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Abstract

This manuscript details the construction of a measure of Facebook relational maintenance behaviors. The first study generated an item pool by drawing from previous qualitative investigations, and adapting an established relational maintenance scale. Participants were then invited to evaluate these items in order to establish face validity. During study two, participants were asked how often they used the behaviors represented in these items to maintain a specific friendship. Exploratory factor analysis was conducted to determine the underlying structure of these items, and three latent factors emerged, *social contact, response-seeking,* and *relational assurances*. This factor structure was then assessed using confirmatory factor analysis during phase three. Study three participants were also asked to complete measures of friendship quality, Facebook intensity, and online social communication. The relationship of the three factors of Facebook relational maintenance to friendship quality, Facebook intensity, and online social communication suggests convergent and discriminant validity for the Facebook relational maintenance measure.

Development and Validation of a Facebook Relational Maintenance Measure

People enact behaviors to maintain the existence and quality of their relationships (Dindia, 2003). Relational maintenance behaviors can be strategic or routine in nature, and are prevalent in varied relational contexts (Canary, Stafford, Hause, & Wallace, 1993). Early work on the measurement of relational maintenance focused primarily on face-to-face behaviors (e.g., Stafford & Canary, 1991); yet, the proliferation of computer-mediated communication such as social network sites (SNS), has provided new fora for relational maintenance (Walther & Ramirez, 2009).

SNS serve important relational functions for users worldwide, and relational maintenance is considered to be one of the most important reasons for using SNS (Bryant, Marmo, & Ramirez, 2011; Debatin, Lovejoy, Horn, & Hughes, 2009; Ellison, Steinfield, & Lampe, 2011; Walther & Ramirez, 2009). Facebook continues to outperform other SNS in terms of number of users (Pew Research Center, 2013) making it an ideal place to examine relational processes. While traditional relational maintenance scales offer a starting point for considering maintenance behaviors that can be communicated via SNS, the unique affordances of SNS provide new maintenance opportunities that are worthy of consideration. Unfortunately, the measurement of SNS relational maintenance is inconsistent across studies and lacks empirical validation. Hence, the present study seeks to design and validate a Facebook Relational Maintenance Measure (FRMM) using items gleaned from traditional relational maintenance scales (e.g., Stafford, 2011) and SNS relational maintenance research (e.g., Bryant and Marmo, 2010; Cowden, 2012). The FRMM helps to unify relational and SNS measures of relational maintenance, and provides a validated scale that can be applied by researchers of Facebook and other SNS.

Relational Maintenance via Facebook

SNS allow users to display their identity, articulate social connections, and communicate with others in their network (boyd & Ellison, 2007). The use of SNS is pervasive among American adults and teens. More than 73% of online adults utilize SNS (Duggan & Smith, 2013), with 48% using SNS on an average day (Brenner, 2012). Ninety-two percent of these SNS users have a Facebook account (Hampton, Goulet, Rainie, & Purcell, 2011). Additionally, 94% of teens have a Facebook profile, with 81% saying Facebook is the profile they use most often (Pew Research Center's Internet & American Life Teen-Parent Survey, 2012). Facebook surpassed 1.3 billion active users as of April 2013 (Facebook.com), and trails Google as the world's second most trafficked website (Alexa.com). Approximately 618 million people visit Facebook on a daily basis (Facebook.com), which suggests that the site is a habitual part of users' daily lives. Given Facebook's steadfast usage and focus on interpersonal relationships, it is a well-suited site for relational maintenance research.

Relational maintenance consists of strategic and routine behaviors that help people keep their relationships in desirable states (Canary & Stafford, 1994). Early research by Stafford and Canary (1991) developed a five-item typology called the Relational Maintenance Strategies Measure (RMSM). Maintenance strategies were inductively developed from married and dating participants' response to an open-ended question, "What do you do to maintain a satisfactory relationship?" Each strategy consists of specific behaviors that people engage in to maintain their relationships. Within the RMSM, *positivity* involves efforts toward pleasant and cheerful communication; *openness* involves acts of self-disclosure; *assurances* include behaviors that indicate a relationship will persist; *social network* behaviors integrate a partner with other social ties; *task sharing* involves performing routine tasks and chores together. Later, Stafford (2011)

refined the RMSM creating the Relational Maintenance Behavior Measure (RMBM), which

included the additional strategies of *understanding* (e.g., showing sympathy and forgiveness) and

relational talk (e.g., communication about the relationship). The RMSM and additional

behaviors have guided relational maintenance research; however, the extent to which these

typologies remain valid within the SNS context remains understudied.

Walther and Ramirez (2009) labeled relational maintenance as "the greatest utility of

social networking systems" (p. 302), with other scholars echoing the sentiment that relational

maintenance is the primary function of SNS such as Facebook (Bryant et al., 2011; Debatin et

al., 2009; Ellison et al., 2011). Facebook is a powerful relational maintenance tool because it is

convenient, overcomes spatial distances, and reduces communication costs (Cowden, 2012;

Dwyer, 2007). Moreover, asynchronous Facebook communication provides extra time for users

to create and edit messages that maximize their self-presentational goals (O'Sullivan, 2000;

Walther & Boyd, 2002). As a result of these features, Facebook users can maintain relationships

with a large number of people with relative ease.

Measuring Maintenance on Facebook. There is a well-documented need to understand

Facebook relational maintenance behaviors (Bryant et al., 2011; Tong & Walther, 2011; Walther

& Ramirez, 2009), but disagreement exists regarding the best approach. One approach has

applied traditional relational maintenance measures to online environments (Houser, Fleuriet, &

Estrada, 2012; Ledbetter, 2010). We argue that this represents a primarily deductive approach

because these studies operate under the assumption that general maintenance behaviors can be

accurately extended to specific online contexts. For example, Ledbetter (2010) adapted Stafford

and Canary's (1991) RMSM to study instant messaging, and concluded that, "the RMSM is a

statistically sound tool for future online communication research" (p. 30). Houser and colleagues

(2012) took a similar approach by utilizing the RMSM to study multiple online environments, including SNS. It, therefore, appears that the RMSM, and updated versions such as Stafford's (2011) RMBM, might be successfully applied to study Facebook relational maintenance.

The deductive approach of applying existing relational maintenance measures has provided useful insight, but is limited because offline communicative actions are not necessarily replicated in online behaviors (Tong & Walther, 2011). Certain offline relational maintenance behaviors, such as sharing tasks, might not easily translate to online social environments, such as SNS. For example, in Ledbetter's (2010) study, task sharing was found to occur less frequently via instant messaging than face-to-face. Conversely, the openness strategy has been found to be more critical for online relational maintenance than offline (Rabby, 2007). Moreover, SNS such as Facebook might provoke the creation of entirely new behaviors that qualify as relational maintenance. Indeed, many SNS users report that browsing a friend's profile makes them feel closer to that friend, even if one-on-one communication does not occur (Bryant & Marmo, 2010). This behavior might qualify as relational maintenance, despite lacking the active communication that one would expect from traditional offline conceptualizations (e.g., Canary et al., 1993). Utilizing a purely deductive approach to the development of a Facebook relational maintenance measure might fail to capture new forms of maintenance behaviors that SNS afford.

A second approach to the study of SNS is evident in scholars' attempts to inductively develop a measure of Facebook relational maintenance (Bryant & Marmo, 2010; Marmo & Bryant, 2010; Cowden, 2012). Cowden (2012), for example, conducted qualitative interviews to thematically analyze Facebook behaviors. Likewise, Bryant and Marmo (2010) carried out focus groups in which college students discussed their Facebook behaviors. The resulting relational maintenance scale included SNS-specific behaviors such as "poking" someone, utilizing

Facebook applications and games, and passively keeping surveillance over a friend's updates by scrolling via the newsfeed. The authors, however, noted that their inductively generated list of Facebook relational maintenance behaviors closely resembled existing offline typologies. For example, posting a funny Facebook wall comment might qualify as a positivity behavior and sharing one's thoughts in a status update is a form of openness. Hence, Bryant and Marmo (2010) and Marmo and Bryant (2010) ultimately utilized Canary et al.'s (1993) relational maintenance typology to categorize their Facebook specific behaviors.

In sum, several relational maintenance measures exist, but have problems precluding their direct application to the SNS context. The first issue deals with the aforementioned lack of consistency in how Facebook relational maintenance measures are developed. Both deductive and inductive approaches are useful, but their divergent results make it difficult to align the existing body of SNS relational maintenance research. The present study will address this issue by deductively applying traditional relational maintenance items from Stafford's (2011) RMBM to the Facebook context, while also including items inductively developed for the Facebook context by Bryant and Marmo (2010) and Cowden (2012). Doing so should help provide a robust set of potential SNS relational maintenance behaviors for analysis.

The second problem with existing research lies in the lack of an empirically validated SNS relational maintenance measure. For example, Dainton (2013) utilized Marmo and Bryant's (2010) openness and positivity items, with a newly developed set of Facebook assurance items. While the items held a three-factor structure during CFA, Dainton did not include any additional RMBM strategies, leaving only a partial understanding of the larger scope of potential SNS relational maintenance. Marmo and Bryant (2010) present a more comprehensive set of six Facebook relational maintenance strategies, but their items failed to hold a six-factor structure

when McEwan (2013) put them through quantitative factor analysis tests. In light of these conflicting results, the present study aims to determine if there is a unique, replicable factor structure underlying SNS relational maintenance behaviors.

For research to effectively move forward in this area, and to provide consistency across studies for the purpose of replication and comparison, it is necessary to not only understand the relational maintenance strategies being utilized on SNS such as Facebook, but also to establish the psychometric properties of items. A valid Facebook relational maintenance measure must not only possess a sound factor structure, but should also demonstrate convergent and discriminant validity in line with previous relational maintenance research. Therefore, the present study seeks to empirically validate a Facebook relational maintenance measure that might also serve as a model or springboard for investigators studying relational maintenance on other SNS and socially oriented websites.

Study One

The purpose of study one was to develop a list of Facebook relational maintenance items, and examine them for face validity. Items from previous deductive and inductive approaches of studying Facebook relational maintenance were gathered in order to exhaustively represent the Facebook relational maintenance behaviors from previous research. We asked a small sample of participants to report whether they perceived the items as behaviors that would actually be helpful for maintaining relationships. We also examined how frequently Facebook users engaged in the maintenance behaviors and tested whether the frequency of use was correlated with closeness. Previous research has shown relationships at varying levels of closeness use similar maintenance strategies (Canary et al., 1993), however closer relationships enact them more frequently. This effect has been established in both offline (Canary et al., 1993; McEwan &

Guerrero, 2012; Oswald & Clark, 2003; Oswald, Clark, & Kelly, 2004) and online (Marmo &

Bryant, 2010; McEwan, 2013) maintenance studies. Thus, we retained items participants

reported actually using, considered to be useful for relational maintenance, and showed the

relationship with closeness associated with relational maintenance behaviors. Furthermore,

participants were invited to assist in the development of the items by commenting about

confusing wording, pointing out the behaviors that did not seem to apply to the Facebook

environment, and suggesting additional Facebook relational maintenance behaviors.

Method

   Participants and procedure. Participants for study one were recruited using a snowball

sample on Facebook. All co-investigators posted a recruitment script to their Facebook walls

encouraging people in their social networks to participate and repost the recruitment script. The

initial sample consisted of 68 participants, 27.9% ($n = 19$) of whom were male and 72.1% ($n =$

49) of whom were female. The average age of the participants was 34.36 ($SD = 9.90$).

   After providing informed consent, participants were asked to open their Facebook page,

click on the Event tab, and select the Facebook friend whose birthday was coming up next on

their events calendar. Participants were directed to report on this Facebook friend throughout the

remainder of the survey in order to achieve variance regarding closeness levels. One participant

reported on a romantic partner, five participants reported on an immediate family member, seven

participants reported on a non-immediate family member, six participants reported on a close

friend, 20 participants reported on a casual friend, 25 reported on an acquaintance, two reported

on a co-worker, and two reported on a former student.

   Instrumentation. *Facebook relational maintenance* items were culled from existing

research that utilized both deductive and inductive approaches to the measurement of Facebook

relational maintenance. The deductive source of relational maintenance items involved adapting

24 items from five of the seven factors in Stafford's (2011) RMBM (i.e., positivity,

understanding, assurances, relational talk, and self-disclosure). Participants were asked to answer

each traditional item (e.g., act positively) in relation to his/her Facebook communication with the

identified friend. No items were included from the task sharing and network factors because

these behaviors did not have direct translations to the Facebook environment. For example,

friends might use Facebook to make plans to share tasks, but are unlikely to accomplish tasks via

Facebook. Communication with other network members, on the other hand, is an unavoidable

but passive component of the Facebook experience so RMBM behaviors listed such as to "spend

time with our families" did not easily adapt to the Facebook environment.

The inductive approaches were represented using items from Bryant and Marmo's (2010,

see also Marmo & Bryant, 2010) work with qualitative focus groups and Cowden's (2012)

interview investigation of Facebook relational maintenance. Twenty-two items came from

Bryant and Marmo's (2010) set of six Facebook relational maintenance behaviors. Fourteen

items were developed based on Cowden's qualitative categories; including, "I post

sensationalized updates" and "I feel connected to my friend when I read their status update."

Two additional items were included from Ellison et al.'s (2011) work on Facebook relationship

formation and maintenance, "I browse my friend's profile," and "I contact my friend using

Facebook."

In total, 62 items were used to assess potential Facebook relational maintenance

behaviors. Participants evaluated each item twice. At the beginning of the survey they were

asked to report how frequently they engaged in each of these behaviors with their relational

partner on a 7-point Likert-type scale (1 strongly disagree; 7 strongly agree). At the end of the

survey, participants were asked whether each particular behavior would be a helpful way to maintain their relationship on a 6-point Likert-type scale (1 not at all helpful; 6 very helpful).

Closeness was measured using Aron, Aron, & Smollan's (1992) pictorial Inclusion of Other in Self (IOS) measure, which presents seven Venn-like diagram of closeness and respondents indicate which pair of overlapping circles best represents the level of closeness in their relationship. Using this single-item measure, a higher score is indicative of greater relational closeness between partners.

Item Analysis and Retention

Each of the 62 items was analyzed in three ways to determine its fitness for inclusion in a Facebook relational maintenance measure. First, we asked participants to identify any items that were confusing, and offer feedback regarding how to clarify the measure. Items that received multiple comments were considered for deletion. For example, multiple participants noted they felt items asking if an individual "acts" a certain way did not translate well to Facebook.

Second, we asked participants if they thought the behaviors in the items would be helpful for maintaining their relationship. Items under the mean for helpfulness ($M = 2.92$, $SD = 1.32$) were considered for deletion from the final scale.

Third, existing research indicates the enactment of relational maintenance is positively associated with relational closeness (Ledbetter, Stassen-Ferrara, & Dowd, 2013; McEwan & Guerrero, 2012). Each item was, thus, examined for its correlation with closeness. All items were positively correlated with closeness. Items sharing less than 10% of the variance with closeness were considered for deletion. In addition, each item was assessed with an independent samples *t*-test to determine whether the item discriminated between close friends and acquaintances. Items that did not discriminate between close friends and acquaintances were considered for deletion.

Items that were problematic on two or more evaluations were eliminated from the scale.

Out of the 62 original items, 44 were retained for further investigation (see Table 1).

Study Two

The purpose of study two was to investigate the number and structure of maintenance

strategies represented in the maintenance behavior items analyzed in study one. Study one

investigated the prevalence and usefulness of Facebook relational maintenance behaviors in a

variety of relational contexts. However, it seemed prudent to have consistency in the type of

relationship on which participants reported. Friends, for example, might utilize Facebook

differently than romantic partners. Focusing on one relational context can, therefore, control the

potential error that could result from participants reporting on different types of relationships.

Communication via Facebook is particularly well suited to the maintenance of friendships

(Bryant & Marmo, 2012; Houser et al, 2012; McEwan, 2013). The most frequent communication

on Facebook occurs amongst friends, as opposed to significant others and family members

(Houser et al., 2012). Hence, study two further developed the Facebook relational maintenance

scale by investigating the 44 items derived from study one within the context of friendships.

Method

Participants and procedure. Participants ($N = 270$) were recruited from introductory

communication courses at a large southwestern university, and were given extra-credit for

completing an online survey. Participants (52.2% male, 47.4% female) were primarily young

adults ($M = 20.27$, $SD = 3.00$). In regard to ethnicity, 62.2% of the participants identified as

being white, 14.8% as Asian, 7.4% as Hispanic/Latino, 3.3% as Black/African-America, and

12.2% as multi-racial or other.

After giving consent, participants were instructed to consider a friend with whom they use Facebook whose first name began with the same first letter as their own. This instruction was to achieve greater variance in terms of friendship closeness ($M = 3.81$, $SD = 1.82$ on a 1-7 scale, Skew = .24, Kurtosis = - .97). Of the participants, 34.4% reported on a male-male relationship, 33.3% reported on a cross-sex relationship, and 30.4% reported on a female-female relationship.

Instrumentation. *Facebook relational maintenance* was assessed using the 44 items derived from Study 1. Participants were asked how often they engaged in each behavior on Facebook with their friend on a 7-point Likert-type scale (1 strongly disagree; 7 strongly agree).

Results and Discussion

To determine the latent factor structure of the Facebook relational maintenance scale, the 44 items were analyzed using principal axis factoring with promax rotation (see Costello & Osborne, 2005). An oblique rotation was used because the maintenance strategies of both the RMSM and RMBM are often correlated, so it was reasonable to assume Facebook relational maintenance strategies would also correlate. Factor retention was based on parallel analysis comparison to 95th percentile eigenvalues from 100 randomly generated correlation matrices (Hayton, Allen, & Scarpello, 2004; Patil, Singh, Mishra, & Donovan, 2007). Items with minimum loadings of .32 were retained (Tabachnick & Fidell, 2001). Items cross-loading on more than one factor (had loadings greater than .32 on more than one factor) were dropped.

The parallel analysis comparison for the final solution suggested three factors should be retained, so extractions were constrained to three factors. The final three-factor solution comprising 26 items was retained based on a comparison to 95th percentile eigenvalues (Bartlett's $\chi^2(325) = 5920.72$, $p < .001$, KMO = .948) (See Table 2).

The first factor was labeled *social contact* ($M = 3.94$, $SD = 1.48$, $\alpha = .94$) as the behaviors incorporated in these items reflect reaching out to a Facebook friend. The second factor was labeled *response-seeking* ($M = 2.77$, $SD = 1.49$, $\alpha = .94$). These items reflect posting broadcast-style mass messages Facebook users hope will maintain relationships by attracting attention from their friend. The third factor labeled *relational assurances* ($M = 2.99$, $SD = 1.72$, $\alpha = .96$) was comprised of items specifically tied to assessment and progression of the relationships. Assurances have been found to be important both for romantic (Canary et al., 2002; Canary et al., 1993) and platonic (McEwan & Guerrero, 2012) relationships. Although our initial examination of the factor structure was exploratory, the results are encouraging because they are similar to McEwan's (2013) study, which produced a two-factor structure of sharing (i.e., broadcast type maintenance tactics such as in *response-seeking*) and caring (i.e., targeted, interpersonal messages such as in *social contact*) using Bryant and Marmo's (2010) items.

Study Three

An additional data set was collected and analyzed using confirmatory factor analysis procedures to affirm the factor structure found in study two. In study three, we also investigated the convergent and discriminant validity of the measure. Maintenance behaviors have often been used to predict relational quality variables (Stafford & Canary, 1991; Stafford, 2011). Thus, we argue that the relational quality variables of satisfaction, liking, commitment, and closeness should be correlated with a valid measure of Facebook relational maintenance. For discriminant validity, we argue Facebook relational maintenance behaviors, although related to general Facebook use and a desire for online social communication, should explain variance in friendship quality that is distinct from variables that reflect general use.

Method

Participants and procedure. Participants ($N = 319$) were recruited from communication courses at four universities (two midsize midwestern universities, a small northeastern college, and a private west coast university), and were given extra-credit for completing the online survey. Participants (45.8% male, 54.2% female) were primarily young adults ($M = 21.16$, $SD = 2.55$). In regard to ethnicity, 69.6% of the participants identified as being white, 3.1% as Asian, 5% as Hispanic/Latino, 17.6% as Black/African-America, and 4.1% as multi-racial or other.

After giving consent, participants were instructed to consider a friend using the same procedure as study two in order to achieve variance in terms of friendship closeness ($M = 3.83$, $SD = 1.95$ on a 1-7 scale, Skew = .20, Kurtosis = - 1.18). In regard to the selected friendship, 26.4% of participants reported on a male-male relationship, 37.7% reported on a cross-sex relationship, and 35.8% reported on a female-female relationship.

Instrumentation. *Facebook Relational Maintenance* was assessed using the 26 items derived from study two. Three new items were included specifically addressing using the "like" function in Facebook and were included with the *social contact* factor. A total of 29 items were assessed. Similar to study one and two, participants were asked how often they engaged in a particular behavior with their friend on a 7-point Likert-type scale.

Convergent validity variables. *Liking* was measured using Veksler and Eden's (2008) 6-item liking measure (e.g. "I think that future interactions with this person would be pleasurable"; $M = 4.78$, $SD = 1.44$, $\alpha = .90$). Items were assessed on a 7-point Likert-type scale (1 strongly disagree; 7 strongly agree).

Norton's (1983) 6-item quality of marriage index (QMI) was adapted to assess relational *satisfaction* (e.g., "My relationship with my friend is very stable"; $M = 4.64$, $SD = 1.67$, $\alpha = .95$). Items were assessed on a 7-point Likert-type scale (1 strongly disagree; 7 strongly agree).

Rusbult's (1983) 4-item global measure of commitment was adapted to measure *commitment*. The term "Relationship" was changed to "friendship," and items were assessed on a 7-point Likert-type scale (1 low commitment; 7 high commitment). One item was dropped from further analyses due to low correlations with the other three items. The mean score for the remaining three items was 4.42 ($SD = 1.73$, $\alpha = .88$).

Closeness was assessed using Aron et al.'s (1992) single-item pictorial inclusion of other in the self (IOS) measure ($M = 3.83$, $SD = 1.95$).

Discriminant validity variables. In order to determine that the Facebook relational maintenance scale was not simply measuring Facebook usage or desires for online social communication, Ellison et al.'s (2007) Facebook intensity measure and Ledbetter et al.'s (2011) online social communication measure were included for discriminant validity analysis.

Facebook intensity (FBI) ($M = 3.70$, $SD = 1.27$, $\alpha = .88$) was assessed using Ellison et al.'s (2007) measure, which indicates how much participants have integrated Facebook into their daily lives and how emotionally connected they are to Facebook. Six of the FBI items were measured with a 7-item Likert-type scale (1 strongly disagree; 7 strongly agree). The last two items of the scale ask how many Facebook friends one has, and how many hours per day one spends on Facebook. These two items were transformed by taking the log and transforming to a z-score prior to averaging all items due to differences in the item scale ranges.

Online social communication (OSC) ($M = 3.91$, $SD = 1.22$, $\alpha = .70$) was measured using Ledbetter et al.'s (2011) scale. The OSC measures how much an individual enjoys and relies on using the internet for social purposes. Items such as "Without the Internet, my social life would be drastically different" were measured on a 7-point Likert-type scale (1 strongly disagree; 7 strongly agree).

Results

      Confirmatory Factor Analysis. A second order confirmatory factor analysis was

conducted. The first order latent factors were *social contact, response-seeking, and relational*

assurance. The second order latent factor was *Facebook relational maintenance.* Model fit for

this and all subsequent models was considered adequate if the CFI was greater than .95 (Hu &

Bentler, 1999) and the RMSEA was below .80 (taking into account the associated confidence

interval) (Browne & Cudeck, 1993; Kline, 2005). The initial fit of the model was not adequate,

$\chi^2(272) = 1414.028, p < .001 \; \chi^2/df = 5.20$, CFI = .86, RMSEA = .115 (.109, .121). Based on

analyses of factor loadings and standardized residual covariances, five items were trimmed from

social contact, three items were trimmed from *response-seeking*, and two items were trimmed

from *relational assurances*. The resulting fit of the three-factor model was adequate, $\chi^2(101) =$

284.60, $p < .001$ CMIN/DF = 2.82, CFI = .964, RMSEA = .076 (.065, .086) (see Table 4).

      In order to confirm the three-factor solution as the best possible model, three additional

models were estimated: a model where the social contact and response-seeking items were

combined into one factor, $\chi^2(118) = 1160.82, p < .001$ CMIN/DF = 9.837, CFI = .800, RMSEA

= .167 (.158, .176); a model where social contact and relational assurance items were combined

into one factor, ($\chi^2(118) = 864.19, p < .001$ CMIN/DF = 7.324, CFI = .857, RMSEA = .141

(.132, .150); and a model where all three factors were loaded on to a single factor ($\chi^2(135) =$

1585.50, $p < .001$, CMIN/DF = 13.324, CFI = .712, RMSEA = .197 (.188, .206)). Based on χ^2

difference tests, the fit for the three-factor model was significantly better than when social

contact and response-seeking were combined, $\chi^2_D(17) = 876.22, p < .001$, when social contact

and relational assurances were combined, $\chi^2_D(17) = 579.59, p < .001$, or when all three factors

were combined, $\chi^2_D(34) = 1300.90, p < .001$. Reliability coefficients associated with both the a

priori factors and the re-constituted factors were high (*social contact* α = .94, *response-seeking* α = .96, *relational assurances* α = .95, *social contact/response-seeking* α = .95, *social contact/relational assurances* α = .95, *social contact/relational assurances/response-seeking* α = .96).

Convergent validity. In order to examine convergent validity, bivariate correlations were examined to determine that each Facebook relational maintenance strategy correlated with relational quality indicators (See Table 5).

Social Contact. The social contact maintenance factor was correlated with all four relational quality variables: liking, $r(313) = .65$, $p < .001$, satisfaction, $r(313) = .72$, $p < .001$, closeness, $r(318) = .53$, $p < .001$, and commitment, $r(313) = .73$, $p < .001$.

Response-Seeking. The response-seeking maintenance factor was correlated with all four relational quality variables: liking, $r(313) = .33$, $p < .001$, satisfaction, $r(313) = .42$, $p < .001$, closeness, $r(318) = .34$, $p < .001$, and commitment, $r(313) = .47$, $p < .001$.

Relational Assurance. The relational assurances maintenance factor was correlated with all four relational quality variables: liking, $r(313) = .47$, $p < .001$, satisfaction, $r(313) = .57$, $p < .001$, closeness, $r(318) = .46$, $p < .001$, and commitment, $r(313) = .61$, $p < .001$.

Discriminant validity. An examination of bivariate correlations between the maintenance strategies, the relational quality indicators, and the FBI and OSC assisted in determining discriminant validity. The FBI and OSC were significantly but not highly correlated with the maintenance strategies (r^2 ranged from .02 to .12). This suggests that, as expected, there is a small amount of overlap between Facebook usage, desire for online social communication, and the Facebook relational maintenance strategies. However, the Facebook relational maintenance strategies appear to be capturing additional variance that is not related to simply

using Facebook or desiring online social communication. In order to determine whether the

Facebook relational maintenance strategies were significantly better predictors of relational

quality indicators than the FBI and the OSC, we conducted Fisher's *z* transformation tests.

Facebook relational maintenance strategies were significantly better predictors of relational

quality than general usage of Facebook or online communication as measured by the FBI and the

OSC (See Table 6). In every case but one, the maintenance factors were more strongly correlated

with the relational quality indicators than the FBI or the OSC. However, response-seeking was

not a better predictor of liking than the FBI.

Discriminant validity was also assessed via AMOS. An alternative model was examined

where FBI and OSC were loaded onto the Facebook relational maintenance latent factor as if

they were additional factors of Facebook relational maintenance. Although the overall model fit

was good, the factor loadings for FBI and OSC were .31 and .24 respectively. In comparison, the

factor loadings in our three-factor model were .84 for social contact, .78 for response-seeking,

and .90 for relational assurances. It was, thus, concluded that general Facebook use and general

use of online communication are related but conceptually distinct from Facebook relational

maintenance behaviors.

Discussion and Limitations

The present study represents the construction and validation of a Facebook relational

maintenance measure (FRMM). A 62-item initial item pool was established based on the

published work of Bryant and Marmo (2010), Cowden (2012), and the RMBM (Stafford, 2011).

Three separate data collections and analyses were conducted to evaluate the items, investigate

the underlying latent factor structure, and confirm the final three-factor solution, consisting of

social-contact, response-seeking, and *relational assurances.*

The *social contact* maintenance items involve communication tactics targeted toward reaching out to a specific individual. This tailored communication approach reflected by the items in the *social contact* maintenance factor reflects attempts to connect with and maintain a relationship with a unique and targeted individual. Given that these behaviors involve unique communication, social contact maintenance might be linked with closer and higher quality relationships. Future research should test this speculation.

The *response-seeking* maintenance factor consisted primarily of items that suggested using broadcast-style messages to maintain one's friendships. People appear to send these messages in hope others in their friend list will reach out to them. We suspect successful attempts might be linked to positive relational outcomes. However, ignored attempts may have a detrimental effect on friendship quality.

The third factor, *relational assurances* maintenance, consists of items that reflect discussing the meaning and the future of one's friendship on Facebook. All of the items in this factor were adapted items from Stafford's (2011) RMBM. These items reflect both the assurances and relational talk factors of the RMBM, thus we labeled this factor relational assurances. Although, some may associate relational talk with romantic relationships, relational discussions can be important for friends as well. Indeed, due to the more tenuous nature of friendships, relational talk may be particularly important for keeping a friendship in existence. Facebook may be an opportunistic medium for people to affirm their friendships.

The convergent and discriminant validity of all three factors was investigated by exploring the associations that maintenance factors share with other variables. Theoretically, relational maintenance should be related to improvements in relational quality. All three factors –

social contact, *response-seeking*, and *relational assurances* – were related to greater liking, satisfaction, closeness, and commitment.

To establish the discriminant validity of our scale, we posited Facebook relational maintenance behaviors should be distinct from general internet and Facebook usage. Analysis showed the FBI and the OSC shared a limited amount of variance with the FRMM suggesting the FRMM is measuring an underlying variable that is conceptually different from emotional connectedness to Facebook and a desire for online social connection. In addition, maintenance behaviors should predict relational quality in a way general usage of Facebook and having a preference for online social communication would not. Our analysis also showed the FRMM was a much better predictor of relational quality variables than either the FBI or the OSC. Thus, our study indicates that the FRMM is measuring maintenance behaviors that are unique from general computer-mediated communication.

The existence of a measure for Facebook relational maintenance behaviors will help researchers explore questions related to how people use Facebook in their interpersonal relationships. For example, researchers could examine how Facebook relational maintenance affects relational quality in a variety of relationships. Researchers could also explore how maintenance behaviors enacted on Facebook integrate with other maintenance strategies. Multiplexity, or the use of multiple types of media with network ties, has been shown to affect closeness between people such that those who use more media types are closer (Haythornthwaite, 2005). The FRMM could be used in conjunction with other maintenance scales in order to explore how people use both offline and online maintenance behaviors to maintain relationships. The FRMM will help support higher quality research on these and other interesting questions regarding the maintenance of social relationships.

A concern with any scale that is related to a specific medium is that as the affordances of the medium change the scale may become invalid. The FRMM does include the major affordances of Facebook such as posting on the wall, the ability to send private messages, browse profiles, and post status updates. However, these affordances are included in the very definition of an SNS (see boyd & Ellison, 2007, for a thorough discussion), which indicates that is should be applicable to other SNS. The FRMM is also strongly grounded in the content of messages used for relational maintenance. For example, items refer to being cheerful, seeking attention, or discussing the nature of the friendship. The content of these messages can be conveyed on Facebook, but these maintenance strategies could also be utilized on other current and future SNS. We hope these features of the scale (the general approach to affordances combined with specific message content) will allow it to survive new iterations of the Facebook platform and transfer to other SNS. For example, much of the scale would apply to similar SNS such as Google+ or Orkut, as these SNS also have affordances similar to public wall posts, status updates, and private messages that would allow people to engage in relational maintenance. Even the more professionally oriented SNS, LinkedIn, allows for the liking of particular status updates and sending private messages. For SNS that are structured differently, the affordance items may need to be adapted, but the message content items can remain the same. Hence, future research might amend the FRMM developed in the present study to study a variety of SNS or similar online contexts.

Conclusion

There has been consistent growth in scholars' interest in understanding how people use Facebook to maintain relationships (Bryant & Marmo, 2010; Craig & Wright, 2012; Dainton, 2013; Ellison et al., 2013; Houser et al., 2012; Ledbetter, 2010; McEwan, 2013; Walther &

Ramirez, 2009). The present study developed and validated the FRMM, and we hope the existence of this scale will help further these investigations of relational maintenance on Facebook as well as other current or emerging SNS. In addition, the establishment of a quality relational maintenance measure will help researchers compare and contrast findings across studies, and, therefore, serves as a springboard for additional research.

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Table 1.
Initial Item List from Study 1

Items from Bryant and Marmo(2010)

View this person's profile to monitor his/her interactions and watch out for his/her best interests.
Send cheerful messages.
Send messages I think s/he will enjoy
Update my profile information and status so s/he can stay up-to-date on my everyday life.
Play Facebook games
Respond in a timely manner when s/he sends me a Facebook message
Pay attention to this person's updates as a way to know what they are doing without actually talking to them.
Coordinate future interactions with this person.
Offer condolences and support when s/he posts bad news.
Monitor their Facebook page.
Offer congratulations when s/he shares good news in a post.
Post on their Facebook wall.
Tag them in a Facebook status.
Comment on his/her profile so other users will see our connection.
Post photos so s/he can share the experience even though s/he was not present.
Share my thoughts.
Reflect on experiences I have shared with him/her.
Wish him/her a happy birthday.
Send private messages.
Communicate using multiple components of Facebook.
Pay attention to his/her updates when scrolling through the newsfeed.
Seek support by posting emotional news in hopes s/he responds.
Post on his/her wall to make him/her feel special.

Items adapted from Cowden (2012)

Post a status update to get a response from this person.
Post a status update to receive attention from this person.
Post a status update to connect to this person.
Post a status update to elicit a response from this person.
Post sensationalized status updates.
Post emotional status updates.
Tag this person in posts.
Post content only this person understands (ex: inside jokes).
Update my status regarding "big" events in my life.
Post dramatic status updates.
Feel connected to this person when I read their status updates.
Update my status to inform this person about my everyday life.
Comment on this person's status updates to show I care.
Comment on this person's status updates to highlight things we have in common.
Comment on this person's status updates because they have commented on my update.
Update my profile so s/he will stay up-to-date on my everyday life.

Items adapted from RBMS (Stafford, 2011)

Act positively
Act upbeat when we communicate together
Act cheerfully
Act optimistically
Am understanding
Am forgiving
Apologize when I am wrong.

Do not judge
Talk about my fears
Am open about my feelings
Encourage sharing thoughts with each other
Encourage sharing feelings with each other
Discuss the quality of our relationship
Tell them how I feel about the relationship
Talk about our relationship
Talk about future events.
Talk about our plans for the future.
Tell them how much they mean to me.
Show them how much they mean to me.
Post on this person's wall to make him/her feel special.
Send cheerful messages I think s/he will enjoy.

Items from Ellison, Steinfield, & Lampe (2011)
Browse this person's profile.
Contact them

Items retained in the final measure are in bold.

Table 2
Pattern Matrix for Final Factor Solution for Study Two

Factor One: Social Contact	1	2	3
I offer congratulations when s/he shares good news in a post.	**.908**	.041	-.173
I wish him/her a happy birthday.	**.857**	-.245	-.112
I offer condolences and support when s/he posts bad news.	**.851**	-.042	-.021
I respond in a timely manner when s/he sends me a Facebook message.	**.824**	-.202	-.029
I send messages I think s/he will enjoy.	**.770**	.072	.045
I reflect on experiences I have shared with him/her.	**.686**	.037	.195
I share my thoughts with this person.	**.682**	-.035	.270
I coordinate future interactions with this person.	**.639**	.027	.183
I post on their Facebook wall.	**.638**	.321	-.092
I send this person cheerful messages.	**.620**	.081	.139
I send private messages.	**.622**	.060	.197
I tag them in a Facebook status.	**.559**	.220	.029
I update my status regarding "big" events in my life.	**.524**	.267	-.147
I browse this person's profile	**.356**	.135	.231

Factor Two: Response-Seeking			
I post a status update to get a response from this person.	-.162	**1.016**	.013
I post a status update to receive attention from this person.	-.206	**.976**	.104
I update my status to inform this person about my everyday life	.022	**.890**	-.079
I post a status update to connect to this person.	.062	**.839**	-.014
I seek support by posting emotional news in hopes that s/he responds.	-.095	**.740**	.144
I comment on this person's status updates because they have commented on my update.	.229	**.609**	.043
I post photos so s/he can share the experiences even though s/he was not present	.292	**.539**	.046

Factor Three: Relational Assurances			
I talk about our relationship	-.122	-.019	**1.048**
I tell this person how I feel about our relationship.	-.131	.055	**1.005**
I discuss the quality of our relationship.	.001	.131	**.820**
I talk about our plans for the future.	.130	.006	**.767**
I show this person how much s/he means to me.	.121	.027	**.779**

Table 3
Initial Item List for Study Three

<u>*Social Contact*</u>
I offer congratulations when s/he shares good news in a post.
I wish him/her a happy birthday
I offer condolences and support when s/he posts bad news.
I respond in a timely manner when s/he sends me a Facebook message.
I send messages I think s/he will enjoy.
I reflect on experiences I have shared with him/her.
I share my thoughts with this person.
I coordinate future interactions with this person.
I post on their Facebook wall.
I send this person cheerful messages.
I send private messages.
I tag them in a Facebook status.
I update my status regarding "big" events in my life.
I browse this person's profile.
I like my friend's status updates.
I try to like my friend's status update or comment when they post something important.
I will like my friend's update so they know I saw it.

<u>*Response-Seeking*</u>
I post a status update to get a response from this person.
I post a status update to receive attention from this person.
I update my status to inform this person about my everyday life.

I post a status update to connect to this person.
I seek support by posting emotional news in hopes that s/he responds.
I comment on this person's status updates because they have commented on my update.
I post photos so s/he can share the experience even though s/he was not present.

<u>*Relational Assurances*</u>
I talk about our relationship.
I tell this person how I feel about our relationship.
I discuss the quality of our relationship.
I talk about our plans for the future.
I show this person how much s/he means to me.

Items retained in the final measure are in bold.

Table 4
Structure Coefficients for Facebook Relational Maintenance Measure CFA

	Social Contact $M = 3.88$ $SD = 1.59$ $\alpha = .94$	Response Seeking $M = 2.58$ $SD = 1.65$ $\alpha = .95$	Relational Assurances $M = 2.91$ $SD = 1.87$ $\alpha = .96$
I post on their Facebook wall.	**.82**	.54	.62
I reflect on experiences I have shared with him/her.	**.86**	.55	.64
I offer condolences and support when s/he posts bad news.	**.76**	.50	.57
I coordinate future interactions with this person.	**.80**	.52	.60
I send this person cheerful messages.	**.81**	.54	.62
I send private messages.	**.82**	.55	.63
I like my friend's status updates	**.76**	.50	.58
I try to like my friend's status update or comment when they post something important.	**.84**	.55	.63
I browse this person's profile	**.72**	.47	.54
I post a status update to get a response from this person.	.63	**.96**	.68
I post a status update to receive attention from this person.	.67	**.95**	.62
I post a status update to connect to this person.	.64	**.91**	.60
I seek support by posting emotional news in hopes that s/he responds	.58	**.83**	.55
I talk about our relationship	.71	.66	**.93**
I tell this person how I feel about our relationship	.72	.67	**.95**
I discuss the quality of our relationship	.70	.65	**.93**

Factor loadings for second order latent variable onto Facebook Maintenance were .84 (Social Contact), .78 (Response-Seeking), and .90 (Relational Assurances).

Table 5

Correlations for all Study Three Variables

	SC	RS	RA	L	S	Cl	Co	OSC
Social Contact (SC)	--							
Response-Seeking (RS)	.65***	--						
Relational Assurances (RA)	.72***	.69***	---					
Liking (L)	.65***	.33***	.47***	---				
Satisfaction (S)	.72***	.42***	.57***	.84***	--			
Closeness (Cl)	.53***	.34***	.46***	.49***	.60***	--		
Commitment (Co)	.73***	.47***	.61***	.80***	.93***	.62***	--	
Online Social Communication (OSC)	.24***	.17***	.13**	.17**	.12**	.03	.12*	---
Facebook Intensity (FBI)	.36***	.23***	.22***	.30***	.20***	.14*	.18**	.55***

*$p < .05$, **$p < .01$, ***$p < .001$ (2 tailed)*

Table 6

Fisher r-to-z Transformations

	Liking	Satisfaction	Closeness	Commitment
Social Contact				
Facebook Intensity	5.78***	8.75***	5.61***	9.27***
Online Social Communication	7.49***	9.77***	6.99***	10.03***
Response-Seeking				
Facebook Intensity	.43	3.04**	2.66**	4.07***
Online Social Communication	2.12*	4.06***	4.04***	4.83***
Relational Assurances				
Facebook Intensity	2.49**	5.52***	4.45***	6.54***
Online Social Communication	4.20***	6.54***	5.83***	7.30***

*p < .05, **p < .01, ***p < .001 (1-tailed)
Significance indicates that the maintenance strategy was a significantly stronger predictor of the relational quality variable for that column than the general use variable (e.g. FBI or OSC).