

Attachment Styles as Predictors of Facebook-Related Jealousy and Surveillance in Romantic
Relationships

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All authors are affiliated with the Department of Psychology at Brunel University.

Study 2 was supported by an award from the Brunel Research Initiative and Enterprise Fund to the first author.

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Abstract

Facebook has become ubiquitous over the past five years, yet few studies have examined its role within romantic relationships. In two studies, we tested attachment anxiety and avoidance as predictors of Facebook-related jealousy and surveillance (i.e., checking a romantic partner's Facebook page). Study 1 found that anxiety was positively associated, and avoidance negatively associated, with Facebook jealousy and surveillance. The association of anxiety with Facebook jealousy was mediated in part by lower trust. Study 2 replicated this finding, and daily diary results further showed that over a one-week period, anxiety was positively associated, and avoidance negatively associated, with Facebook surveillance. The association of anxiety with greater surveillance was mediated in part by daily experiences of jealousy.

Keywords: attachment, Facebook, jealousy, online, romantic relationships, social networking websites, surveillance, trust

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Imagine the following scenario: a woman is worried that her boyfriend doesn't love her as much as she loves him, and fears that he will leave her for someone else. Driven by anxiety and suspicion, she logs onto Facebook to see if she can find any evidence of his extra-dyadic transgressions. On his Facebook page, she sees that he has recently added three attractive women to his list of friends, he has been tagged in a photo with his arm around an unknown pretty girl, and his relationship status is still listed as "single" rather than "in a relationship." Seeing his Facebook page has only made her feel worse – jealous, insecure, and scared of rejection. Nevertheless, she checks his Facebook page a few hours later to see if she can find any new information.

Social networking websites have exploded in popularity over the last few years, yet their influence within romantic relationships remains relatively unexplored. At the forefront, Facebook has attracted more than 800 million active users since its inception in 2004. Facebook claims to help people connect by enabling users to add friends to their network, post photos, videos, and links, write status updates, leave comments and wall postings, communicate privately through email or instant messaging, join groups, invite people to events, and add applications. Attesting to its social connection function, Joinson (2008) found that people most commonly used Facebook for keeping in touch with others. Pivotal to the present research, the second most-common use of Facebook was for people-watching and to find out what others are up to. Indeed, 60% of college students have reported using Facebook to keep tabs on romantic partners, friends, and acquaintances (Stern & Willis, 2007). Researchers have coined such terms as interpersonal electronic surveillance (Tokunaga, 2010), social surveillance (Steinfeld, Ellison,

& Lampe, 2008), social searching (Lampe, Ellison, & Steinfield, 2006), or, in the present studies, Facebook surveillance, to describe the covert use of technology to observe other people's online and offline activities. The current studies contributed to this burgeoning research area by examining Facebook surveillance and jealousy within romantic relationships.

Social Networking Websites and Romantic Relationships

Social networking websites may help people to initiate and maintain romantic relationships. Listing one's relationship status as single, for example, may signal that one is interested in finding a relationship partner on Facebook (Young, Dutta, & Dommety, 2009). People may also maintain their relationships through public displays of commitment and through surveillance of a romantic partner's status updates, wall postings, friend lists, photos, and event invitations – an information-gathering strategy that may actually help new partners to reduce relational uncertainty (Tokunaga, 2011).

Other researchers, however, have highlighted the consequences of Facebook use for romantic relationships. Notably, Muise, Christofides, and Desmarais (2009) found that the amount of time that romantically-involved people spent on Facebook was positively associated with Facebook jealousy. This refers to jealous feelings and behavior related to Facebook use, such as feeling jealous if one's romantic partner becomes Facebook friends with an ex-partner or worrying that one's partner is secretly developing a relationship with someone else on Facebook. According to Muise et al., Facebook jealousy operates in a feedback loop, such that spending more time on Facebook increases exposure to information about one's partner that may arouse jealousy, and jealousy, in turn, may increase the amount of time spent on Facebook in search of relationship-relevant information. Along similar lines, Elphiston and Noller (2011) found that Facebook intrusion – i.e., when excessive attachment to Facebook disrupts daily activities and

relationships – was associated with relationship dissatisfaction. In extreme cases, the use of Facebook to monitor the activities of current or ex-romantic partners may facilitate obsessive relational intrusion and cyberstalking behavior (Chaulk & Jones, 2011). In the present studies, we hypothesized that Facebook jealousy and surveillance were not inevitable consequences of Facebook use, but rather were predicted by individual differences in attachment style. Next, we outline attachment theory, discuss the ways that it has informed research on romantic jealousy, and extend it as a framework for guiding research on Facebook jealousy and surveillance.

Attachment Theory

According to attachment theory, the quality of an infant's interactions with caregivers during times of need help to shape the infant's expectations, or working models, of later relationships (Bowlby, 1969, 1973, 1980). Attachment security develops when caregivers are perceived as available and responsive, and is characterized by positive working models of self and others (Bartholomew & Horowitz, 1991). Because secure individuals believe that they are worthy of love and that others can be trusted and relied on, they are confident that their proximity-seeking attempts will be met with care, they are comfortable with closeness, and they do not worry excessively about abandonment (Mikulincer & Shaver, 2007).

Anxious attachment, on the other hand, develops when caregivers are inconsistently available and responsive (Cassidy & Berlin, 1994), and is characterized by negative working models of self and positive models of others (i.e., preoccupied attachment; Bartholomew & Horowitz, 1991). Individuals who are high in attachment anxiety doubt that they are worthy of love, worry that caregivers cannot be counted on when needed, and fear rejection (Mikulincer & Shaver, 2003). They tend to hypervigilantly monitor the environment for signs of caregiver availability, and will often appraise ambiguous cues as relationship-threatening (Collins, 1996),

ruminate over these perceived threats (Shaver & Hazan, 1993), and catastrophize about the future of the relationship (Campbell, Simpson, Boldry, & Kashy, 2005). If an attachment figure is appraised as unavailable, anxious individuals tend to use *hyperactivating* strategies, which include intensified efforts – often clingy, intrusive, angry, and controlling – to obtain proximity, attention, care, and reassurance (Mikulincer & Shaver, 2007).

Avoidant attachment develops from a history of interactions with caregivers who are unavailable and unresponsive, and is characterized by positive working models of self and negative models of others (dismissive avoidant) or negative models of self and others (fearful avoidant; Griffin & Bartholomew, 1994). Individuals who are high in avoidance do not trust caregivers to be available when needed, and strive to maintain emotional distance, self-reliance, and control (Hazan & Shaver, 1987). When the attachment system is activated, avoidant individuals are more likely to use *deactivating* strategies to cope with relationship threats, which include defensive distancing, denial of intimacy needs, and diverting attention away from or suppressing threat- and attachment-related cues, thoughts, and emotions (Mikulincer & Shaver, 2007). Attachment anxiety and avoidance are commonly conceptualized as independent dimensions, and individuals who score low on both dimensions are classified as securely attached (Brennan, Clark, & Shaver, 2000).

Attachment and Jealousy

Relative to securely attached individuals, insecurely attached individuals tend to experience lower levels of trust, satisfaction, intimacy, and stability in their romantic relationships (Kirkpatrick & Davis, 1994; Simpson, 1990). Central to the present research, they are also more prone to jealousy (Buunk, 1997), which refers to the thoughts, feelings, and behavior associated with perceiving sexual or emotional threats to one's romantic relationship

(White & Mullen, 1989). Because attachment-anxious individuals hold negative self-views, they tend to be higher in suspicion and worry that their partner will leave them for a superior rival (Guerrero, 1998), thus increasing vigilance for extra-dyadic threats and monitoring their partner's behavior for signs of waning interest. Indeed, attachment-anxious individuals report higher levels of chronic jealousy than attachment-avoidant individuals and respond to jealousy-provoking situations with intensified fear, anger, and sadness (Sharpsteen & Kirkpatrick, 1997). Avoidant individuals, in turn, tend to report greater jealousy than securely attached individuals (Buunk, 1997; Hazan & Shaver, 1987).

Anxious and avoidant individuals tend to vary in their behavioral responses to jealousy. Preoccupied individuals are more likely to respond to jealousy-inducing threats by engaging in surveillance behavior (Guerrero, 1998; Guerrero & Afifi, 1998), which includes spying on or following their partner, keeping tabs on his/her activities, and examining the partner's possessions for evidence of infidelity (Guerrero, Andersen, Jorgensen, Spitzberg, & Eloy, 1995). On the other hand, people with negative views of others (dismissing and fearful) are more likely to report avoidance/denial responses to jealousy-inducing threats (Guerrero, 1998). These responses include avoiding communication with one's partner or denying that one feels jealous (Guerrero et al.).

Based on these findings from the jealousy literature, it stands to reason that the tendency of anxious individuals to be hypervigilant for signs of partner availability may lead them to excessively monitor their partner's Facebook activity. In turn, they may be more likely to appraise ambiguous information on their partner's Facebook page as threatening, resulting in greater Facebook jealousy. In contrast, avoidant individuals' defensive efforts to avoid

attachment activation may mean that they are less likely to check their partner's Facebook page and are less prone to Facebook jealousy than anxious individuals.

Mediating Influence of Relationship Quality

According to Fletcher, Simpson, and Thomas (2000), relationship quality is comprised of six components: trust, satisfaction, passion, love, intimacy, and commitment. We considered two mediating pathways through which attachment style may influence Facebook jealousy and surveillance: via trust and satisfaction, or via passion and love. First, people who are higher in anxiety tend to trust their partners less and evaluate their relationships as less satisfying (Collins & Read, 1990; Hazan & Shaver, 1987; Levy & Davis, 1988; Shaver & Brennan, 1992). In turn, people who are lower in trust tend to be higher in Facebook jealousy (Muise et al., 2009) and are more likely to snoop through a secretive partner's physical belongings (Vinkers, Finkenauer, & Hawk, 2011). People who are less satisfied in their relationships are also more likely to engage in spying behavior, such as checking a partner's email or cell phone (Goodboy, Myers, & Members of Investigating Communication, 2010). As such, we hypothesized that anxious attachment would be positively related to Facebook jealousy and surveillance via lower trust and satisfaction. We did not make a parallel mediating prediction for highly avoidant individuals because they were predicted to report *lower* Facebook jealousy and surveillance, and would therefore need to be *higher* in trust and satisfaction to fulfill the requirements for mediation (Baron & Kenny, 1986). Highly avoidant individuals, however, also tend to be lower in trust and satisfaction compared to secure individuals (Hazan & Shaver, 1987; Levy & Davis, 1988; Shaver & Brennan, 1992).¹

In the second mediating pathway, we surmised that anxiety and avoidance may be associated with Facebook jealousy and surveillance via passion and love. Hazan and Shaver

(1987) found that anxious-ambivalent individuals, relative to those who were avoidant or secure, were more likely to report that they easily fall in love, and that their romantic relationships were greater in obsessive preoccupation, emotional highs and lows, jealousy, sexual attraction, desire for union and reciprocation, and love at first sight. Attachment-anxious individuals are also more likely to endorse the love style of mania (Collins & Read, 1990; Levy & Davis, 1988), which is characterized by obsessive, dependent, possessive love (Lee, 1977). Mania, in turn, is associated with a higher likelihood of spying on one's partner (Goodboy et al., 2010), suggesting that frequently checking a partner's Facebook page and feeling jealous may simply reflect the infatuated tendencies of people who are high in attachment anxiety. Avoidant individuals, on the other hand, are more likely to report that they fall in love less easily and frequently, that finding someone to fall in love with is rare, that romantic love as depicted in movies does not really exist, and that romantic love does not last (Hazan & Shaver, 1987). As such, lower Facebook jealousy and surveillance may reflect their relatively tepid feelings for their partner. Higher levels of passion and love, then, may explain why anxious individuals experience greater Facebook jealousy and surveillance than avoidant individuals.

Predictions for intimacy and commitment were more speculative. Highly anxious individuals desire excessive closeness with their partner, but they often do not experience as much intimacy and commitment as they would like (Mikulincer & Erev, 1991). In fact, they tend to be ambivalent about commitment because they fear rejection (Joel, MacDonald, & Shimotomai, 2011). Highly avoidant individuals, meanwhile, tend to report desiring, and experiencing, lower levels of intimacy and commitment in their relationships (Mikulincer & Erev). In terms of the predicted associations with Facebook activity, intimacy might be positively related to Facebook surveillance because visiting a partner's Facebook page may

express and reinforce feelings of proximity with a loved-one. From this perspective, looking at a partner's Facebook page may reflect healthy intimacy rather than dysfunctional suspicion and paranoia. On the other hand, highly intimate and committed relationships might afford enough proximity and security to reduce Facebook surveillance and jealousy. Due to these conflicting possibilities, we examined the association of attachment anxiety with Facebook jealousy and surveillance via intimacy and commitment on an exploratory basis. Because highly avoidant individuals tend to be lower, not higher, in commitment, we ruled out commitment as a mediator of the predicted negative association of avoidance with Facebook jealousy and surveillance. We did consider the possibility, however, that the tendency of highly avoidant individuals to limit intimacy and maintain emotional distance may translate into avoiding their partner's Facebook page.

Gender Differences

In line with the findings of Muise et al. (2009), we expected that women would report spending more time on Facebook and greater Facebook jealousy than men. Accordingly, we also hypothesized that women would report greater Facebook surveillance. We did not expect to find any gender differences in attachment style or the relationship quality components, nor did we expect the associations of attachment style and the relationship quality components with Facebook jealousy and surveillance to be moderated by gender.

The Present Research

We conducted two studies to test the hypothesis that anxious attachment is positively related, and avoidant attachment negatively related, to Facebook jealousy and surveillance. To our knowledge, these are the first studies to examine attachment style as a predictor of Facebook jealousy and surveillance, and to probe different components of relationship quality as potential

mediators. Such research is warranted because of Facebook's increasing ubiquity and the relatively unexamined role that it plays in romantic relationships. This research also extends the literature on attachment style as a predictor of surveillance behaviors in response to romantic jealousy (e.g., Guerrero & Affifi, 1998) by examining a new form of surveillance that is distinctive for its anonymity, ease of use, and low risk of detection. We sought to examine whether these unique characteristics of Facebook surveillance have made it a commonplace behavior within many romantic couples, perhaps even reflecting healthy relationship functioning, or, like other forms of surveillance – such as checking a partner's email or phone – it is more common among jealous, attachment-anxious partners or those involved in dissatisfying, mistrustful relationships. In Study 1, we investigated whether attachment dispositions were associated with Facebook jealousy and surveillance, and whether any of Fletcher et al.'s (2000) relationship quality components mediated these associations. Study 2 aimed to replicate and build on the findings of Study 1 by collecting data from *both* relationship partners and testing whether attachment styles predicted Facebook jealousy and the frequency of checking the partner's Facebook page over a one-week period.

Study 1

Participants

The sample consisted of 255 participants (201 women, 54 men). They were recruited through posting a link to an online survey on two websites that host online psychology surveys (Social Psychology Network Online Social Psychology Studies, Psychological Research on the Net), and through the personal contacts of the fourth author. Participants indicated that they were daily users of Facebook and were involved in a romantic relationship with a partner who also had a Facebook account. Men and women did not significantly differ in age ($M = 21.44$, $SD = 7.02$

and $M = 22.53$, $SD = 5.16$, respectively) or length of relationship in months ($M = 20.23$, $SD = 22.82$ and $M = 29.37$, $SD = 34.74$, respectively). 69% of participants indicated that they were dating their current partner and no one else, 9% were cohabitating, 8% were married, 7% were engaged, and 7% were dating their current partner and others. Relationship status was controlled in the following analyses by creating an effect-coded variable to differentiate more committed relationships (1 = cohabitating, engaged, or married) from less committed relationships (-1 = exclusive and non-exclusive dating). 66% of participants were North American, 22% were British, 7% were European, 2% were from Australia or New Zealand, and the remaining 3% were from the Middle East, Africa, East Asia, Southeast Asia, or Latin America.

Procedure and Materials

An online survey was created through a survey-development website (www.surveymonkey.com). The following measures were presented to participants in English.

Attachment Style. The Experiences in Close Relationships–Revised (ECR-R) Questionnaire (Fraley, Waller, & Brennan, 2000) is comprised of 18 items that measure attachment anxiety (e.g., “When I show my feelings for romantic partners, I’m afraid they will not feel the same about me”), and 18 items that measure attachment avoidance (e.g., “I prefer not to be too close to romantic partners”). Responses were measured with a 5-point Likert scale (1 = *Strongly disagree*, 5 = *Strongly agree*). Cronbach’s alpha was .91 for anxiety and for avoidance.

Self-Esteem. The Rosenberg Self-Esteem Inventory (RSEI; Rosenberg, 1965) consists of 10 items (e.g., “On the whole, I am satisfied with myself”) that are answered on a 4-point Likert scale ranging from 1 (*Strongly disagree*) to 4 (*Strongly agree*). Internal consistency was high ($\alpha = .90$). Self-esteem was controlled in the following regression models to ensure that any

associations of attachment anxiety or avoidance with Facebook jealousy were attributable to attachment style rather than self-esteem.

Relationship Quality. The six-item short form of the Perceived Relationship Quality Components (PRQC) Inventory (Fletcher et al., 2000) assesses six components of relationship quality: satisfaction, commitment, intimacy, trust, passion, and love (e.g., “How committed are you to your relationship?”). Each item was measured with a 5-point Likert scale (1 = *Not at all*, 5 = *A great deal*). The PRQC Inventory was designed to reduce item overlap between components, and Fletcher et al.’s (2000) factor analyses revealed that the best-fitting model allowed the six components to form quasi-independent lower-level factors that also loaded on a higher-order factor of global relationship quality.

Facebook Jealousy. The 27-item Facebook Jealousy Scale (Muisse et al., 2009) assesses emotional and sexual jealousy experienced while using Facebook (e.g., “How likely are you to feel threatened if your partner added a previous romantic or sexual partner to his or her Facebook friends?” and “How likely are you to look at your partner’s Facebook page if you are suspicious of their activities?”). Responses were measured with a 7-point Likert scale (1 = *Very unlikely*, 7 = *Very likely*). Internal consistency was high ($\alpha = .96$). Participants also indicated how much time they spent actively using Facebook on a typical day.

Facebook surveillance. A single item asked, “How often do you look at your partner’s page?” A 5-point Likert scale was anchored with *Never* (1) and *Very often* (5).

Results and Discussion

Means and standard deviations are reported in Table 1. Men reported having a significantly greater number of Facebook friends than women, and women reported significantly greater commitment than men. Pearson’s correlations are reported in Table 2², and the results of

hierarchical regression models that tested the predictors of Facebook jealousy and surveillance are reported in Table 3. Sex was effect-coded (1 = male, -1 = female). In both models, the control variables were entered in the first step, followed by the main effects of anxious and avoidant attachment in the second step, and the main effects of the six relationship quality components in the third step. Two-way interactions of anxious and avoidant attachment with sex were entered in a fourth step, but none were significant and are therefore not reported. Results from Step 1 of the first model revealed that Facebook jealousy was higher in women, people whose relationship status indicated lower commitment, and those who were lower in self-esteem. Confirming hypotheses, Step 2 showed that attachment anxiety was positively associated and attachment avoidance negatively associated with Facebook jealousy.

Step 3 showed that trust was the only relationship quality component that predicted Facebook jealousy over and above the control and attachment variables, suggesting it had the potential to mediate the association of anxiety with Facebook jealousy. As shown in Figure 1, Baron and Kenny's (1986) conditions for testing mediation were satisfied: the independent variable (anxious attachment) significantly predicted the mediator (trust) and the dependent variable (Facebook jealousy), and the mediator significantly predicted the dependent variable when the independent variable was controlled. To test mediation, trust was added to Step 2 of the regression model, resulting in a reduction in the coefficient of anxiety from .64 ($p < .0001$) to .58 ($p < .0001$). The Sobel test was significant ($z = 2.41, p = .02$), supporting partial mediation.

As shown in Table 3, the results of the second regression model showed that Facebook surveillance was greater in people whose relationship status indicated lower commitment, and as predicted, it was positively associated with anxious attachment and negatively associated with

avoidant attachment. None of the relationship quality components significantly predicted Facebook surveillance over and above the control and attachment variables.

In sum, the results of Study 1 confirmed that attachment anxiety and avoidance were significantly related to Facebook jealousy and surveillance, and further, that more anxious individuals may have experienced greater Facebook jealousy at least in part because they trusted their partners less. Contrary to hypotheses, the associations of attachment style with Facebook jealousy and surveillance were not mediated by passion and/or love. In spite of its strengths, Study 1 was limited in several ways: men were underrepresented; results may not generalize beyond people who checked Facebook on a daily basis; Facebook surveillance was rated retrospectively and on a relatively subjective rating scale; and we did not control for the romantic partner's attachment style, perceived relationship quality, or Facebook activity, which may potentially influence one's own Facebook jealousy. Study 2 sought to redress these limitations and to replicate and extend the findings of Study 1.

Study 2

In Study 2, we collected data from both members of heterosexual romantic couples over a one-week period. Analyses were based on the Actor-Partner Interdependence Model (APIM; Kashy & Kenny, 2000) because dyads were the unit of analysis rather than individuals. The APIM allowed us to test *actor* effects, which refer to the association of the participant's own independent variables with his/her own dependent variables, controlling for the partner's variables, and *partner* effects, which refer to the association of the partner's independent variables with the actor's dependent variables, controlling for the actor's variables. More specifically, we hypothesized that actors who were higher in anxiety, lower in avoidance, and less trusting would report greater Facebook jealousy and more frequently check their partner's

Facebook page over the course of one week. Furthermore, we hypothesized that actors would report greater Facebook jealousy and surveillance to the extent that their *partners* reported lower relationship quality, especially commitment. We also explored whether partner's attachment style and amount of time spent on Facebook contributed to actor's Facebook jealousy and surveillance. Similar to Study 1, we examined whether the relationship quality components mediated the putative association of anxiety and avoidance with Facebook jealousy and surveillance. Study 2 introduced several additional improvements on Study 1: trait neuroticism was controlled because it tends to be associated with attachment anxiety; we included participants who did not necessarily use Facebook on a daily basis; and Facebook surveillance was measured more precisely by obtaining daily ratings of the number of times participants looked at their partner's Facebook page.

Method

Participants

Data was collected from 108 heterosexual couples as part of a larger study on romantic couples living in the United Kingdom. They were recruited through an online advertisement posted on the authors' university intranet page and through a website that posts classified advertisements (www.gumtree.co.uk). 68 couples who indicated that both partners had a Facebook account were retained for analysis.³ 78% of participants indicated that they checked their Facebook account on a daily basis, 17% checked once every few days, 1% checked once a week, 1% checked once every few weeks, 1% checked once a month, and 3% checked once every few months. These frequencies did not significantly differ for men and women, although women were slightly more likely to check Facebook on a daily basis (87%) than men (70%). Men and women did not significantly differ in age ($M_s = 26.93$ and 25.36 ; $SD_s = 5.11$ and 4.84 ,

respectively). 49% of participants were born in Europe, 14% in the United Kingdom, 10% in North America, 8% in Australia or New Zealand, 4% in Latin America, 5% in East Asia, 4% in Africa, 2% in South Asia, 2% in the Middle East, and 1% in Southeast Asia. An effect-coded variable that contrasted people born in Western countries (1) with people born in non-Western countries (-1) was included in the following regression models. 32% of participants indicated that they were exclusively dating their partner, 37% were cohabitating, 11% were engaged, and 20% were married. The mean length of relationships was 28.62 months ($SD = 24.06$).

Procedure and Materials

First, participants were emailed a link to an intake questionnaire that assessed Facebook jealousy, length of time spent on Facebook and frequency of using Facebook, attachment style, global ratings of relationship quality, self-esteem, neuroticism, and demographic characteristics. When both partners had completed the intake questionnaire, they began the diary phase of the study the following day. Every day for one week, they were emailed a link to an online diary record. They were instructed to complete the record at night before going to bed. If they forgot to complete a record one day, they were asked to skip that day rather than complete it by memory the following day. Participants who did not submit a daily record were emailed a reminder to complete their diaries on time. Each partner was paid £5 for completing the intake questionnaire, and £1 for each diary record, thus providing an incentive to complete the diary records on a daily basis. At the end of the one-week period, participants were thanked, fully debriefed, and paid. All of the following questionnaires were presented to participants in English.

Intake Questionnaire

Attachment Style. The 36-item Experiences in Close Relationships – Revised (ECR-R) Questionnaire (Fraley et al., 2000), using the same response format as in Study 1, was high in internal consistency ($\alpha = .88$ for both anxiety and avoidance).

Global Relationship Quality. The full 18-item version of the Perceived Relationship Quality Components (PRQC) Inventory (Fletcher et al., 2000) assesses global relationship satisfaction, commitment, intimacy, trust, passion, and love with three items each. It used the same response format as in Study 1. Cronbach's alpha coefficients ranged from .71 (trust) to .94 (satisfaction).

Self-Esteem. The Self-Liking Self-Competence Scale (SLSC; Tafarodi & Swann, 1995) assesses two dimensions of self-esteem with 8 items each: self-liking (e.g., "I feel great about who I am") and self-competence (e.g., "I perform well at many things"). The self-liking subscale was highly reliable ($\alpha = .91$), but the self-competence subscale was not ($\alpha = .26$). As such, only the self-liking subscale was included in the analyses.

Neuroticism. 7 items ($\alpha = .85$) from the Berkeley Personality Profile (Harary & Donahue, 1994) assess trait neuroticism (e.g., "I get nervous easily"). Responses were measured with a 5-point Likert scale (1 = *Strongly disagree*, 5 = *Strongly agree*).

Facebook Jealousy. The Facebook Jealousy Scale (Muisse et al., 2009), utilizing the same response format as in Study 1, was highly reliable ($\alpha = .96$). Participants were also asked how many minutes they spent actively checking Facebook on a typical day, and how frequently they used Facebook by indicating one of 6 response options that ranged from *daily* to *once a year*.

Daily Diary Record

Facebook surveillance was assessed with the item, "How many times did you look at your partner's Facebook page today?" The 6-point scale ranged from 0 (1) to 5 or more times (6).

To control for the possibility that partners looked at each other's pages as a byproduct of using Facebook email or instant messaging to communicate with each other, one item asked participants to indicate how much time they spent communicating with their partner that day through the social networking website. Six response options ranged from *None* (1) to *More than 10 hours* (6). Using the same response options, additional items asked participants how much time they spent that day communicating with their partner through phone, email, text messaging, instant messaging, and Skype (summing these five modes of communication within each day for a total score), and how much time they spent interacting face-to-face. We reasoned that couples who communicate heavily through technology may be more prone to checking each other's Facebook pages, whereas couples who spent more time in face-to-face interactions may be less prone.

The diary record also measured each of the 6 relationship quality components with the six-item short-form of the PRQC. Responses were based on a 5-point Likert scale (1 = *Not at all*, 5 = *A great deal*). It was slightly modified to refer to perceived relationship quality on that particular day instead of globally (e.g., "How committed did you feel to your relationship today?"). An additional item measuring jealousy was also included ("How much jealousy did you experience in your relationship today?"). These items were included to assess whether daily perceptions of relationship quality contributed to variance in Facebook surveillance over and above the global ratings of relationship quality as measured at intake.

Finally, the diary record assessed daily variation in mood with the 10-item International Positive and Negative Affect Schedule Short-Form (I-PANAS-SF; Thompson, 2007). Respondents indicate on a 5-point scale (1 = *Not at all*, 5 = *A great deal*) how much each of 5 items assessing positive affect (e.g., "Inspired"; $\alpha = .74$) and 5 items assessing negative affect

(e.g., “Upset”; $\alpha = .80$) describe how they felt that day. This scale was included to control for the potential effect of mood on Facebook surveillance.

Results and Discussion

Data Analytic Strategy

In dyadic designs, observations are non-independent because romantic partners tend to mutually influence each other’s scores. To account for non-independence, we tested two multilevel models, each based on a different nested data structure. The first model tested the predictors of Facebook jealousy, and consisted of a two-level data structure in which person was nested within dyad. The variables included in this model were measured during the intake phase of the study; no daily diary variables were included. Person-level variables – attachment anxiety, avoidance, the global relationship quality components, and Facebook jealousy – were the lower-level units of analysis (Level 1), and dyad was the upper-level unit of analysis (Level 2).

The second multilevel model tested the predictors of Facebook surveillance, and consisted of a three-level data structure based on intake and daily diary variables. In dyadic daily diary designs, observations are not only interdependent between dyad members, but also within person, such that an individual’s observations on one day are likely to be associated with their observations on another day (Kenny, Kashy, & Cook, 2006). In this data structure, each individual’s daily observations are nested within person, and person is nested within dyad. Accordingly, daily diary scores for the relationship quality components and Facebook surveillance were the lower level units of analysis (Level 1), person-level variables – attachment avoidance, anxiety, and the global relationship quality components – were the middle level unit of analysis (Level 2), and dyad was the highest level unit of analysis (Level 3). The analyses for

Facebook surveillance were based on 413 daily interactions that consisted of two complete observations (male score, female score).

The following analyses were guided by the Actor-Partner Interdependence Model (Kashy & Kenny, 2000), following the recommendations of Kenny et al. (2006) and Campbell and Kashy (2002) for conducting hierarchical linear modeling with dyadic data using PROC MIXED in SAS. Because dyadic data allows for random intercepts but not random slopes (Kenny et al., 2006), we conducted random intercept-only models. All continuous predictors were centered on the grand mean, and degrees of freedom for the multilevel analyses were based on the Satterthwaite approximation. Means and standard deviations for the intake variables are reported in Table 4, and correlations between intake variables are reported in Table 5.

Predictors of Facebook Jealousy

Predictors of Facebook jealousy were entered into the multilevel analysis in four steps. Control variables (Level 1) were entered at Step 1, and included actor's sex, age, Western vs. non-Western cultural background, neuroticism, self-esteem, length of relationship, relationship status, actor's and partner's frequency of using Facebook (1 = daily, -1 = not daily), and number of minutes spent actively using Facebook on a typical day. Main effects of actor's and partner's anxiety and avoidance (Level 1) were entered at Step 2, and main effects of actor's and partner's global relationship quality components (Level 1) were entered at Step 3. Interactions of the main effect variables with sex were entered at Step 4, but none were significant and are therefore not reported. As seen in Table 6, Facebook jealousy was positively predicted by actor's attachment anxiety, and negatively predicted by actor's frequency of using Facebook,⁴ actor's trust, and partner's intimacy.

Actor's trust and partner's intimacy represented two potential mediators of the association of actor's anxiety with increased Facebook jealousy because they were the only global relationship quality predictors that significantly predicted Facebook jealousy over and above the independent variable (actor's anxiety). It was necessary for each to be negatively associated with actor's anxiety to fulfill Baron and Kenny's (1986) criteria for mediation, but this association was only significant for actor's trust. As shown in Figure 2, when actor's trust was added to Step 2 of the regression model (controlling for partner's trust), the coefficient for actor's anxiety dropped from .97 ($p < .0001$) to .79 ($p < .0001$). The Sobel test was significant, $z = 1.93$, $p = .05$. Similar to the results of Study 1, then, attachment anxiety was related to greater Facebook jealousy at least in part because more anxious people trusted their partners less.

Predictors of Facebook Surveillance

Because the diary period lasted for only one week, the following analyses excluded five couples who indicated that one partner checked Facebook less than once a week. 89% of the remaining women and 67% of men indicated that they checked Facebook on a daily basis; this gender difference was significant ($\chi^2(1) = 75.24$, $p < .0001$). Participants indicated in 67% of the daily diary records that they had not checked their partner's Facebook page that day, whereas they checked once in 23% of the records, twice in 6% of records, three times in 3% of records, four times in 1% of records, and checked five or more times in 1% of records. These frequencies did not significantly differ by sex ($\chi^2(5) = 4.70$, $p = .45$). Correlations of men's and women's intake variables with frequency of checking partner's Facebook page are reported in Table 5.

The predictors of Facebook surveillance, a diary-level variable (Level 1), consisted of person-level variables (Level 2: control variables, attachment avoidance and anxiety, global relationship quality components) and diary-level variables (Level 1: daily relationship quality

components). The control variables were entered in Step 1, main effects for actor's and partner's attachment variables in Step 2, main effects for actor's and partner's global relationship quality components in Step 3, and main effects for actor's and partner's daily ratings of relationship quality components in Step 4. The control variables were the same as in the previous analysis for Facebook jealousy, but we controlled for several additional variables (all Level 1 diary variables): actor's assessment of how much time was spent that day communicating with the partner through social networking sites and other technology (e.g., email, text messaging), length of time spent in face-to-face interaction with the partner that day, and actor's daily positive and negative affect.⁵ Interactions of the global and daily relationship quality components with sex were added to Step 3 and Step 4, respectively, after the main effects had already been assessed (due to space limitations, Table 6 does not report interactions with sex, and it only reports the main effects of daily relationship quality that were significant).

As reported in Table 6, actors engaged in greater Facebook surveillance if they were male, used Facebook on a daily basis, spent more time on Facebook, and had partners who spent more time on Facebook. Confirming hypotheses, actor's anxiety was positively related to Facebook surveillance, and actor's avoidance was negatively related. Actors were also higher in Facebook surveillance when partners reported less global commitment, but more global love. Neither of these two variables was significantly associated with actor's anxiety or avoidance, however, indicating that they did not fulfill Baron and Kenny's (1986) criteria for mediation. In addition, actor's daily love and jealousy were positively associated with Facebook surveillance, whereas partner's daily jealousy was negatively associated. Further analyses revealed that only actor's daily jealousy satisfied the criteria for mediation, as shown in Figure 3.⁶ When actor's daily jealousy was added to Step 3 of the regression model (controlling for partner's daily

jealousy), the coefficient for actor's anxiety decreased from .23 ($p < .01$) to .19 ($p < .05$). The Sobel test was significant ($z = 2.54, p = .01$), suggesting that attachment-anxious people more frequently checked their partner's Facebook page at least in part because they experienced intensified jealousy on a daily basis.⁷

Finally, several of the global relationship components significantly interacted with sex: actor's love ($b = -.32, p < .05$), actor's passion ($b = .28, p < .0001$), and partner's passion ($b = -.31, p < .0001$). Analysis of these interactions showed that actor's passion was positively associated with men's Facebook surveillance ($b = .23, p < .01$) and negatively associated with women's surveillance ($b = -.32, p < .01$). The reverse pattern was observed for partner's passion, which was negatively associated with men's Facebook surveillance ($b = -.28, p < .01$) and positively associated with women's surveillance ($b = .33, p < .0001$). Furthermore, actor's global love was significantly associated with women's surveillance ($b = .54, p < .05$) but not with men's. Additional analyses showed that sex did not interact with any of the attachment variables or the daily relationship quality components, nor did it moderate any mediating relationships between attachment style, global relationship quality, and Facebook surveillance. Independent of attachment style, then, actors checked their partner's Facebook page more frequently if they reported more daily jealousy, and if their partner reported less global commitment and less daily jealousy, but more global love. Men who reported greater global passion and women who reported greater global love also checked their partner's Facebook page more frequently.

General Discussion

Taken together, these studies showed that anxious attachment is positively associated, and avoidant attachment negatively associated, with Facebook jealousy and surveillance. Attachment-anxious individuals experienced heightened Facebook jealousy at least in part

because they trusted their partners less. This pattern of results emerged in both studies in spite of their different sample characteristics: participants in Study 1 were predominantly North American, university-aged individuals who used Facebook on a daily basis, whereas the sample in Study 2 consisted of predominantly European, slightly older, more seriously involved romantic couples who varied more widely in the frequency of their Facebook use. These results were also consistent with the findings of Muise et al. (2009), who found that trust was the only relational factor that predicted Facebook jealousy. Results from Study 2 further revealed that attachment-anxious individuals tended to check their partner's Facebook page more frequently at least in part because they felt more jealousy on a daily basis, whereas attachment-avoidant individuals appeared to avoid looking at their partner's Facebook page altogether.

That global trust and daily jealousy were the only relationship quality variables to partially mediate the association of anxiety with Facebook jealousy and surveillance is consistent with attachment theory. Because of their negative self-models, attachment-anxious people tend to feel that they are unworthy of love, and as such, that their partners may leave them for someone else (Mikulincer & Shaver, 2007). Lack of trust and heightened jealousy may lead highly anxious individuals to hypervigilantly check their partner's Facebook page, and ambiguous cues that are perceived as threatening may intensify anxiety, jealousy, and mistrust in a vicious circle. To the extent that anxious individuals react in a hypersensitive, angry, destructive manner to the partner's "inappropriate" Facebook activity, the partner's commitment may decrease and thus confirm the anxious individual's negative relationship expectations in a process of behavioral confirmation (Downey, Freitas, Michaelis, & Khouri, 1998). Contrary to hypotheses, there was no evidence that anxious people were higher in Facebook jealousy and surveillance because of infatuated love; jealousy and mistrust better accounted for this pattern of

results than passion and love. These findings therefore extend research that has linked attachment anxiety to surveillance behaviors in response to romantic jealousy (Guerrero, 1998; Guerrero & Afifi, 1998) by highlighting Facebook's utility as a new, easy-to-use weapon that attachment-anxious individuals may add to their arsenal of surveillance tactics.

Contribution of Relationship Quality Components to Facebook Jealousy and Surveillance

It is noteworthy that in Study 2, several of the relationship quality components significantly predicted Facebook jealousy and surveillance over and above the attachment variables, even though they did not qualify as mediators. Specifically, partner's global intimacy and commitment were negatively associated with actor's Facebook jealousy and surveillance, respectively, whereas partner's global love, women's global love, actor's daily love, and men's global passion were positively associated with actor's Facebook surveillance. Regardless of one's chronic attachment style, then, partner's intimacy and commitment may neutralize actor's Facebook jealousy and surveillance. Actors may be less driven to look at their partner's Facebook page out of jealous insecurity, and less likely to interpret ambiguous information on Facebook as relationship-threatening, if their partner's closeness and devotion allows them to feel secure in the relationship.

These results further suggest that Facebook jealousy and especially surveillance may be dually-motivated: consistent with Sternberg's (1986) distinction, the more pragmatic, cognitive, "warm" and "cold" components of relationship quality (intimacy and commitment, respectively) may decrease Facebook jealousy and surveillance because they increase felt security, whereas the sexual, affective, "hot" components (passion and love) may increase the desire to look at a romantic partner's Facebook page. Looking at a partner's Facebook page, then, may not necessarily reflect "surveillance" per se because it is not always motivated by attachment

insecurity or poor relationship quality; rather, people in love may simply find it rewarding to see each other's status updates, photos, or a public declaration that they are involved in a relationship together. Looking at a partner's Facebook page may also reflect a type of symbolic proximity-seeking behavior with a loving, responsive partner. It is important to note that these findings emerged when relationship status and length were controlled in the analyses, dismissing the possibility that love and passion may drive the frequency of checking a partner's Facebook page upwards in relatively new relationships, whereas commitment may drive Facebook checking downwards in relatively more established, long-lasting relationships.

In sum, Facebook surveillance was not only the domain of anxious, jealous individuals or those whose partners were lacking commitment; it was also more prevalent among passionate and loving partners. As such, this modern, easily accessed and undetectable type of surveillance may diverge from more effortful forms of surveillance that are unilaterally negative (e.g., following a partner or going through his/her belongings). Further research would do well to differentiate between benign, even positive forms of Facebook surveillance, and more negative, pernicious forms.

Gender Differences

Several significant gender differences emerged in both studies. In Study 1, men reported having significantly more Facebook friends than women, and were less committed to their relationships. In Study 2, women reported spending significantly more minutes on Facebook and greater Facebook jealousy than men, consistent with the findings of Muise et al. (2009). Men were also significantly less likely than women to use Facebook on a daily basis. After controlling for men's less frequent use and less time spent on Facebook, the analyses revealed that men actually looked at their partner's Facebook page significantly more often on a daily basis than

did women. This suggests that men may spend a greater proportion of their time on Facebook looking at their partner's page compared to women. Men's frequency of checking their partner's Facebook page was associated with passion, suggesting that men's sexual interest may have led them to look for visual cues of their partner, such as Facebook photos. That men reported lower Facebook jealousy in spite of more frequently checking their partner's Facebook page lends further support to this speculation. Note, however, that there were no gender differences in Facebook surveillance in Study 1, suggesting that the results of Study 2 must be viewed cautiously.

Interestingly, when men were high in global passion, both men and women looked at the other's Facebook page more frequently, whereas when women were high in global passion, both men and women looked at the other's Facebook page *less* often. That men were particularly likely to look at their partner's Facebook page when their own passion was high and their partner's passion was low suggests a certain fascination with non-reciprocating partners. Women, however, were more likely to look when their own passion was low but their partner's passion was high. Because this finding is open to interpretation (for instance, perhaps women were flattered by the attention of passionate men, and visited their Facebook pages for an ego boost), additional research is needed to corroborate these gender differences in an independent sample.

Limitations and Future Directions

Notwithstanding the strengths of these studies, some caution is still warranted when interpreting results. First, these studies were correlational, and therefore could not establish the causal direction between variables. We made the assumption that anxiety led to lower trust and greater daily jealousy, which in turn led to greater Facebook jealousy and surveillance, but it is

just as plausible to surmise that anxiety led people to look at their partner's Facebook page more often, feel more Facebook jealousy when ambiguous cues were appraised as threatening, and subsequently trusted their partners less and experienced greater daily jealousy. An experiment that manipulated anxiety or avoidance, the relationship quality components, or even exposure to a partner's Facebook page could help to establish the direction of causality between these variables.

The present results may have also been limited by the selection of measures. It is noteworthy that none of the relationship quality components completely mediated the association of attachment styles with Facebook jealousy or surveillance, suggesting that alternative measures may have produced stronger results. For example, the passion and love components of the Perceived Relationship Quality Components Inventory might better reflect the love style of eros – physical attraction and sexual desire – than the obsessive, preoccupied love style of mania. The Love Attitudes Scale (Hendrick & Hendrick, 1986) or the Passionate Love Scale (Hatfield & Sprecher, 1986) might be better able to assess whether the heightened Facebook jealousy and surveillance of attachment-anxious individuals is driven by passionate, infatuated love. Moreover, we did not include a measure of chronic jealousy, as Muise et al. (2009) did in their study. It is possible that the association of daily jealousy with checking partner's Facebook page may have been attenuated if chronic jealousy were controlled. The association of insecure attachment styles with chronic jealousy, however, suggests that it may not contribute much variance to the dependent variables over and above anxiety and avoidance.

Another limitation is that the relationship quality components were highly inter-correlated. Multicollinearity between predictor variables can produce unstable regression coefficients, suggesting that these results should be replicated using alternative, less correlated

measures. It is worth noting, however, that Fletcher et al. (2000) found less item overlap between relationship components as measured with the PRQC Inventory compared to other measures of relationship quality. They also confirmed the quasi-independence of the six components through factor analysis.

The present findings suggested several additional avenues for future research. For one, it is worthwhile to investigate whether the tendency of highly anxious individuals to keep tabs on their current partner through Facebook may mean that they are also more likely to monitor the Facebook activities of ex-partners, and remain attached to ex-partners as a result. A recent study found that more than half of participants had contacted ex-partners through Facebook, and a third of these monitored their ex-partner's Facebook activities (Chaulk & Jones, 2011) – a tendency that may be more pronounced amongst highly anxious individuals. Even though highly anxious people tend to sustain greater attachments to ex-partners, this attachment may be neutralized if they are led to believe that alternative romantic partners are available (Spielmann, MacDonald, & Wilson, 2009). Similarly, anxious people might break an attachment to an ex-partner if they defriend ex-partners on Facebook, go for longer periods of time without checking the ex-partner's page, and attend to the available alternative partners amongst their own Facebook friends. More darkly, it is possible that highly anxious individuals are more likely to cyberstalk ex-partners on Facebook. Future studies might fruitfully investigate whether checking a partner's Facebook page, a lower form of relational intrusion (Chaulk & Jones, 2011), escalates to higher forms by utilizing a longitudinal research design.

Additionally, that people who are high in anxiety tend to engage in greater jealousy-induction than people who are high in avoidance (Whitson & Mattingly, 2010) suggests that highly anxious individuals may attempt to induce jealousy in their partner through their

Facebook activity. It is also possible that when feeling threatened, anxious individuals may express hyperactivating strategies through the medium of Facebook. As such, further research could investigate whether anxious people are more likely to post photos, comments, or status updates intended to make their partners jealous, or to express hostile, needy, or attention-seeking behaviors through Facebook.

Concluding Remarks

Before the advent of Facebook, anxious individuals' mistrust and jealousy may have led them to monitor a romantic partner's activities through other forms of intrusive behavior, such as checking their partner's pockets, wallet, or mobile phone. In the past few years, the possibility of monitoring a partner's activities through Facebook has complemented or even supplanted this hypervigilant behavior because it may reliably yield attachment-relevant cues with minimal effort and little to no risk that one's snooping will be discovered. Avoidant individuals, in contrast, are likely to eschew the potentially threatening information furnished by their partner's Facebook page and thus experience less Facebook jealousy. Competing relational pressures may also influence Facebook jealousy and surveillance, with commitment and intimacy exerting downward pressure, and feelings of love and passion exerting upward pressure. Overall, the current studies contribute to our nascent understanding of the role that social networking websites like Facebook play in romantic relationships.

References

- Avivi, Y. E., Laurenceau, J. P., & Carver, C. S. (2009). Linking relationship quality to perceived mutuality of relationship goals and perceived goal progress. *Journal of Social and Clinical Psychology, 28*, 137-164.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.
- Bartholomew, K., & Horowitz, L.M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61*, 226-244.
- Bowlby, J. (1969). *Attachment and loss: Vol. 1: Attachment*. New York: Basic Books.
- Bowlby, J. (1973). *Attachment and loss: Vol. 2: Separation*. New York: Basic Books.
- Bowlby, J. (1980). *Attachment and loss: Vol. 3: Loss*. New York: Basic Books.
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46-76). New York: Guilford Press.
- Buunk, B. P. (1997). Personality, birth order, and attachment styles as related to various types of jealousy. *Personality and Individual Differences, 23*, 997-1006.
- Campbell, L. C., & Kashy, D. A. (2002). Estimating actor, partner, and interaction effects for dyadic data using PROC MIXED and HLM: A user-friendly guide. *Personal Relationships, 9*, 327-342.
- Campbell, L. C., Simpson, J. A., Boldry, J., & Kashy, D. A. (2005). Perceptions of conflict and support in romantic relationships: The role of attachment anxiety. *Journal of Personality and Social Psychology, 88*, 510-531.

- Cassidy, J., & Berlin, L. J. (1994). The insecure/ambivalent pattern of attachment: Theory and research. *Child Development, 65*, 971-981.
- Chaulk, K., & Jones, T. (2011). Online obsessive relational intrusion: Further concerns about Facebook. *Journal of Family Violence, 26*, 245-254.
- Collins, N. L. (1996). Working models of attachment: Implications for explanation, emotion, and behavior. *Journal of Personality and Social Psychology, 71*, 810-832.
- Collins, N. L., & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology, 58*, 644-663.
- Downey, G., Freitas, A. L., Michaelis, B., & Khouri, H. (1998). The self-fulfilling prophecy in close relationships: Rejection sensitivity and rejection by romantic partners. *Journal of Personality & Social Psychology, 75*, 545-560.
- Elphiston, R. A., & Noller, P. (2011). Time to face it! Facebook intrusion and the implications for romantic jealousy and relationship satisfaction. *CyberPsychology, Behavior, and Social Networking, 14*, 631-635.
- Fletcher, G. J. O., Simpson, J. A., & Thomas, G. (2000). The measurement of perceived relationship quality components: A confirmatory factor analytic approach. *Personality and Social Psychology Bulletin, 26*, 340-354.
- Fraley, R. C., Waller, N. G., & Brennan, K. G. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology, 78*, 350-365.
- Goodboy, A. K., Myers, S. A., & Members of Investigating Communication. (2010). Relational quality indicators and love styles as predictors of negative relational maintenance behaviors in romantic relationships. *Communication Reports, 23*, 65-78.

- Griffin, D. W., & Bartholomew, K. (1994). Models of the self and other: Fundamental dimensions underlying measures of adult attachment. *Journal of Personality and Social Psychology, 67*, 430-445.
- Guerrero, L. K. (1998). Attachment-style differences in the experience and expression of romantic jealousy. *Personal Relationships, 5*, 273-291.
- Guerrero, L. K., & Afifi, W. A. (1998). Communicative responses to jealousy as a function of self-esteem and relationship maintenance goals: A test of Bryson's dual motivation model. *Communication Reports, 11*, 111-122.
- Guerrero, L. K., Andersen, P. A, Jorgensen, P. F., Spitzberg, B. H., & Eloy, S. V. (1995). Coping with the green-eyed monster: Conceptualizing and measuring communicative responses to romantic jealousy. *Western Journal of Communication, 59*, 270-304.
- Harary, K., & Donahue, E. (1994). *Who do you think you are?* San Francisco: Harper.
- Hatfield, E. & Sprecher, S. (1986). Measuring passionate love in intimate relations. *Journal of Adolescence, 9*, 383-410.
- Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 52*, 511-524.
- Hendrick, C., & Hendrick, S. (1986). A theory and method of love. *Journal of Personality and Social Psychology, 50*, 392-402.
- Joel, S., MacDonald, G., & Shimotomai, A. (2011). Conflicting pressures on romantic relationship commitment for anxiously attached individuals. *Journal of Personality, 79*, 51-74.
- Joinson, A. N. (2008). 'Looking at', 'looking up' or 'keeping up with' people? Motives and uses of Facebook. In *Proceedings of the 26th Annual SIGCHI Conference on Human Factors in*

- Computing Systems*(Florence, Italy, April 5-10 2008), CHI '08, ACM, New York (pp. 1027-1036).
- Kashy, D. A., & Kenny, D. A. (2000). The analysis of data from dyads and groups. In H. Reis & C. M. Judd (Eds.), *Handbook of research methods in social psychology* (pp. 451-477). New York: Cambridge University Press.
- Kenny, D. A., Kashy, D. A., & Bolger, N. (1998). Data analysis in social psychology. In D. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (4th ed., Vol. 1, pp. 223–265). New York: McGraw-Hill.
- Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis*. New York: The Guilford Press.
- Kirkpatrick, L. A., & Davis, K. E. (1994). Attachment style, gender, and relationship stability: A longitudinal analysis. *Journal of Personality and Social Psychology*, *66*, 502-512.
- Krull, J. L., & MacKinnon, D. P. (2001). Multilevel modelling of individual and group level mediated effects. *Multivariate Behavioral Research*, *36*, 249–277.
- Lampe, C., Ellison, N. B., & Steinfield, C. (2006). A Face(book) in the crowd: Social searching vs. social browsing. In *Proceedings of CSCW-2006* (pp. 167–170). New York: ACM Press.
- Lee, J. A. (1977). A typology of styles of loving. *Personality and Social Psychology Bulletin*, *3*, 173-182.
- Levy, M. B., & Davis, K. E. (1988). Lovestyles and attachment styles compared: Their relations to each other and to various relationship characteristics. *Journal of Social and Personal Relationships*, *5*, 439-471.

- Mikulincer, M., & Erev, I. (1991). Attachment style and the structure of romantic love. *British Journal of Social Psychology, 30*, 273-291.
- Mikulincer, M., & Shaver, P. R. (2003). The attachment behavioral system in adulthood: Activation, psychodynamics, and interpersonal processes. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 53-152). San Diego, CA: Elsevier Academic Press.
- Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change*. New York: Guilford.
- Muise, A., Christofides, E., & Desmarais, S. (2009). More information than you ever wanted: Does Facebook bring out the green-eyed monster of jealousy? *CyberPsychology & Behavior, 12*, 441-444.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Sharpsteen, D. J., & Kirkpatrick, L. A. (1997). Romantic jealousy and adult romantic attachment. *Journal of Personality and Social Psychology, 72*, 627-640.
- Shaver, P. R., & Brennan, K. A. (1992). Attachment styles and the "Big Five" personality traits: Their connections with each other and with romantic relationship outcomes. *Personality and Social Psychology Bulletin, 18*, 536-545.
- Shaver, P. R., & Hazan, C. (1993). Adult romantic attachment: Theory and evidence. In D. Perlman & W. Jones (Eds.), *Advances in personal relationships* (Vol. 4, pp. 29-70). London: Kingsley.
- Simpson, J. A. (1990). Influence of attachment styles on romantic relationships. *Journal of Personality and Social Psychology, 59*, 971-980.

- Spielmann, S. S., MacDonald, G., & Wilson, A. E. (2009). On the rebound: Focusing on someone new helps anxiously attached individuals let go of ex-partners. *Personality and Social Psychology Bulletin*, *35*, 1382-1394.
- Steinfeld, C., Ellison, N. B., & Lampe, C. (2008). Social capital, self-esteem, and use of online social network sites: A longitudinal analysis. *Journal of Applied Developmental Psychology*, *29*, 434-445.
- Stern, S. R., & Willis, T. J. (2007). What are teenagers up to online? In S. R. Mazarella (Ed.), *20 questions about youth and the media* (pp. 211-224). New York, NY: Peter Lang Publishing.
- Sternberg, R. J. (1986). A triangular theory of love. *Psychological Review*, *93*, 119-135.
- Tafarodi, R. W., & Swann, W. B., Jr. (1995). Self-liking and self-competence as dimensions of global self-esteem: Initial validation of a measure. *Journal of Personality Assessment*, *65*, 322-342.
- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the Positive and Negative Affect Schedule (PANAS). *Journal of Cross-Cultural Psychology*, *38*, 227-242.
- Tokunaga, R. S. (2011). Social networking site or social surveillance site? Understanding the use of interpersonal electronic surveillance in romantic relationships. *Computers in Human Behavior*, *27*, 705-713.
- Vinkers, C. D. W., Finkenauer, C., & Hawk, S. T. (2011). Why do close partners snoop? Predictors of intrusive behavior in newlywed couples. *Personal Relationships*, *18*, 110-124.

- White, G. L., & Mullen, P. E. (1989). *Jealousy: Theory, research, and clinical strategies*. New York: Guilford Press.
- Whitson, D., & Mattingly, B. A. (2010). Waking the green-eyed monster: Attachment styles and jealousy induction in romantic relationships. *Psi Chi Journal of Undergraduate Research*, *15*, 24-29.
- Young, S., Dutta, D. & Dommetty, G. (2009). Extrapolation psychological insights from Facebook profiles: A study of religion and relationship status. *CyberPsychology & Behavior*, *12*, 347-350.

Footnotes

¹ In both of the studies reported here, we tested whether the components of relationship quality moderated rather than mediated the associations of anxiety and avoidance with Facebook jealousy and surveillance. The interactions of the relationship components with anxiety and avoidance were not significant, suggesting that neither trust, satisfaction, nor any of the other components were differentially associated with Facebook jealousy and surveillance for anxious and avoidant individuals. As such, the interactions will not be mentioned further.

² Although Table 2 shows that the correlation of attachment avoidance with Facebook jealousy was not significant for women or men, a multiple regression analysis revealed that avoidance significantly predicted Facebook jealousy when attachment anxiety was included as a second covariate in the model (avoidance: $\beta = -.17, p < .01$; anxiety: $\beta = .63, p < .0001$). Controlling for attachment anxiety, then, helped to pull out the main effect of avoidance.

³ Couples were excluded if one partner did not have a Facebook account or did not clearly indicate how many minutes he/she spent on Facebook in a typical day. A multilevel model examined whether the couples who were included in this study differed in relationship quality (i.e., total scores on the PRQC) from couples who were excluded. Sex, age, cultural background, length of relationship, relationship status, self-esteem, and neuroticism were controlled in the model. Results did not reveal a significant group difference in relationship quality ($p = .87$).

⁴ This unexpected finding should be interpreted cautiously until it can be replicated in another sample. One possibility, however, is that people who do not use Facebook on a daily

basis are exposed to a greater accumulation of potentially jealousy-inducing information in one session than people who are exposed to less information more frequently (i.e., on a daily basis).

⁵ Because most of the control variables did not significantly predict the dependent variables, they are not reported in Table 6. To sum up the significant findings, Facebook jealousy was predicted by actor's age ($b = -.04, p < .05$), cultural background ($b = -.28, p < .05$) and neuroticism ($b = .41, p < .01$), whereas Facebook surveillance was predicted by the amount of time that partners spent communicating with each other through technology ($b = .05, p < .001$) and actor's negative affect ($b = .12, p < .01$).

⁶ Because the independent variable is an upper level predictor (Level 2), and the mediator and dependent variable are Level 1 variables, this is an example of upper level mediation (Kenny, Kashy, & Bolger, 1998). Multilevel modeling is appropriate for testing upper level mediation (Krull & MacKinnon, 2001).

⁷ Figures 2 and 3 depict actor-mediated actor effects; there was no evidence of partner-mediated actor effects (see Avivi, Laurenceau and Carver (2009) for elaboration of actor- and partner-mediated actor and partner effects).

Table 1

Study 1: Descriptive statistics

	Men		Women		<i>t</i> (253)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Self-esteem	3.09	.60	3.18	.62	-1.00
Minutes on Facebook	97.50	85.14	92.60	74.99	.41
Number of friends	515.77	435.04	397.78	278.06	2.41*
Facebook jealousy	3.58	1.37	3.89	1.27	-1.58
Facebook surveillance	3.81	1.21	3.72	1.17	.52
Attachment anxiety	2.39	.83	2.32	.78	.59
Attachment avoidance	2.01	.73	2.01	.70	.01
Intimacy	4.13	1.12	4.39	.87	-1.83 [†]
Satisfaction	4.02	1.21	4.04	1.02	-.16
Commitment	4.17	1.21	4.47	.90	-2.07*
Trust	4.04	1.27	4.04	1.04	-.05
Passion	4.11	1.11	4.18	.94	-.45
Love	4.37	1.09	4.50	.87	-.94

[†] $p < .10$. * $p < .05$.

Table 2

Study 1: Pearson's correlations

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Anxiety		.30*	-.46**	-.38**	-.19	-.15	-.09	-.06	.05	.60**	.35*
2. Avoidance	.45**		-.61**	-.66**	-.77**	-.70**	-.68**	-.65**	-.11	-.04	-.23
3. Trust	-.46**	-.44**		.77**	.56**	.54**	.58**	.52**	-.06	-.18	.04
4. Satisfaction	-.43**	-.52**	.62**		.72**	.56**	.70**	.77**	-.04	-.01	.13
5. Commitment	-.27**	-.43**	.61**	.71**		.65**	.63**	.83**	.15	.14	.24 [†]
6. Intimacy	-.26**	-.46**	.48**	.63**	.58**		.72**	.54**	-.03	.21	.14
7. Passion	-.18*	-.35**	.38**	.63**	.54**	.67**		.73**	-.01	.21	.21
8. Love	-.24**	-.51**	.48**	.64**	.69**	.53**	.52**		-.03	.23 [†]	.23 [†]
9. FB minutes	.13	.06	-.01	-.02	.01	-.02	-.05	-.09		.12	.28*
10. FB jealousy	.55**	.13 [†]	-.36**	-.27**	-.15*	-.12 [†]	-.03	-.08	.11		.54**
11. FB surveil.	.21**	-.10	-.13 [†]	-.08	.02	.06	.03	.02	.11	.40**	

Note. Women's data is presented below the diagonal, and men's data is presented above the diagonal. FB minutes = minutes per day spent actively using Facebook. FB jealousy = Facebook jealousy. FB surveil. = Facebook surveillance.

[†] $p < .10$. * $p < .05$. ** $p < .01$.

Table 3

Study 1: Standardized regression coefficients for the predictors of Facebook jealousy and surveillance

Predictors	Facebook Jealousy	Facebook Surveillance
Step 1		
Sex	-.13*	-.03
Age	-.03	-.02
Relationship status	-.17*	-.31***
Relationship length	.08	.03
Self-esteem	-.21**	-.10 [†]
Minutes on Facebook	.07	.10
Number of Facebook friends	.10	.11 [†]
Step 2		
Anxiety	.64***	.27***
Avoidance	-.15*	-.28***
Step 3		
Intimacy	.03	.01
Satisfaction	-.08	-.11
Commitment	.08	.18 [†]
Trust	-.23**	-.08
Passion	.09	-.03
Love	.07	-.04

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

Study 2: Descriptive statistics

	Men		Women		<i>t</i> (136)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Facebook jealousy	2.64	1.27	3.23	1.28	2.72**
Minutes on Facebook	64.20	73.37	96.74	106.80	2.09*
Self-esteem	3.49	.33	3.29	.43	-3.07**
Neuroticism	2.43	.70	3.06	.75	5.14***
Attachment anxiety	2.07	.61	2.31	.72	2.15*
Attachment avoidance	2.03	.64	1.93	.56	-.96
Global intimacy	4.50	.68	4.49	.66	-.09
Global satisfaction	4.40	.84	4.34	.79	-.45
Global commitment	4.51	.73	4.55	.63	.29
Global trust	4.36	.75	4.29	.73	-.54
Global passion	3.92	1.01	3.90	.91	-.15
Global love	4.53	.71	4.61	.60	.70

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5

Study 2: Pearson's correlations among actor's variables. All variables were measured in the intake questionnaire except frequency of checking partner's Facebook page.

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Anxiety	.39**	.40**	-.36**	-.35**	-.18	-.23 [†]	-.07	-.28*	.29*	.45**	.13**
2. Avoidance	.42**	.20*	-.58**	-.60**	-.56**	-.67**	-.43**	-.64**	.04	.29*	.01
3. Trust	-.50**	-.45**	.29**	.68**	.53**	.67**	.38**	.65**	.10	-.29*	.05
4. Satisfaction	-.54**	-.55**	.63**	.44**	.62**	.87**	.62**	.75**	.06	-.17	.09*
5. Commitment	-.40**	-.71**	.55**	.74**	.32**	.72**	.30*	.82**	.08	-.10	.01
6. Intimacy	-.45**	-.62**	.61**	.80**	.80**	.50**	.62**	.75**	.08	-.07	.08 [†]
7. Passion	-.44**	-.47**	.44**	.74**	.56**	.71**	.62**	.37**	.06	.10	.17***
8. Love	-.37**	-.60**	.57**	.64**	.85**	.74**	.56**	.37**	.04	-.11	.01
9. FB minutes	.07	-.10	.02	.05	.15	.13	.05	.13	.41**	.35**	.31***
10. FB jealousy	.48**	.01	-.43**	-.28*	-.17	-.13	-.17	-.22 [†]	.01	.18*	.21***
11. FB checking	.09*	-.08 [†]	-.01	.05	.12**	.09*	.07 [†]	.11*	.08 [†]	.13**	.26***

Note. Women's data is presented below the diagonal, and men's data is presented above the diagonal. Correlations along the diagonal are between dyad members. FB minutes = minutes per day spent actively using Facebook. FB jealousy = Facebook jealousy. FB checking = frequency of checking partner's Facebook page.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6

Study 2: Unstandardized regression coefficients for the predictors of Facebook jealousy and surveillance (i.e., the frequency of checking partner's Facebook page)

Predictors	Facebook Jealousy		Facebook Surveillance	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Step 1				
Intercept	4.35	.59	1.24	.10
Sex	-.13	.12	.07*	.03
Actor: Frequency of using Facebook	-.27*	.13	.10 [†]	.05
Partner: Frequency of using Facebook	-.11	.13	-.02	.05
Actor: Time spent on FB	.01	.01	.09***	.02
Partner: Time spent on FB	.01	.01	.04*	.02
Step 2				
Actor's anxiety	.97***	.19	.26***	.07
Actor's avoidance	-.12	.17	-.22***	.06
Partner's anxiety	-.11	.17	-.01	.06
Partner's avoidance	-.06	.18	-.08	.06
Step 3				
Global Trust				
Actor	-.51**	.18	-.12 [†]	.07
Partner	.24	.19	-.14 [†]	.07
Global Satisfaction				
Actor	-.16	.24	.05	.09
Partner	.45 [†]	.24	-.01	.09
Global Commitment				
Actor	.04	.28	-.19 [†]	.11
Partner	.02	.27	-.36***	.11
Global Intimacy				
Actor	.23	.31	.14	.12
Partner	-.64*	.30	-.11	.12
Global Passion				
Actor	.01	.16	.07	.06
Partner	.02	.15	.08	.05
Global Love				
Actor	.05	.27	.11	.12
Partner	-.09	.27	.65***	.12
Step 4				
Daily Love				
Actor			.13*	.06
Partner			.06	.06
Daily Jealousy				
Actor			.13**	.04
Partner			-.09*	.04

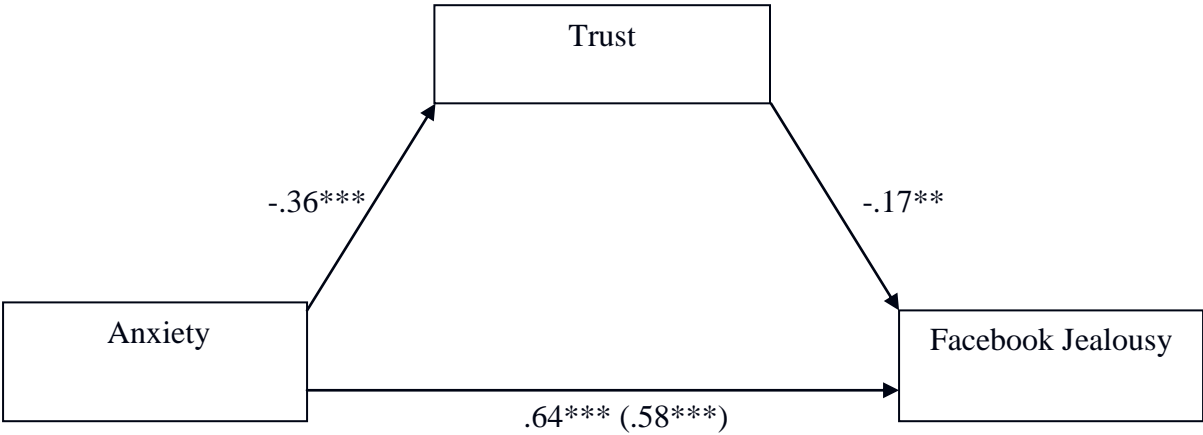
[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure Captions

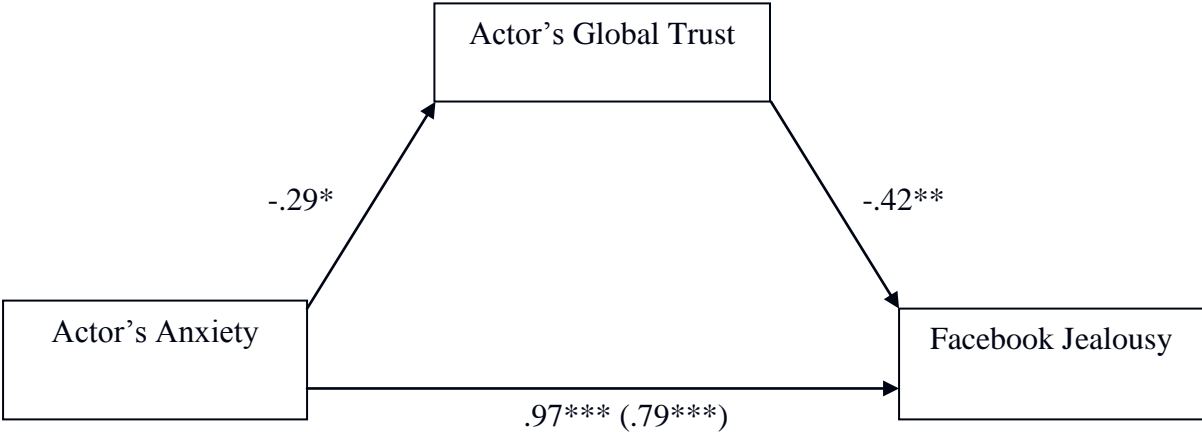
Figure 1. Testing trust as a mediator of the association of anxiety with Facebook jealousy in Study 1. Note: The coefficient in parentheses refers to the association between anxiety and Facebook jealousy after trust was introduced into the model (Sobel's $z = 2.41$, $p = .02$).

Figure 2. Testing actor's global trust as a mediator of the association of actor's anxiety with Facebook jealousy in Study 2. Note: The coefficient in parentheses refers to the association between actor's anxiety and Facebook jealousy after actor's global trust was introduced into the model (Sobel's $z = 1.93$, $p = .05$).

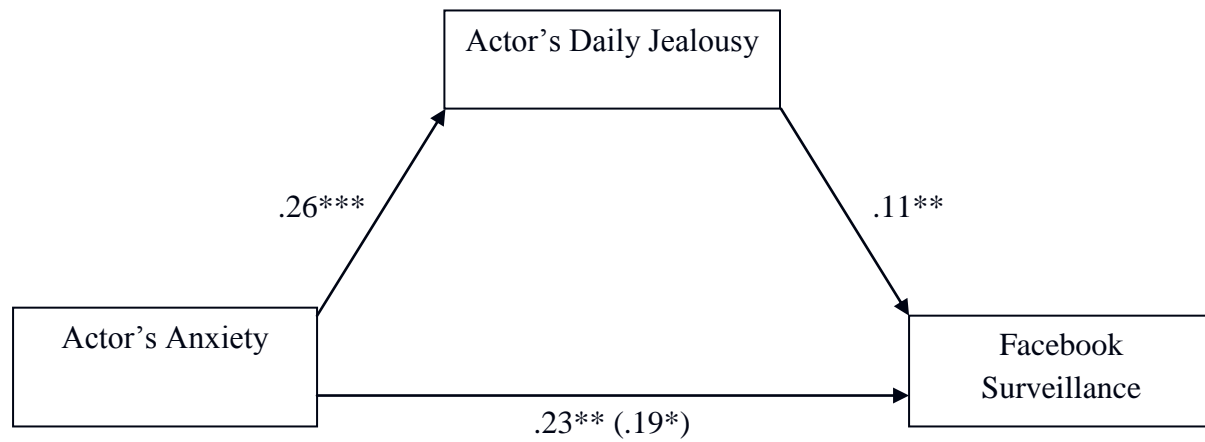
Figure 3. Testing actor's daily jealousy as a mediator of the association of actor's anxiety with Facebook surveillance in Study 2. Note: The coefficient in parentheses refers to the association between actor's anxiety and Facebook surveillance after actor's daily jealousy was introduced into the model (Sobel's $z = 2.54$, $p = .01$).



$**p < .01, ***p < .0001$



$*p < .05$, $**p < .01$, $***p < .001$



* $p < .05$, ** $p < .01$, *** $p < .0001$