



Attachment theory as a framework for explaining engagement with Facebook



Joshua Hart*, Elizabeth Nailling, George Y. Bizer, Caitlyn K. Collins

Union College, 807 Union Street, Schenectady, NY 12308, USA

ARTICLE INFO

Article history:

Received 3 November 2014

Received in revised form 4 December 2014

Accepted 5 December 2014

Keywords:

Adult attachment

Personality

Social media

Self-presentation

ABSTRACT

Research on the relation between personality and styles of engagement with social media is surprisingly limited and has generated mixed results. The present research applied attachment theory to illuminate individual differences in styles of Facebook engagement. Two studies ($N = 583$) supported a mediational model explaining various forms of active Facebook use as stemming from attachment anxiety, which predisposes individuals to sensitivity about social feedback, thereby leading them to engage in attention-seeking social media behavior. These results held while controlling for extraversion, neuroticism, and self-esteem. Attachment avoidance predicted restrained Facebook use, primarily due to its association with (low) extraversion. These findings resolve inconsistencies in previous research and demonstrate that attachment theory is a particularly useful framework through which to study the influence of personality on social-media behavior.

© 2015 Published by Elsevier Ltd.

1. Introduction

As social media has become a principal mode of social interaction in the past decade, self-expressive profiles and postings on sites such as Facebook have become an outlet for individuals' motivated social behavior. Even casual users likely notice that individuals exhibit different patterns of social media behavior; for example, some people post frequent "status updates" that range from reporting mundane daily activities to espousing polemical opinions, whereas others take a reticent or pragmatic approach, visiting social media sites to view others' activity, but infrequently engaging beyond that.

One question that naturally arises is how these different patterns—we will call them "active" versus "restrained" social media use—relate to personality. In the present research, we use adult attachment theory (Mikulincer & Shaver, 2007) to illuminate one way in which personality can explain individual differences in social-media behavior. Specifically, we examine how adult attachment style predicts patterns of engagement with Facebook.

Based on dispositional differences in the functioning of the attachment system—a behavioral regulatory system that mediates close relationships—attachment style reflects individuals' characteristic cognitions, emotions and behavior in close relationships

(i.e., with parents, romantic partners), and it also predicts different ways of interacting with acquaintances and strangers (see Mikulincer & Shaver, 2007, for a comprehensive review). Two dimensions, *anxiety* and *avoidance*, characterize individuals' attachment styles. These "insecure" attachment dimensions reflect, respectively, hyperactivation of the attachment system, or augmented intimacy-seeking behaviors; and deactivation of the attachment system, or reduction of intimacy-seeking behaviors and augmented self-reliance. *Secure* attachment is defined by low anxiety and low avoidance, reflecting comfort with both intimacy and independence. According to attachment theory, individuals develop anxiety and/or avoidance in order to manage chronic concerns about interpersonal loss, rejection, or abandonment. In turn, these traits are influential across a range of intrapersonal and interpersonal contexts, in which anxious attachment predisposes individuals to strive to earn others' affection and avoidance predisposes individuals to try to suppress relational needs. Given that attachment style reflects fundamental social motivations, it seems a likely candidate to explain personality-based variance in socially oriented behaviors on social-media platforms.

1.1. The present research in context

Prior research on personality and social-media use has tended to focus on the "Big Five" personality traits, but such findings have been mixed. Seidman (2013) suggested that the mixed results may stem in part from a focus on behavioral variables, and

* Corresponding author at: Department of Psychology, Union College, 807 Union Street, Schenectady, NY 12308, USA. Fax: +1 518 388 6177.

E-mail address: hartj@union.edu (J. Hart).

recommended an additional focus on motivational variables. We concur, and we further suggest that some of the vagaries in prior research may have been due to the fact that the Big Five are relatively broad personality superfactors that may not be the most precise predictors of specific tendencies (as opposed to general classes of tendencies).

We think attachment style is a better candidate to explain some aspects of social media engagement. The Big Five personality traits share variance with attachment style (e.g., [Nofle & Shaver, 2006](#)). Therefore, the lack of a direct measure of attachment style in most prior research may account for some of the mixed findings, as when researchers are led to attribute some characteristics to Big Five dimensions that are more closely related to attachment style, or fail to find relationships because the Big Five dimensions are not the best predictors. For example, [Seidman \(2013\)](#) found that neuroticism predicted self-disclosure on Facebook, which may have resulted from neuroticism's association with attachment anxiety; by contrast, neuroticism was not associated with acceptance-seeking, whereas attachment anxiety should be.

To our knowledge, only three previous studies examined relationships between attachment style and social media use. These studies were limited in important ways. In one study, [Jenkins-Guarnieri, Wright, and Hudiburgh \(2012\)](#) reported that, whereas extraversion predicted intensity of Facebook use, "self-esteem, attachment style, and other FFM [Five Factor Model] personality traits... were not significantly related to Facebook use" (p. 298; note that the null findings for four of the Big Five traits gives another example of the mixed results in this area). However, the authors conceded that marked participant attrition and the use of a sample that was homogeneous in terms of age (17–24 years), gender (mostly female), and location (the Rocky Mountain region) limited generalizability. To this we would add that the Facebook "intensity" measure was a single-factor scale reflecting frequency of use rather than the style of use (e.g., posting, commenting, and "liking").

In another study, [Jenkins-Guarnieri, Wright, and Johnson \(2013\)](#) used attachment and Big Five personality traits to predict Facebook use. This time, they applied structural equation modeling, and in contrast to their prior study, they found a (negative) indirect effect of attachment style (through extraversion) on extent of Facebook use. However, the structural model was peculiar in two ways. First, it treated attachment as a single dimension (insecurity vs. security), whereas the vast majority of research treats anxiety and avoidance dimensions separately and finds that they exert independent effects (including [Jenkins-Guarnieri et al.'s 2012](#) study). Indeed, anxiety and avoidance frequently exhibit strikingly and complexly different relations to other constructs, particularly interpersonal ones (c.f., [Hart, Hung, Glick, & Dinero, 2012](#)). Second, the model was unusual because it treated attachment insecurity as an antecedent to extraversion and neuroticism, whereas the latter traits are traditionally viewed as existing alongside attachment style. No research we know of suggests that adult attachment style causes extraversion and neuroticism, which are highly heritable (e.g., [Plomin & Caspi, 1999](#)), whereas adult attachment style is probably not ([Fraleigh, Roisman, Booth-LaForce, Owen, & Holland, 2013](#)). In fact, it is likely that major traits are reciprocally influential and are most appropriately treated as covariates (sharing variance but also having unique qualities).

A third study yielded results most consistent with the reasoning that motivated the present research (described below): attachment anxiety was associated with more frequent Facebook use, more "comfort seeking" on Facebook (i.e., using Facebook primarily when experiencing negative emotions), and more concern about being socially evaluated on Facebook ([Oldmeadow, Quinn, & Kowert, 2013](#)). However, the study did not control for related personality dimensions such as neuroticism, nor did it examine

potential process models of the mechanisms mediating relations between Facebook use variables.

In sum, research relating personality to social-media engagement has been flawed and has produced an inconsistent array of findings. We attempted to improve on prior research by (a) using demographically heterogeneous samples, including a cross-cultural sample, (b) developing hypotheses derived from attachment theory about the psychological *mechanisms* that explain why anxiety and avoidance (independently) predict different patterns of social-media engagement, (c) examining multiple specific dimensions of social-media engagement, not simply extent of use, while (d) controlling simultaneously for traits that are known to share considerable variance with attachment style and are the most obvious third variables that might explain associations between attachment style and other constructs (cf. [Hart, Shaver, & Goldenberg, 2005](#); [Nofle & Shaver, 2006](#)): extraversion (negatively related to avoidance), neuroticism (positively related to anxiety), and self-esteem (negatively related to anxiety).

1.2. Overview of studies and hypotheses

Anxiously attached individuals' worries that their close relationship partners will reject them leads to compulsive proximity- and intimacy-seeking. Consequently, they tend to be sensitive to others' opinions of them (e.g., [Park, Crocker, & Mickelson, 2004](#); [Srivastava & Beer, 2005](#)), and they tend to disclose personal information about themselves early in relationships and engage in other behaviors aimed at rapidly attaining intimacy ([Mikulincer & Shaver, 2007](#)). Together, these tendencies are sometimes described as "excessive reassurance seeking"; that is, anxious individuals' concerns about others' affection compel them to engage in behaviors designed to elicit positive feedback ([Shaver, Schachner, & Mikulincer, 2005](#)).

Such a personality profile suggests that in a social-media format such as Facebook, attachment anxiety should predict greater need for positive feedback and hence greater concerns about managing others' impressions (cf. [Oldmeadow et al., 2013](#)). In turn, because Facebook is a forum where individuals interact with "friends," and are likely to generally expect to receive positive feedback in the form of "likes" and comments (especially to the extent that they are motivated to receive feedback; [Hepper, Hart, Gregg, & Sedikides, 2011](#)), anxiously attached individuals' sensitivity to feedback should predict more expressive, attention-seeking behaviors (and more activity in general), aimed at generating positive feedback. In short, anxiously attached individuals' sensitivity to feedback should lead them to engage more actively on Facebook.

By contrast, avoidant individuals' discomfort with intimacy and consequent denial of relational needs leads them to maintain a "safe" distance from relationship partners, and to eschew interactions that might involve dwelling on or discussing emotions. Hence, attachment avoidance should predict restrained Facebook behaviors and minimal concerns about feedback from others.

In two studies, we measured attachment style, extraversion and neuroticism, and self-esteem, as well as Facebook engagement variables tapping sensitivity to feedback and several dimensions of Facebook engagement, including feedback seeking (extensive and frequent posting on a range of topics), general activity (time spent on Facebook, frequency of commenting and liking behaviors), and attention from others. In both studies, we hypothesized that attachment anxiety would predict more active, attention-seeking Facebook behaviors, mediated by anxious individuals' concerns about social feedback. We also hypothesized that attachment avoidance would predict more restrained Facebook use, due to those individuals' tendency to suppress relational concerns.

2. Study 1

2.1. Participants

Participants completed a survey posted on Mechanical Turk (MTurk, see [Buhrmester, Kwang, & Gosling, 2011](#)), in return for \$.50. Nearly half the participants were located in the United States; the rest were located internationally (largely in India). MTurk samples tend to be diverse in geographical location, age, and other important variables, roughly approximating the population (in the United States at least; see [Simons & Chabris, 2012](#)). Before analysis, we excluded 10 participants whose answers on two identical Big Five Inventory (BFI) questions deviated by more than 1 scale point (i.e., we used consecutive identical questions to screen for participants who were not paying attention). This left 267 participants (117 women) aged 19–73 ($M = 32.68$, $SD = 10.94$) who identified primarily as White (44%) and Asian/Asian-American (43%), with the rest (13%) identifying with another ethnicity.

2.2. Materials and procedure

Participants completed online questionnaires assessing, in order: attachment style, self-esteem, neuroticism and extraversion, and several dimensions of Facebook engagement. The 36-item Experiences in Close Relationships inventory (ECR; [Brennan, Clark, & Shaver, 1998](#)) measured attachment anxiety (e.g., “I worry about being abandoned”) and avoidance (e.g., “I don’t feel comfortable opening up to romantic partners”). Due to a programming error, one item was missing from the anxiety subscale. The 10-item Rosenberg Self-Esteem scale (RSE; [Rosenberg, 1965](#)) measured self-esteem. Extraversion and neuroticism were measured using their respective items from the BFI ([John, Donahue, & Kentle, 1991](#)).

2.2.1. Facebook engagement

We generated a battery of questions pertaining to Facebook engagement. These included some filler questions for which we had no a priori hypotheses, in addition to five conceptually derived subscales, described below. These subscales were internally consistent, as demonstrated by their alpha coefficients (see [Table 1](#)).

Five items measured our proposed mediator, *feedback sensitivity*: “I feel insecure when fewer friends than usual like or comment on my status updates [pictures]”; “I feel really confident and well-liked when more people than usual like or comment on my pictures”; and “I do not care how many friends like or comment on my status updates [pictures]” (reverse scored). (1 = *disagree strongly*; 6 = *agree strongly*.)

Nine items measured our primary outcome variable, *feedback seeking*, including overall status-posting frequency (“How often

do you post status updates?”); participants selected a range of options from 1 = *Less than once a month*; 2 = *1–5 times a month*; 3 = *6–10 times a month*; 4 = *11–20 times a month*; 5 = *21–40 times a month*; 6 = *More than 40 times a month*). Six of the items tapped common kinds of status updates, beginning with “I post status updates...”: “...about my daily routines and activities (i.e., my meals, my classes/work)”; “...when something exciting is going on in my life (i.e., major accomplishment, vacations, etc.)”; “...when I have something funny or creative to say”; “...about my personal views on politics or other controversial issues”; “...about personal issues”; “...that reference my religion/spirituality in some way.” (1 = *never* to 6 = *always*.) Two items tapped status-update behaviors that seem aimed at attention-seeking: “My status updates contain inappropriate attributes (innuendos, swear words, etc.)”; and “I tag others in my status updates so that they will see and like/comment on them” (1 = *never* to 6 = *always*).

Six items measured a second activity-related outcome variable, *attention received*: “How many likes [comments], on average, do your status updates [profile pictures; non-profile pictures] receive?” (1 = *less than 5 [likes or comments to 6 = 25 or more [likes or comments]*).

We measured *general activity* with one item asking about time spent a day logged on to Facebook (1 = *less than 15 min*; 6 = *more than 3 h*), plus three items tapping frequency of commenting on other Facebook users’ status updates, profile pictures, and non-profile pictures (using the same scale and anchors as for feedback seeking).

Six items measured participants tendency toward *privacy*: “I only like or comment on the status updates of people I know”; “I find it strange when people I do not know very well personally like or comment on my status updates”; “I think it is creepy when people I do not know friend request me”; “I only friend request people who I have met before in person”; “I like or comment on the status updates of people who I do not know very well personally” (reverse scored); and “I like it when I get friend requests from people I do not know very well personally” (reverse scored). (1 = *disagree strongly* to 6 = *agree strongly*).

Exploratory factor analyses of these 5 scales suggested that they represent a common superordinate “activity” factor. However, reliability analyses showing that the internal consistency of an omnibus scale comprising subsets of the 5 scales was highest ($\alpha = .82$) when feedback sensitivity and privacy subscales were removed (leaving feedback seeking, attention received, and general activity subscales combined). Moreover, the pattern of correlations ([Table 2](#)) among the 5 scales suggested that feedback sensitivity and privacy had the lowest correlations with the other 3 scales. All of this was true in Study 2, too, suggesting a superordinate Facebook “activity” factor consisting of feedback seeking, attention received, and general activity; and also suggesting that, consistent with our a priori conceptualization, feedback sensitivity should be treated as a distinct variable (probably reflecting a distinction between emotional reactions and behavior).

2.3. Results

[Table 1](#) displays the means and standard deviations for the dependent variables. [Table 2](#) displays zero-order correlations among the main study variables. To test our hypotheses, we conducted separate analyses (see [Table 3](#)) regressing each of the 5 Facebook engagement dimensions on attachment anxiety and avoidance (Step 1), plus extraversion, neuroticism, and self-esteem (Step 2), followed by mediational analyses.

2.3.1. Feedback sensitivity

As hypothesized, attachment anxiety predicted feedback sensitivity, even after controlling for all the other predictors. It was the

Table 1
Means and standard deviations for the dependent variables.

	M	SD
<i>Study 1</i>		
Feedback sensitivity	2.89	1.05
Feedback seeking	2.71	1.00
General activity	2.15	.92
Attention received	2.33	1.23
Privacy	4.02	.99
<i>Study 2</i>		
Feedback sensitivity	2.60	1.20
Feedback seeking	2.41	.92
General activity	2.52	1.17
Attention received	2.05	.97
Privacy	4.11	1.24

Table 2
Correlation matrix for both studies' main variables.

	Anxiety	Avoidance	Extraversion	Neuroticism	Self esteem	Feedback sens	Feedback seek	Gen activity	Attn received
Anxiety	(.95, .93)	.42***	-.10	.56***	-.62***	.60***	.45***	.26***	.16**
Avoidance	.34***	(.94, .93)	-.40***	.39***	-.54***	.20**	.06	-.08	-.11
Extraversion	.28***	.48***	(.91, .86)	-.45***	.29***	.06	.28***	.26***	.37***
Neuroticism	.63***	.34***	-.46***	(.90, .88)	-.68***	.29***	.09	.03	-.12*
Self esteem	-.60***	-.43***	.46***	-.66***	(.94, .92)	-.37***	-.18**	-.03	.02
Feedback sens	.34***	.08	-.05	.25***	-.25***	(.84, .76)	.55***	.39***	.34***
Feedback seek	.14*	-.12*	.15*	.06	.02	.29***	(.82, .89)	.56***	.55***
Gen activity	.13*	-.12*	.08*	.09	.04	.21***	.62***	(.81, .79)	.74***
Attn received	.03	-.15**	.16**	.01	.05	.19**	.48***	.54***	(.87, .93)

Note. Study 1's correlation coefficients are above the diagonal; Study 2's are below the diagonal. Coefficient alphas are reported in parentheses along the diagonal (Study 1, Study 2).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3
Regression results for Study 1.

	B	SE	β
Feedback sensitivity (Step 1)			
Anxiety	.51	.04	.63***
Avoidance	-.06	.06	-.06
Feedback sensitivity (Step 2)			
Anxiety	.49	.06	.60***
Avoidance	-.03	.07	-.03
Extraversion	.15	.08	.12
Neuroticism	-.02	.09	-.01
Self esteem	-.05	.07	-.05
Feedback seeking (Step 1)			
Anxiety	.40	.05	.51***
Avoidance	-.15	.06	-.15*
Feedback seeking (Step 2)			
Anxiety	.40	.06	.52***
Avoidance	-.01	.07	-.01
Extraversion	.37	.08	.30***
Neuroticism	-.06	.09	-.05
Self esteem	.01	.07	.01
General activity (Step 1)			
Anxiety	.25	.05	.35***
Avoidance	-.21	.06	-.23**
General activity (Step 2)			
Anxiety	.26	.06	.36***
Avoidance	-.09	.07	-.10
Extraversion	.27	.08	.24**
Neuroticism	.04	.09	.04
Self esteem	.07	.07	.09
Attention received (Step 1)			
Anxiety	.24	.06	.26***
Avoidance	-.28	.08	-.22**
Attention received (Step 2)			
Anxiety	.27	.07	.28***
Avoidance	-.08	.09	-.06
Extraversion	.49	.10	.33***
Neuroticism	-.15	.12	-.11
Self esteem	-.01	.09	-.01
Privacy (Step 1)			
Anxiety	-.13	.05	-.17*
Avoidance	.14	.07	.14*
Privacy (Step 2)			
Anxiety	-.15	.06	-.20*
Avoidance	.11	.08	.11
Extraversion	-.11	.09	-.09
Neuroticism	.25	.11	.22*
Self esteem	.12	.08	.14

* $p < .05$.

** $p < .01$.

*** $p < .001$.

only significant predictor. (The positive relation between extraversion and feedback sensitivity was nonsignificant.)

2.3.2. Feedback seeking

As hypothesized, attachment anxiety positively predicted feedback seeking; and attachment avoidance negatively predicted it. However, whereas the effect of anxiety remained while controlling for the other predictors, the effect of avoidance was entirely eliminated when a positive effect of extraversion was considered. Hence, the effect of avoidance was due to its negative relationship with extraversion.

2.3.3. General activity

As hypothesized, attachment anxiety positively predicted general activity on Facebook, and attachment avoidance negatively predicted it; however, whereas the effect of attachment anxiety remained while controlling for the other predictors, the effect of avoidance was eliminated when a positive effect of extraversion was considered.

2.3.4. Attention received

As hypothesized, attachment anxiety positively predicted attention received, and attachment avoidance negatively predicted it. Again, whereas the effect of anxiety remained while controlling for the other predictors, the effect of avoidance was eliminated due to a positive effect of extraversion.

2.3.5. Privacy

As hypothesized, attachment anxiety negatively predicted privacy, and attachment avoidance positively predicted it. Whereas the effect of anxiety remained while controlling for the other predictors—despite a simultaneous positive effect of neuroticism—the effect of avoidance became nonsignificant.

2.3.6. Mediation analyses

We tested our mediational hypotheses following Preacher and Hayes's (2008) guidelines. The mediation analyses included all the same covariates as in the regression analyses, used 5000 bootstrap samples, and estimated bias-corrected and accelerated 95% confidence intervals (CIs).

As hypothesized, feedback sensitivity mediated the effect of attachment anxiety on feedback seeking (see Fig. 1; CI for the indirect effect = .12–.26), general activity (CI = .09–.20), attention received (CI = .11–.27), and privacy (CI = -.03 to -.21).

As would be expected given that the effects of avoidance on the Facebook measures were due to shared variance with extraversion, feedback sensitivity did not mediate the effect of avoidance on any

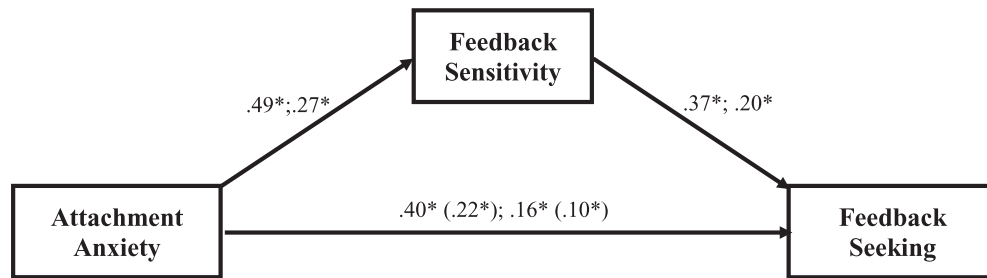


Fig. 1. Mediation Model. Coefficients are for Study 1; Study 2. * $p < .05$. To simplify presentation, feedback seeking is the only outcome depicted (results were parallel for attention received and general activity).

of the outcome variables. Interestingly, it also did not mediate the effect of extraversion on any of those variables (see discussion below).

2.3.7. Interactions

We also conducted exploratory regression analyses (including the same covariates as in the other analyses) testing whether the interaction between anxiety and avoidance (i.e., security vs. insecurity) might predict any of the Facebook measures. It did not ($ps > .16$).

2.4. Discussion

Study 1 generally confirmed our hypotheses. Attachment anxiety predicted feedback sensitivity, feedback seeking, general activity, attention received, and (lower) inclination toward privacy. Anxious persons' feedback sensitivity mediated the relationships between attachment anxiety and all the other outcome variables, suggesting that anxious individuals behave actively on Facebook because they are motivated to seek positive feedback from others. Moreover, all the effects were due exclusively to attachment anxiety and not to constructs that relate very strongly to it (neuroticism and [lower] self-esteem).

Also supporting hypotheses, when controlling for attachment anxiety (which is positively correlated with avoidance despite their apparent opposition), attachment avoidance generally predicted the opposite patterns of Facebook engagement (i.e., restraint). However, we were surprised to learn that avoidant individuals' restrained behaviors seemed to be explained by their (lower) extraversion (and in the case of privacy, their higher neuroticism). In other words, avoidance predicts restrained engagement with Facebook primarily because avoidant individuals tend to be more introverted, and not, as theorized, because they are trying to avoid intimacy per se. This makes sense considering that social media is a relatively distant way of interacting with others. Perhaps avoidant individuals are not as strongly disposed toward distance-maintaining behaviors online as they are in person because the online format already affords an element of separation from others.

Finally, it is interesting to note that the positive effects of extraversion on Facebook activity were not mediated by feedback sensitivity (indeed, extraversion was not related to feedback sensitivity). This provides additional evidence that the process we have delineated explains the results for attachment anxiety, not some spurious factor such as the response biases of socially oriented (i.e., anxiously attached or extraverted) individuals. Extraverts may be inclined toward active Facebook engagement, but it is for different reasons than anxiously attached individuals have for doing so.

In Study 2, we sought to replicate the findings of Study 1. This time, we restricted the sample to participants located in the United

States, to test whether any of the findings of Study 1 might be due to the use of an international sample.¹

3. Study 2

3.1. Participants and procedure

Participants were recruited in the same manner as in Study 1, except for the location restriction. Before analyses we excluded 8 participants whose answers on two consecutive identical questions deviated by more than 1 scale point (this time we embedded the identical questions in the ECR questionnaire). This left 316 participants (195 women), aged 18–83 ($M = 32.79$, $SD = 11.62$) who identified primarily as White (72%), Black (9%), Asian/Asian-American (7%), and Hispanic/Latino (7%), with the rest (5%) identifying with another ethnicity. We followed the same procedure as in Study 1.

3.2. Results

We followed the same analytic strategy as in Study 1. Table 1 displays the means and standard deviations; Table 2 displays the zero-order correlations, and Table 4 displays the regression results.

3.2.1. Feedback sensitivity

As in Study 1, attachment anxiety was the only significant predictor of feedback sensitivity, even after controlling for all the other predictors.

3.2.2. Feedback seeking

Attachment anxiety positively predicted feedback seeking; and attachment avoidance negatively predicted it. However, whereas the effect of anxiety remained while controlling for the other predictors, the effect of avoidance became nonsignificant when a positive effect of extraversion was considered. Hence, the effect of avoidance was due to its negative relationship with extraversion.

3.2.3. General activity

Attachment anxiety positively predicted general activity on Facebook, and attachment avoidance negatively predicted it; however, whereas the effect of attachment anxiety remained while controlling for the other predictors, the effect of avoidance became

¹ Although the sample of US participants was not large enough to test for cultural differences, exploratory analyses suggested that our findings were weaker among US participants. We therefore restricted Study 2 to US participants to ensure that the findings would replicate in a US sample. To reduce the likelihood of repeat US participants across the studies, we examined IP addresses from both samples. Only 3 IP addresses occurred in both samples; of these, 2 were clearly different people (according to demographic information). Thus, 1 person appears to have participated in both studies. Removing that person from analyses does not change the results.

nonsignificant when a marginal positive effect of neuroticism and a positive effect of self-esteem were considered.

3.2.4. Attention received

Attachment anxiety positively predicted, albeit nonsignificantly, attention received, and attachment avoidance negatively predicted it. The effect of avoidance became nonsignificant due to a positive effect of extraversion.

3.2.5. Privacy

In contrast to Study 1, none of the personality variables significantly predicted an inclination toward privacy.

3.2.6. Mediation analyses

We conducted the same mediation analyses as in Study 1, replicating the finding that sensitivity to feedback significantly mediated the effect of attachment anxiety on feedback seeking (CI for the indirect effect = .02–.10), general activity (CI = .02–.10), and attention received (CI = .02–.08; this despite a nonsignificant direct effect of attachment anxiety). (We did not conduct mediation analyses for privacy, because it was not significantly related to any of the predictor variables.)

As in Study 1, feedback sensitivity did not mediate the effect of avoidance on any of the outcome variables, nor did it mediate the effect of extraversion on any of the variables.

3.2.7. Interactions

As in Study 1, regression analyses testing for interactions between anxiety and avoidance were nonsignificant for most of the Facebook outcome measures ($ps > .06$), but there were two interactions in which the effect of attachment anxiety on feedback seeking and general activity occurred mainly among individuals who were also low in avoidance (unstandardized $Bs = -.10$ and $-.14$; $\beta s = -.12$ and $-.13$; $ps = .04$ and $.03$, respectively).

3.3. Discussion

Study 2 replicated all the main findings from Study 1, providing evidence for the reliability (and cross-cultural generalizability) of these results. The main finding is that attachment anxiety predisposes individuals to be sensitive to feedback from others, which prompts these individuals to spend more time on Facebook, to post more frequently, on a wider range of topics, and to engage in more frequent “tagging” of others and commenting on others’ profiles.

Extraversion, neuroticism, and self-esteem were not as consistently related to Facebook engagement. The most consistent finding was that extraversion predicted more engagement on Facebook, which explained the lower engagement of individuals high in attachment avoidance, who tend to be more introverted.

4. General discussion

The present research suggests that there are (at least) two kinds of active Facebook users: people who are higher in attachment anxiety, and people who are higher in extraversion. We leave a fuller explanation of the extraversion finding to future research; however, the present studies depict a clear accounting of anxiously attached individuals’ inclination toward frequent and varied posting, commenting, and “liking” on Facebook: these individuals are prone to concerns about social feedback, which prompts them to engage actively on Facebook, presumably in an effort to generate positive feedback from others; in turn, this activity appears to generate the higher levels of attention that it is designed to elicit.

By contrast, individuals who are more disengaged from Facebook (restrained) tend to be more introverted, a finding that speaks

Table 4
Regression Results for Study 2.

	<i>B</i>	SE	β
Feedback sensitivity (Step 1)			
Anxiety	.33	.05	.36***
Avoidance	-.05	.07	-.05
Feedback sensitivity (Step 2)			
Anxiety	.27	.07	.29***
Avoidance	-.05	.07	-.05
Extraversion	.09	.08	.07
Neuroticism	.06	.10	.04
Self esteem	-.09	.07	-.10
Feedback seeking (Step 1)			
Anxiety	.14	.04	.21***
Avoidance	-.17	.05	-.19**
Feedback seeking (Step 2)			
Anxiety	.16	.05	.22**
Avoidance	-.09	.06	-.11
Extraversion	.16	.07	.16*
Neuroticism	.09	.08	.10
Self esteem	.07	.06	.10
General activity (Step 1)			
Anxiety	.16	.05	.19**
Avoidance	-.20	.07	-.18**
General activity (Step 2)			
Anxiety	.17	.07	.19*
Avoidance	-.14	.07	-.13
Extraversion	.08	.08	.07
Neuroticism	.18	.10	.14
Self esteem	.15	.07	.16*
Attention received (Step 1)			
Anxiety	.06	.04	.09
Avoidance	-.16	.06	-.18**
Attention received (Step 2)			
Anxiety	.06	.06	.08
Avoidance	-.11	.06	-.11
Extraversion	.15	.07	.15*
Neuroticism	.07	.09	.07
Self esteem	.02	.06	.03
Privacy (Step 1)			
Anxiety	.02	.06	.02
Avoidance	.00	.07	.00
Privacy (Step 2)			
Anxiety	-.01	.07	-.01
Avoidance	-.04	.08	-.03
Extraversion	-.13	.09	-.10
Neuroticism	.14	.11	.11
Self esteem	.09	.08	.09

* $p < .05$.

** $p < .01$.

*** $p < .001$.

for itself. We were surprised that attachment avoidance did not seem to play much of a role in Facebook restraint apart from its association with introversion/extraversion, and propose that the reason for this is that online social media formats already afford interpersonal distance, so avoidant individuals do not feel as threatened by interactions in these settings as they do by intimacy in more personal contexts. However, it is worth noting that several of the coefficients for the relation between avoidance and Facebook variables were nearly significant (i.e., $ps < .10$) while controlling for extraversion, leaving open the possibility that they would remain significant in larger samples. (These are other good topics for future research to pursue.)

Although the present research improves on prior research in a number of ways, including the use of samples representing diverse ages, cultural backgrounds, and geographical locations, the use of a cross-sectional correlational method naturally presents some

limitations on the inferences that can be drawn. In particular, though we think there are compelling reasons for the causal hypotheses represented in our mediation models (i.e., attachment anxiety causes feedback sensitivity which causes feedback seeking and other aspects of active Facebook engagement), alternative causal models are plausible (e.g., active Facebook engagement causes attachment anxiety, or feedback sensitivity). Additionally, the use of self-report methods leaves open the question of whether participants who are more anxiously attached really do post more frequent status updates, etc., or whether they simply perceive themselves as doing so. Finally, we did not ask participants to report how much positive and negative feedback they receive on Facebook, so we do not know whether anxiously attached individuals' feedback seeking is associated not only with attention received but specifically positive attention. In light of these limitations, future research should examine participants' actual Facebook pages and behavior and employ experimental designs to assess the effect of (a) feedback seeking on actual feedback, and (b) the effect of positive or negative feedback on subsequent Facebook use. These approaches could provide convergent support for the processes we have postulated.

Assuming that additional research supports our model, the present results bear theoretical and practical implications. The research suggests that attachment theory is a fruitful framework for studying social media behavior. Attachment processes—and individual differences moderating those processes—are not only relevant to interpersonal relationships, many of which are increasingly formed or conducted over social media, but also to individuals' self-esteem and impression maintenance in the context of those relationships. To the extent that social media represents an expanded stage (beyond in-person interactions) on which these processes play out (e.g., Michikyan, Subrahmanyam, & Dennis, 2014), attachment dynamics are likely to be among the personality-based influences that explain the motivations, emotions, and cognitions behind phenomena such as the style and content of communications exchanged on Facebook, Twitter, Instagram, and so on.

Studies have shown that among socially competent, socially supported individuals, social media use leads to even greater social benefits in relationships outside of the social media network (the rich-get-richer theory; Kraut et al., 2002); for example, among extraverts with high social support, increased use of internet-mediated communication leads to more community involvement and family communication (Kraut et al.). Ironically, something similar may be true for socially anxious persons, who may gain more real-world social benefits from social media use, as social media provide a less intimidating context to develop relationships, thereby leading to increased perceptions of closeness (Valkenburg & Peter, 2007). In this light, our findings suggest that anxiously attached individuals may find Facebook to be a salutary outlet for their heightened needs for positive feedback and a sense of connectedness, particularly to the extent that they are actually successful at garnering attention (our results suggest that they are).

However, it is also possible that the kinds of interactions that take place on Facebook may be relatively "empty," providing only short bursts of well-being that fade once participants go offline. If so, it is possible that individuals who use Facebook for positive feedback may form a compulsive habit. Furthermore, using Facebook to fulfill self-presentational, self-esteem, or relational needs exposes people to the possibility of experiencing chronic upward social comparison, as they invariably witness others' self-promoting, attention-seeking behaviors and successful garnering of positive social feedback (Chou & Edge, 2012). Some researchers suggest that such processes may, for example, contribute to the maintenance of eating disorders (Mabe, Forney, & Keel, 2014) or to reductions in subjective well-being (Kross et al., 2013).

Presumably, anxiously attached individuals would be particularly prone to such deleterious side-effects.

We hope the present research, in contributing to an explanation of why people behave actively on social-media sites, provides a springboard for future investigations of these issues and how attachment processes inform them.

Ethical statement

The authors affirm that this research was carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) and that informed consent was obtained from all participants.

Acknowledgements

This research was supported in part by a Student Research Grant and a Faculty Research Fund grant from Union College.

References

- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult romantic attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). New York, NY: Guilford Press.
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science*, 6, 3–5.
- Chou, H., & Edge, N. (2012). "They are happier and having better lives than I am": The impact of using Facebook on perceptions of others' lives. *Cyberpsychology, Behavior, and Social Networking*, 15, 117–121.
- Fraley, R., Roisman, G. I., Booth-LaForce, C., Owen, M., & Holland, A. S. (2013). Interpersonal and genetic origins of adult attachment styles: A longitudinal study from infancy to early adulthood. *Journal of Personality and Social Psychology*, 104, 817–838.
- Hart, J., Hung, J. A., Glick, P., & Dinero, R. E. (2012). He loves her, he loves her not: Attachment style as a personality antecedent to men's ambivalent sexism. *Personality and Social Psychology Bulletin*, 38, 1495–1505.
- Hart, J., Shaver, P. R., & Goldenberg, J. L. (2005). Attachment, self-esteem, worldviews, and terror management: Evidence for a tripartite security system. *Journal of Personality and Social Psychology*, 88, 999–1013.
- Hepper, E., Hart, C., Gregg, A., & Sedikides, C. (2011). Motivated expectations of positive feedback in social interactions. *The Journal of Social Psychology*, 151, 455–477.
- Jenkins-Guarnieri, M. A., Wright, S. L., & Hudiburgh, L. M. (2012). The relationships among attachment style, personality traits, interpersonal competency, and Facebook use. *Journal of Applied Developmental Psychology*, 33, 294–301.
- Jenkins-Guarnieri, M. A., Wright, S. L., & Johnson, B. D. (2013). The interrelationships among attachment style, personality traits, interpersonal competency, and Facebook use. *Psychology of Popular Media Culture*, 2, 117–131.
- John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory—Versions 4a and 5a*. Berkeley, CA: University of California, Berkeley, Institute of Personality and Social Research.
- Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. M. (2002). Internet paradox revisited. *Journal of Social Issues*, 58, 49–74.
- Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D., Lin, N., et al. (2013). Facebook use predicts declines in subjective well-being in young adults. *PLoS ONE*, 8, e69841.
- Noftle, E. E., & Shaver, P. R. (2006). Attachment dimensions and the big five personality traits: Associations and comparative ability to predict relationship quality. *Journal of Research in Personality*, 40, 179–208.
- Mabe, A., Forney, K., & Keel, P. (2014). Do you "like" my photo? Facebook use maintains eating disorder risk. *International Journal of Eating Disorders*, 47, 516–523.
- Michikyan, M., Subrahmanyam, K., & Dennis, J. (2014). Can you tell who I am? Neuroticism, extraversion, and online self-presentation among young adults. *Computers in Human Behavior*, 33, 179–183.
- Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change*. New York, NY: Guilford Press.
- Oldmeadow, J. A., Quinn, S., & Kowert, R. (2013). Attachment style, social skills, and Facebook use amongst adults. *Computers in Human Behavior*, 29, 1142–1149.
- Park, L. E., Crocker, J., & Mickelson, K. D. (2004). Attachment styles and contingencies of self-worth. *Personality and Social Psychology Bulletin*, 30, 1243–1254.
- Plomin, R., & Caspi, A. (1999). Behavioral genetics and personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 251–276). New York: Guilford.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40, 879–891.

- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Shaver, P. R., Schachner, D. A., & Mikulincer, M. (2005). Attachment style, excessive reassurance seeking, relationship processes, and depression. *Personality and Social Psychology Bulletin*, 31, 343–359.
- Seidman, G. (2013). Self-presentation and belonging on Facebook: How personality influences social media use and motivations. *Personality and Individual Differences*, 54, 402–407.
- Simons, D. J., & Chabris, C. F. (2012). Common (mis)beliefs about memory: A replication and comparison of telephone and Mechanical Turk survey methods. *PLoS ONE*, 7, e51876.
- Srivastava, S., & Beer, J. S. (2005). How self-evaluations relate to being liked by others: Integrating sociometer and attachment perspectives. *Journal of Personality and Social Psychology*, 89, 966–977.
- Valkenburg, P. M., & Peter, J. (2007). Preadolescents' and adolescents' online communication and their closeness to friends. *Developmental Psychology*, 43, 267.