROCESS program allows only a single dependent variable per model, we tested a separate model for each of the four types of jealousy about friendships. In light of this, some of the paths included in all models (i.e., the paths from friendship characteristics to threat appraisals) differed slightly between models in a few cases. In these cases, we report the range of coefficients as (B_{lower} , B_{upper}). However, we emphasize that these differences were quite small across models.

H1 predicted that cross-sex friendships would be perceived as more threatening than would be same-sex friendships, and H3 predicted that newly-developed friendships would be more threatening than long-term friendships. Combining these predictions, H5 posited that the greatest degrees of threat would be reported for newly-developed cross-sex friendships. Because we had evidence of interaction effects in the preliminary analyses, we first assessed the presence of these effects in the full models. The aforementioned interaction of sex composition with friendship history on existence threat remained significant in the models for sexual ($B = .18$, $p < .05$) and companionship jealousy ($B = .18$, $p < .05$), and was very close to significance in the intimacy ($B = .18$, $p = .054$) and power jealousy models ($B = .18$, $p = .056$). In order to probe the nature of the interactions, we tested a simple moderation model which included sex composition, friendship history, and their interaction, according to which friendship history moderated the influence of sex composition on existence threat. Following generally accepted procedures (e.g., Hayes, 2013; Jaccard, Turrisi, & Wan, 1990), we interpreted the interaction effect first. Analysis of the conditional effect indicated that cross-sex friendships were associated with greater perceptions of existence threat when friendships were newly-developed (conditional $B = .45$, $p < .001$), though not when friendships were long-term (conditional $B = .09$, $p = .51$). The significant interaction provided support for H5.

As our interaction term components were dichotomous and effect-coded, any remaining effects in the model represent main effects of the individual components (Hayes, 2013). Examination of the main effects indicated that cross-sex friendships were associated with greater perceptions of both existence threat ($B_{\text{lower}} = .26$, $B_{\text{upper}} = .30$, $p < .01$) and relational quality threat ($B = .21$, $p < .05$) than were same-sex friendships. H1 received full support for relational quality threat, and qualified support in the case of existence threat (i.e., only when friendships were newly-developed). There were no significant main effects of friendship history on either existence threat ($B_{\text{lower}} = .05$, $B_{\text{upper}} = .06$, $p = .56$) or relational quality threat ($B_{\text{lower}} = .05$, $B_{\text{upper}} = .06$, $p = .52$). Thus, H3 received support for cross-sex friendships, but not for same-sex friendships.

H2 predicted that partners' cross-sex friendships would be associated with greater jealousy than would partners' same-sex friendships, while H4 hypothesized that newly-developed friendships would be associated with greater jealousy about partners' friendship than would long-term friendships. Further, H5 posited that jealousy would be greatest for newly-developed cross-sex friendships. As above, we began by interpreting the interactions between sex composition and history on jealousy. The interaction was non-significant for sexual jealousy ($B = .04$, $p = .52$), intimacy jealousy ($B = .03$, $p = .65$), and companionship jealousy ($B = .02$, $p = .81$), but was significant for power jealousy ($B = .22$, $p < .01$). Analysis of the conditional effect indicated that same-sex friendships were associated with greater power jealousy than were cross-sex friendships when friendships were long-term ($B = -.35$, $p < .01$), but not newly-developed ($B = .09$, $p = .47$). Thus, the interaction observed in our preliminary ANOVA analyses held up in our full model. In light of these results, H5 was not supported.

We next examined the main effects of sex composition (H2) and friendship history (H4) on jealousy. Regarding H2, sex composition had no significant direct effects on sexual ($B = .11$, $p = .19$), intimacy ($B = -.01$, $p = .92$),

power ($B = -.13, p = .14$) or companionship ($B = .02, p = .73$) jealousy. Similarly, with regard to H4, friendship history had no direct effects on sexual ($B = -.05, p = .62$), intimacy ($B = -.06, p = .40$), power ($B = -.12, p = .13$), or companionship ($B = .11, p = .10$) jealousy. Because we posited mediation (H7b), and total effects may be masked by the inclusion of significant mediators in the model (Baron & Kenny, 1986), we also examined separate univariate associations between sex composition and each of the jealousy types. Partners' cross-sex friendships were associated with greater sexual jealousy than were same-sex friendships, $R^2 = .04, B = .28, .95 \text{ CI} = [.09, .47]$. Sex composition was not associated with intimacy jealousy, $R^2 = .01, B = .10, .95 \text{ CI} = [-.05, .25]$; power jealousy, $R^2 = .00, B = -.02, .95 \text{ CI} = [-.20, .16]$; or companionship jealousy, $R^2 = .02, B = .15, .95 \text{ CI} = [-.01, .32]$. Thus, H2 was supported for sexual jealousy in univariate analyses, but not for intimacy, power, or companionship jealousy. Univariate associations of friendship history with jealousy were non-significant for sexual jealousy, $R^2 = .00, B = .00, .95 \text{ CI} = [-.20, .19]$; intimacy jealousy, $R^2 = .03, B = -.03, .95 \text{ CI} = [-.18, .12]$; power jealousy, $R^2 = .08, B = -.10, .95 \text{ CI} = [-.28, .07]$; and companionship jealousy, $R^2 = .12, B = .14, .95 \text{ CI} = [-.03, .30]$. Accordingly, H4 was not supported in univariate analyses.

However, the non-significance of direct effects in the H2 and H4 analyses was qualified by the presence of significant conditional indirect effects of sex composition on all four forms of jealousy, as described in H7b. Although the existence of significant direct effects (i.e., "effects to be mediated") has traditionally been viewed as a requirement for mediation claims (e.g., Baron & Kenny, 1986), more recent work has established that genuine indirect effects may occur in the absence of direct (or total) effects (e.g., Hayes, 2009; Rucker, Preacher, Tormala, & Petty, 2011; Zhao, Lynch, & Chen, 2010). This can occur when the relationship between an independent variable and a mediator (i.e., the a path) is stronger than the total effect of the independent variable on the dependent variable (i.e., the c path) (Rucker et al., 2011), as was the case in all four models. This dynamic may be further magnified when multiple mediators are at work (Rucker et al., 2011), as in the models we tested.

H7a predicted that threat appraisals would be positively associated with jealousy about partners' friendships, and H7b predicted threat appraisals would mediate the influence of sex composition on jealousy. Existence threat was positively associated with sexual jealousy ($B = .56, p < .001$) and companionship jealousy ($B = .32, p < .001$), but not with intimacy ($B = .05, p = .58$) or power jealousy ($B = .15, p = .14$). Relational quality threat was positively associated with intimacy jealousy ($B = .50, p < .001$), power jealousy ($B = .39, p < .001$), and companionship jealousy ($B = .31, p < .01$), though not with sexual jealousy ($B = .07, p = .49$). Thus, H7a received mixed support.

H7b posited that threat appraisals would mediate the associations of friendship with the various forms of jealousy about partners' friendships. In light of the evidence that friendship history may moderate the relationship between sex composition and jealousy (see preliminary analyses), any indirect effects observed would be conditional indirect effects (Hayes, 2013). This constitutes a case of moderated mediation (Baron & Kenny, 1986), in which the mediator(s) convey the indirect effect(s) of the predictor on the outcome, but these indirect effects are contingent on the level of the moderator. In the context of the current study, this would mean that the *mediational* relationship between sex composition and jealousy would be present, but *moderated* by friendship history. Accordingly, we utilized PROCESS to examine the conditional indirect effects of sex composition on each form of jealousy, through threat appraisals, for each friendship history condition.

There were several significant conditional indirect (i.e., moderated mediation) effects of sex composition on jealousy, mediated through existence threat appraisals. Appraisals of existence threat mediated the influence of sex composition on sexual jealousy for newly-developed friendships (indirect $B = .25, .95 \text{ CI} = [.20, .45]$), but not for long-

term friendships (indirect $B = .05$, .95 CI = [-.10, .22]). Existence threat appraisals also mediated the effect of sex composition on companionship jealousy for newly-developed (indirect $B = .14$, .95 CI = [.06, .26]), but not long-term friendships (indirect $B = .03$, .95 CI = [-.05, .12]).

Several conditional indirect effects were significant for relational quality threat appraisals as well. Relational quality threat appraisals mediated the influence of sex composition on intimacy jealousy for newly-developed (indirect $B = .14$, .95 CI = [.04, .26]), but not long-term friendships (indirect $B = .07$, .95 CI = [-.04, .21]). Similarly, relational quality threat mediated the influence of sex composition on power jealousy for new (indirect $B = .11$, .95 CI = [.03, .24]), but not long-term (indirect $B = .06$, .95 CI = [-.03, .18]) friendships. Finally, relational quality threat mediated the indirect effect of sex composition on companionship jealousy for newly-developed friendships (indirect $B = .09$, .95 CI = [.02, .21]), but not for long-term ones (indirect $B = .04$, .95 CI = [-.02, .15]). In light of the conditional indirect effects of threat appraisals on jealousy via threat appraisals, H7b received some support. However, this was qualified by the moderated nature of the mediational relationship, such that the mediational role of threat appraisals emerged only for newly-developed friendships.

Regarding our research question about sex differences in threat appraisals and jealousy, only one significant difference emerged. Females ($M = 3.88$, $SD = 1.12$) reported greater degrees of companionship jealousy than did males ($M = 3.26$, $SD = 1.27$), ($B = .40$, $p < .01$). No other main effects for sex differences emerged in the models tested. Further, all other patterns of association were identical in all models, regardless of whether sex was included as a covariate. In light of the view that questions about sex differences in jealousy may best be evaluated at the level of interactions rather than main effects (Edlund & Sagarin, 2009), we conducted follow-up analyses to assess whether sex moderated any associations of threat appraisals with jealousy. Sex did not moderate any of the associations between existence or relational quality threat appraisals and sexual, intimacy, power or companionship jealousy.

Discussion

Jealousy in intimate relationships is not a uniform experience; individuals may experience jealousy about a variety of facets of their relationships. Here, we focused on jealousy about sexuality, intimacy, power/influence, and companionship that one's romantic partner may experience with an extradyadic friend. While scholars generally agree that jealousy is rooted in threat appraisals (e.g., Bevan & Samter, 2004; Pines, 1992), relatively little research to date has examined the precise content of these appraisals. When threat appraisals have been studied, it has generally been in the context of comparing appraisals of the general threateningness of sexual versus emotional infidelity scenarios (e.g., Buss, Larsen, Westen, & Semmelroth, 1992; with exception, see Parker, 1997). In contrast, the present study explored differences in the content of threat appraisals (i.e., existence and relational quality threats) as a factor shaping the experience of jealousy about partners' friendships. We first hypothesized that a partner's involvement in a cross-sex friendship would be perceived as more threatening than a same-sex friendship. This prediction was borne out for both existence and relational quality threats, but only for new friendships. Indeed, our results were generally reflective of moderated mediation: friendship sex composition had indirect effects on jealousy (mediated through threat appraisals) when friendships were newly-developed, but not long-term.

The moderated mediation relationships described above illustrate the complex character of rival characteristics in the experience of jealousy about a partner's friendships, as well as the important role of threat appraisals in shaping the jealousy experience. Specifically, the form of these mediational relationships depended on the type

of threat appraisal in view. While friendship sex composition did not influence jealousy about partners' friendships *directly* (with the exception of sexual jealousy in univariate analyses), sex composition did influence jealousy *indirectly* for those dealing with a partner's new friendship, through its effects on threat appraisals. For newly-developed friendships, appraisals of existence threat mediated the influence of sex composition on sexual and companionship jealousy, while appraisals of relational quality threat mediated the influence of sex composition on intimacy, power, and companionship jealousy.

These results suggest that appraising the existence of one's romantic relationship as threatened by a partner's new cross-sex friendship is likely to be associated with fears about sexual involvement within that friendship, and/or with concerns about the friend replacing oneself as a significant source of companionship in the partner's life. This concurs with the notion that violations of sexual fidelity norms often lead to relational termination (Afifi, Falato, & Weiner, 2001), as well as that individuals often expect their heterosexual romantic partners to disengage from cross-sex friendships upon beginning a romantic relationship (Werking, 1997). Concurrently, appraising a partner's new cross-sex friendship as threatening the quality of the romantic relationship did not appear to be associated with concerns about sexual involvement, but was instead linked with concerns about unwanted emotional intimacy between the partner and his or her friend, as well as undue power and influence over one's partner by the friend. That both existence and relational quality threats were associated with companionship jealousy is interesting as well, in that it suggests companionship jealousy may be elicited by concerns about *either* the continuation or the rewardingness of the relationship. Conversely, sexual, intimacy and power jealousy were all appraisal-specific.

We also note that men and women differed little, overall, in their appraisals of threat or experiences of jealousy about partners' friendships. The one exception was that women reported greater degrees of companionship jealousy than did men. The extant literature reveals continued controversy about the existence and extent of sex differences in jealousy in response to relationship threats (e.g., Buss et al., 1992; Carpenter, 2012; DeSteno et al., 2002; Harris, 2003; Sagarin et al., 2012). A growing area of research concerns the conditions under which sex differences in jealousy do and do not appear. Edlund and Sagarin (2009) argued that sex differences are more validly evaluated in light of interactions between sex and threat situations (e.g., sexual versus emotional infidelity) on jealousy, rather than differences in mean levels of jealousy. The current study, however, observed no interactions between sex and threat appraisals on jealousy about a romantic partner's extradyadic friendship involvement. It is possible that the experience of friendship-related jealousy may differ in important ways from the types of jealousy typically examined in past jealousy research (although ample research shows that partners' extradyadic friends may be perceived as threatening the nature or exclusivity of the romantic bond; Bleske-Rechek & Buss, 2006; Schmitt & Shackelford, 2003; Werking, 1997).

Further, while the evolutionary sex difference hypothesis has received stronger support in student samples (Carpenter, 2012; Sagarin et al., 2012), the current study did not observe main or interactive sex differences within a student sample. Additionally, Edlund and Sagarin (2009; also Sagarin et al., 2012) provided evidence that properties of continuous jealousy measures may be associated with the likelihood of observing sex differences. They noted that compact (e.g., 5-point) scales more often fail to detect sex differences compared to scales with more points. Additionally, sex differences were more likely to be observed when only scale endpoints, or endpoints and midpoints, were labeled, compared to scales in which all points were labeled. Finally, the use of *very* versus *extremely* for scale anchors has been observed to moderate sex differences in jealousy responses (Sagarin & Guadagno, 2004). Our jealousy scales were 6-point Likert-type scales, anchored by *strongly disagree* and *strongly*

agree. It is possible that a six point scale could have been too compact to observe sex differences. However, only the endpoints of our scales were labeled, and as we utilized an even number of items, there was no midpoint that might serve to artificially draw responses toward the middle. Thus, several of the primary methodological features that would be expected to increase the likelihood of observing sex differences did not appear to have a substantial impact in our study. While future work on jealousy about partner's friendships would benefit from examining potential variations in measures of friendship-related jealousy, the current results seem to point toward greater similarity than difference in men's and women's experiences of jealousy in response to a partner's extradyadic friendship involvement.

In sum, we interpret our results as suggesting, not that rival characteristics (e.g., sex composition and history) are irrelevant to jealousy about partners' friendships, but rather that the influence of rival characteristics is indirect. The precise nature of jealousy about friendships should be understood in light of the cognitive appraisal processes that mediate between rival characteristics and jealousy, and that discriminate among different forms of jealousy. In highlighting the role of threat appraisals as important for predicting and explaining jealousy in these associations, we believe this study has implications for studying jealousy in other contexts as well, such as sibling jealousy, parent-child jealousy, and jealousy *between* friends (e.g., Bevan & Samter, 2004). We acknowledge as a limitation that we were unable to observe real-time reactions to jealousy-provoking events, and believe such methods would be fruitful in future investigations. Further, our use of hypothetical scenarios enabled us to experimentally manipulate friendship characteristics, which (along with the random assignment to scenarios) allowed us to reasonably infer causality for the effects of friendship characteristics on threat appraisals and jealousy. However, we acknowledge that our cross-sectional method did not allow us to establish definitive causal links between threat appraisals and jealousy. It is possible, in principle, that jealousy about partners' friendships could encourage more severe threat appraisals. Nevertheless, we believe our causal model is consistent with the view of jealousy as rooted in appraisals of threat to a valued relationship (e.g., Pines, 1992). We encourage future research directed toward further clarifying the mediating (and potentially moderating) roles of threat appraisals that form the crucial link between rival characteristics and jealousy content and intensity.

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