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Abstract

This study explores the relationship between perceived bridging social capital and specific Facebook-enabled communication behaviors using survey data from a sample of U.S. adults (N=614). We explore the role of a specific set of Facebook behaviors that support relationship maintenance and assess the extent to which demographic variables, time on site, total and "actual" Facebook Friends, and this new measure (Facebook Relationship Maintenance Behaviors) predict bridging social capital. Drawing upon scholarship on social capital and relationship maintenance, we discuss the role of social grooming and attention-signaling activities in shaping perceived access to resources in one's network as measured by bridging social capital. Finally, we find that Facebook users report significantly higher bridging social capital than non-users.

Keywords: social network sites, social capital, social grooming, Facebook, relationship maintenance, computer-mediated communication

Cultivating Social Resources on Social Network Sites: Facebook Relationship Maintenance Behaviors and Their Role in Social Capital Processes

Social network sites (SNSs) are web-based communication platforms that support socially relevant interactions among contacts (i.e., "Friends") on the site (Ellison, Steinfield, & Lampe, 2011). Previous research has documented a relationship between use of the SNS Facebook and increased levels of social capital (Burke, Kraut, & Marlow, 2011; Burke, Marlow, & Lento, 2010; Ellison, Steinfield, & Lampe, 2007, 2011; Steinfield, Ellison, & Lampe, 2008; Valenzuela, Park, & Kee, 2009), a form of capital that describes resources embedded in social relationships and interactions within a network (Lin, 2001). Facebook may be especially well-suited for accruing *bridging* social capital, which speaks to the benefits associated with weaker, more heterogeneous social ties such as novel information and broadened world-views (Burke et al., 2011; Ellison et al., 2007, 2011), in part because the site enables users to create "social supernets" of hundreds of social connections (Donath, 2007).

Previous research has examined the relationship between social capital and various Facebook activities, such as habitual use of and emotional connection to the site (i.e., "Facebook Intensity"; Ellison et al., 2007), perceptions of "actual friends" on the site (Ellison et al., 2011), and receiving messages from Friends (i.e., "directed communication"; Burke et al., 2011). In this paper, we extend previous work to focus on the relationship between bridging social capital and users' engagement in a set of specific communication behaviors we have labeled Facebook Relationship Maintenance Behaviors (FRMB). This measure assesses users' response intentionality toward requests or needs articulated by members of their network and to engage in relationship maintenance activities such as wishing a Facebook Friend "Happy Birthday." Although past work has identified a link between generic Facebook use and bridging social

capital, here we unpack specific activities users perform on the site to better explicate the mechanism through which Facebook-enabled behaviors relate to social capital accrual. Specifically, we explore how individuals are using the site to maintain social relationships that are constitutive of social capital and empirically investigate the relationship between relationship maintenance activities on the site and perceptions of social capital. To test the relationship between these variables, this manuscript reports on survey data collected from a sample of non-academic staff at a large Midwestern University (N=614). The survey assessed participants' perceptions of social capital, likelihood of engaging in FRMB, and total and "actual" Friends on the site. We draw upon concepts from social capital and relationship maintenance scholarship and consider the socio-technical affordances of SNSs in our analysis.

Social Capital

Social capital (Bourdieu, 1986; Coleman, 1988) describes the ability of individuals or groups to access resources embedded in their social network. A characteristic of all forms of capital (e.g., social, financial, human, intellectual) is they are convertible to another form of capital (Resnick, 2001). Consequently, social capital is structured upon the maintenance of social relationships and can be converted to other forms of capital such as favors (human capital) or new information (intellectual capital). Reciprocity is a key construct in many treatments of social capital, either at a generalized (e.g., donating blood) or specific (e.g., friends helping each other move) level. Lin (2001) defines social capital as the "investment in social relations with expected returns in the marketplace" (p. 19). In this framing, social capital is created through social interactions and the expectations of future social resource provisions they engender.

Social capital is often separated into "bridging" and "bonding" (Putnam, 2000; Williams, 2006); these categories describe resources embedded in different types of "ties," or relationships

within a network. Ties that connect different clusters within a network, often called "bridging" ties, help propagate novel information across those groups (Burt, 1992). As explicated below, weaker ties (such as a friend of a friend) are more likely to be bridging ties and thus provide access to novel information (Granovetter, 1973) and diverse perspectives (associated with bridging social capital), which are less available from close relationships due to homophily (McPherson et al., 2001). Stronger ties, on the other hand, are characterized by multiple iterative interactions and typically provide access to the more substantive forms of capital conversion associated with bonding social capital (e.g., a financial loan) because of the high levels of trust, support, and intimacy in the relationship. Facebook networks contain both strong and weak ties (Bakshy, Rosenn, Marlow & Adamic, 2012). Because individuals often use multiple channels to communicate with strong ties and fewer channels to interact with weaker ties (Haythornthwaite, 2005), the focus of this study is *bridging social capital* because we are interested in how Facebook enables greater access to resources held by weaker ties, who—unlike strong ties—may not be available through other channels.

Bridging Social Capital

One's ability to access useful informational resources, a key component of bridging social capital, is related to the composition of one's network, one's position in this network, and one's communicative and analytic skillset. Bridging ties—dyadic relationships spanning two clusters—allow novel information to spread across a network more effectively by creating information pathways that close "structural holes" between two otherwise unconnected groups (Burt, 1992). This is why social groups such as bowling leagues, which bring together individuals from different walks of life, are well-suited for information diffusion (Putnam, 2000). Empirical support for this notion is provided by Granovetter (1974), who found weak (bridging)

ties were more likely than strong ties to provide useful information about job prospects. More recent work on social capital suggests network position alone is not responsible for access to resources. For instance, Burt (2010) notes that while network structure creates opportunities for accessing novel resources, individuals must take advantage of their network position through specific skills, such as the ability to communicate with multiple clusters and identify useful opportunities. He argues people are rarely connected to influential clusters by accident, but rather have individual characteristics that help place them in these brokering positions.

Facebook's technical and social affordances lower the cost of maintaining weaker ties (allowing users to maintain broader and more diverse social networks) and facilitate resource exchanges, thus enabling users to cultivate bridging social capital (Ellison, Lampe, Steinfield, & Vitak, 2010). Considering Facebook as a relationship maintenance tool, Tong and Walther (2011) note these sites reduce the cost of relationship maintenance behaviors, presumably resulting in more frequent message exchanges with a wider set of contacts. In addition to facilitating the exchange of relationship maintenance messages, SNSs may also help users access resources from these ties through a range of communication features. Messages can either be directed to a specific individual or subset of individuals or distributed to one's entire network. These broadly distributed updates enable interaction between individuals who are Friends with the poster but may not know one another, and thus can facilitate interaction among "friends of friends"—who are more likely to be sources of novel information (Granovetter, 1973).

The technical process of "Friending" another user (i.e., articulating a connection on a SNS) requires little effort and, once that user has been added, no communication is required to keep the connection "live" unless it is purposely severed. Perhaps because of this, most SNS networks are quite large: the average U.S. adult Facebook user reports 229 Friends (Hampton,

Goulet, Rainie, & Purcell, 2011). Interaction on the site is generally limited to a subset of the full network: recent Facebook server-level data show that, on average, users actively engage with a very small percentage of their network while they "maintain relationships" with 2 to 2.5 times more Friends through passive strategies such as visiting profiles and clicking posted links (Facebook Data Team, 2009a).

Given these interaction patterns, recent scholarship has attempted to differentiate among different kinds of network ties and their relationship to social capital perceptions. Ellison et al. (2011) asked undergraduate Facebook users to report how many total Facebook Friends they had, as well as the number of these contacts they considered "actual" friends. On average, they reported about 25% were actual friends, suggesting that Facebook Friend networks include individuals of varying degrees of perceived relational closeness and that users are able to distinguish between them. Ellison and colleagues (2011) found that while the number of *actual* friends positively predicted bridging social capital, the total number of Facebook Friends did not, suggesting some relationships are more likely to provide access to the diverse information and perspectives that characterize bridging social capital than others.

Studies like Ellison et al.'s (2011), which employ college student samples, typically use social capital measures that assess perceptions of resources available in an offline, localized setting such as one's current university. As the site's population has expanded beyond college students, Friend networks now include individuals from many dimensions of a user's life—family, friends, coworkers, neighbors, and more. Individuals use Facebook to fulfill a variety of needs (Joinson, 2008; Smock, Ellison, Lampe, & Wohn, 2011), but the most frequently cited reason for membership is maintaining offline relationships (Lenhart, 2009). In this study, we employ measures of social capital that reflect resources associated with the full composition of

users' Facebook Friends network, which we call "Facebook-specific bridging social capital," as well as their general social network (i.e., all connections, including those with whom they only connect offline or online), which we label "general bridging social capital." These networks should overlap; Hampton et al. (2011) found Facebook users had, on average, "Friended" 48% of their total network. Taking this into consideration, along with Ellison et al.'s (2011) findings regarding "actual" friends, we propose hypotheses for both Facebook-specific social capital and general social capital, which we assume will function primarily the same:

H1: The greater the number of actual friends on Facebook, the greater users' reported (a) Facebook-specific and (b) general bridging social capital.

Relationship Maintenance via Social Network Sites

Lin's (2001) framing of social capital as an "investment in social relations" highlights the importance of actively contributing to and maintaining personal relationships; thus, we consider these activities in addition to network composition. We consider relationship maintenance activities to include the processes through which individuals keep a relationship in existence, in a specified state, in a satisfactory condition, or in repair (Dindia & Canary, 1993), and these activities comprise the majority of time individuals devote to relationships (Duck, 1988). Duck (1991) describes the work involved in "relationshipping" (the work of relationship maintenance) and highlights the importance of having the skills to maintain and repair social bonds, pointing out that relationships "need overhaul, maintenance and servicing just as any other dynamic structure does" (p. 27). Many theories of relationship maintenance focus on dyadic, offline interactions and identify the characteristics of various types of relationships. For example, research in this area highlights the important roles of positivity, openness, self-disclosure, and social support in maintaining existing relationships (Dainton, Zelley, & Langan, 2003; Stafford

& Canary, 1991). More recent research on relationship maintenance has extended study of these strategies into mediated environments (e.g., Rabby, 2007).

Facebook and other SNSs provide an ideal platform for relationship maintenance interactions to occur quickly, with multiple others, and with low transaction costs because they enable wide dissemination of messages and foster participation, feedback, and interaction through various communication channels (Tong & Walther, 2011). Relationship maintenance behaviors in the SNS context are often framed as "social grooming" (Donath, 2007)—activities that signal attention, build trust, and create expectations of reciprocal attention. Grooming has been identified as a meaningful activity among nonhuman primates, functioning to enhance hygiene and general well-being of apes as well as to build social bonds between them; humans engage in equivalent trust-building and relationship-nurturing activities through language, such as gossip (Dunbar, 1996). On SNSs, social grooming occurs via interactions between connected members, with the content, frequency, and length of messages serving as signals of the strength and context of the relationship: the "cost in time is a signal of the resources one is willing to commit to this relationship" (Donath, 2007, p. 238). Tufekci (2008) operationalized social grooming as the desire to stay in touch with friends and curiosity about others. She found that, when compared with non-users, SNS users kept in touch with a significantly higher number of people on a weekly basis. Thelwall and Wilkinson (2010) also explored social grooming in a SNS context, asserting that public comments between two users generally served to initiate and maintain contact with Friends via brief exchanges, such as "happy birthday" posts. Similarly, researchers report relationship maintenance behaviors, such as using SNSs to "keep in touch with an old friend" (Lampe, Ellison, & Steinfield, 2006, p. 169) or "maintaining relationships with people you may not get to see very often" (Joinson, 2008) are some of the most frequently

reported site activities.

An important component of relationship maintenance and social grooming is signaling attention to others. In mediated environments, attention cues may need to be more explicitly signaled because non-verbal signals are unavailable (Walther, 1992). A delay or lack of response to an email, for example, may represent intentional neglect of a message or may merely be due to a technical glitch; ultimately, communicators must interpret silence with the information they have available (Kalman & Rafaeli, 2011). Interpretation of non-responses in a SNS environment is similarly ambiguous due to the way in which information is distributed and displayed. A Facebook status update without comments or "likes" may signal lack of interest by one's network, or the update may not have been widely displayed or noticed—potentially due to the sheer amount of information being pushed through the News Feed or the mechanics of the site's algorithm for displaying content. Given the lack of visible signals of attention in systems like Facebook, users must respond in a manner that leaves an observable marker of attention as a way of cultivating, or grooming, their connections and thus increasing access to the resources they represent. On a SNS, explicitly responding to another user via activities that leave *visible traces*, such as commenting or clicking the "Like" button, is the most reliable way to indicate one has seen and attended to any individual piece of content on the site.

These activities are presented in the News Feed, an aggregated collection of contributions from one's network which uses the "EdgeRank" algorithm, to select content to show in an individual's News Feed based on factors such as how recently the post was created, type of content posted (e.g., video, link, or photo), and interaction patterns with—or "affinity" to— the poster (Newman, 2011). Although the News Feed can be helpful for managing large, heterogeneous networks of "actual" and dormant Friends, the system is configured so users are

unlikely to see all the content produced by their Friends under the default setting. Users also can manually filter their feed by "hiding" specific Friends or adjusting their News Feed preferences, thus minimizing the cognitive effort needed to monitor the hundreds of updates, links, and photos produced by their network. Regardless of whether they are aware of EdgeRank and how it works, users train Facebook's filters by interacting with specific content they find valuable or relevant because activities such as commenting, posting, and tagging one's Friends are used to determine which content is subsequently presented in the Feed. Of course, activities Tong and Walther (2011) identified as relationship maintenance signals, such as commenting on a Friend's post, also serve a social capital function in that they represent an *investment* in a given relationship (Lin, 2001).

Previous research has shown that publicly viewable forms of interaction on the site, such as commenting on a Friend's status update, are significantly related to perceptions of social capital. For example, Burke et al. (2011) collected server-level data to examine the role of three behaviors in predicting bridging social capital: passive consumption of information through the News Feed, broadcasting information through public posts, and engaging in directed communication with another user. Only inbound directed communication significantly predicted bridging social capital. Burke et al.'s (2011) measure of directed communication consisted of a frequency count of comments, Wall posts, "likes," messages, and tags received by a participant. In contrast, our focus is on the *content* of these exchanges and the degree to which they constitute signals of attention, investment in one's network, and social capital contributions such as offering information or conveying social support. Our measure also includes an item about publicly posting birthday wishes to a Friend's Wall, which we believe signals attention to the recipient and performs a social grooming function. Birthday greetings on SNSs are thought to

help maintain relationships (Thelwall & Wilkinson, 2010) and are normative even among those who rarely interact on the system (Viswanath, Mislove, Cha, & Gummadi, 2009). In summary, engaging in these relationship maintenance and attention-signaling behaviors may be linked to expectations of access to social resources in the future, both from one's Facebook network and from one's social network more generally.

H2: The more users engage in Facebook Relationship Maintenance Behaviors, the greater their reported (a) Facebook-specific and (b) general bridging social capital.

Next, we consider the relationship between these relationship maintenance behaviors and users' network composition. Research on network structure (Burt, 1992; Granovetter, 1973) found that weaker, bridging ties are more likely to be sources of non-redundant information, while Ellison et al. (2011) found "actual" friends were more predictive of social capital than total network size. By exploring the interaction between actual friends and relationship maintenance behaviors, we may be able to gain insight into the nature of actual friends and the kinds of ties that are the recipients of these behaviors. Understanding how these variables interact and their effect on bridging social capital would complement insights provided by Burke et al. (2011), who highlight the role of directed communication on the site. Given the lack of specific literature on this topic, we pose the following research question:

RQ: How do number of actual friends and Facebook Relationship Maintenance Behaviors interact in predicting bridging social capital?

Finally, we consider whether using Facebook has an impact on individuals' perceived access to bridging resources from their general social network. Although past research has identified a relationship between Facebook use and social capital, little work has examined differences between users and non-users. One exception is research from a nationally

representative sample of U.S. adults, which suggests that the Internet—and specifically social network sites—may be related to greater perceptions of informational and social support (Hampton et al., 2011); SNS users reported a greater number of close ties than non-users (2.45 vs. 1.75) and were less likely to report having no discussion confidants (5% vs. 15% of non-Internet users). In addition, when compared with non-Internet users, SNS users reported having access to more resources related to advice, companionship, and instrumental aid. Similarly, Brandtzæg (2012) reported somewhat mixed findings regarding the relationship between SNS use and bridging social capital among a Norwegian survey panel, finding a significant relationship in 2008 and 2009 data, but not in 2010. Thus, we propose:

H3: Facebook users will report higher general bridging social capital than non-users.

Method

Participants and Procedure

The data analyzed in this study were collected during February and March of 2011. A random sample of 2149 non-faculty staff at a large Midwestern university were invited, via email, to participate in a study about their use of online communication tools; 614 usable responses were received for a response rate of 28.9%. The average participant was female (66%), 45 years old (*SD*=11.0), and a college graduate (40.1% had a bachelor's degree, 32.1% did post-graduate work). Twenty-two percent of participants (N=134) did not use Facebook. Comparing this dataset to a U.S. dataset collected during the same time period (Madden & Zickhur, 2011), the national sample was less educated (18.8% had a bachelor's degree, 13.9% did post-graduate work), older (*M*=53, *SD*=20.2), less likely to be female (57%), and less likely to be a SNS user (50%) than our sample.

Measures

Unless otherwise noted, all scale-based variables were measured using a Likert-type response scale ranging from 1=Strongly Disagree to 5=Strongly Agree.

Bridging social capital. In this study, we adapted Williams' (2006) 10-item bridging scale—which captures aspects such as contact with diverse others, feeling part of a broader group, and engaging in reciprocal behaviors with one's community—to measure individuals' perceptions of their resources within two types of networks. Research from the Pew Internet Project (Hampton et al., 2011) points to benefits of Facebook use related to access to various resources, such as the diversity of their network, level of political engagement, and the amount of support received from their network. These effects may be associated in part with the ease and convenience of maintaining relationships through the site. Therefore, we chose to capture how participants' perceptions may vary when thinking of their entire social network as well as a separate measure of bridging social capital which focuses specifically on the resources associated with one's Facebook Friends. First, *General Bridging Social Capital* (Cronbach's α=.88; M=3.74, SD=0.58) reflects broad-based perceptions of social capital experienced through interactions with one's entire social network. These items used the phrase "social network" (replacing Williams' "online/offline") and included the following directions: "For the next series of questions, think about your entire social network, including relatives, close and distant friends, coworkers and acquaintances." Second, *Facebook Bridging Social Capital* (Cronbach's α=.93, M=3.33, SD=0.76) captures participants' perceptions of bridging benefits associated with interactions with their Facebook Friends, and used "in my Facebook network" in all items rather than "online/offline." Participants were instructed to only think about Facebook Friends when responding to the 10 items. It is important to note that the items did not specify interactions on the site, but rather used phrasing such as, "Interacting with people in my Facebook network

makes me want to try new things." Item wording, means, and standard deviations for both General Bridging Social Capital and Facebook Bridging Social Capital are presented in Appendix A, online at: http://www-personal.umich.edu/~enicole/scales.html.

Facebook Relationship Maintenance Behaviors (FRMB; Cronbach's α=.90, M=3.55, SD=0.83). FRMB captures individuals' likelihood to engage in directed communication behaviors that represent relationship maintenance activities and signal attention and investment in one's contacts on the system through small but meaningful actions. To construct this measure, we included a series of items in our instrument assessing Facebook users' engagement in interactive communication with their Facebook Friends, including measures of behaviors (e.g., "When I see someone asking for advice on Facebook, I try to respond"), frequency (e.g., "How often do you respond to questions from your Facebook friends?"), and motivations (e.g., "I answer questions on Facebook because I like helping other people"). We then conducted exploratory factor analysis on the 10 items using principal components analysis with Varimax rotation. After removing cross-loading items, the remaining items loaded cleanly onto one, six-item factor; however, one item ("I get respect from others when I answer questions") was removed from the final scale because it slightly lowered the alpha and assessed motivation as opposed to behavior. Confirmatory factor analysis confirmed the model including the five items was a good fit to the data (χ^2=7.91, p >.05; RMSEA=.05; CFI=1.00; GFI=.99). Items, means, and standard deviations for the measure are presented in Table 1. A correlation matrix is presented in Appendix B, online at: http://www-personal.umich.edu/~enicole/correlations.html.

--TABLE 1 HERE--

Following creation of the scale, we conducted a series of tests to look for differences in engagement in Facebook Relationship Maintenance Behaviors across gender, age, and site use.

An independent samples t-test revealed that women (M=3.69, SD=0.75) were more likely to perform these behaviors than men (M=3.28, SD=0.93), t(456)=-5.156, p<.001. FRMB also varied by age, as indicated by an analysis of variance, F(453)=4.211, p<.05. According to Tukey's HSD post-hoc test, those aged 36 to 50 years of age (M=3.66, SD=0.77) were significantly more likely to engage in FRMB than those aged 51 and older (M=3.39, SD=0.95); however, neither of these age groups differed significantly in their performance of FRMB than younger participants aged 20 to 35 (M=3.59, SD=0.78). A second ANOVA revealed that FRMB varied significantly based on the amount of time spent on Facebook, F(459)=50.276, p<.001. Tukey's post-hoc HSD test demonstrated those who spent 0 to 5 minutes on Facebook per day (M=2.93, SD =0.94) and who spent 5 to 15 minutes per day (M=3.58, SD=0.61)—approximately half of our sample—were significantly less likely to perform Facebook Relationship Maintenance Behaviors than those who spent approximately 15 to 45 minutes per day on Facebook (M=3.82, SD=0.62) and over 45 minutes per day (M=4.00, SD=0.62).

Facebook use variables. In order to test the relationship between number of actual friends on Facebook and our two measures of bridging social capital, we included the item employed by Ellison et al. (2011): "Approximately how many of your TOTAL Facebook friends do you consider actual friends?" (open-ended). In addition, we included a measure of total Facebook Friends as a control variable, using the same wording as Ellison et al. ("Approximately how many TOTAL Facebook Friends do you have?"). Participants reported a mean of 207 total Friends (median=120, SD=288.16) and 76 "actual" friends (median=40, SD=101.07) on the site. On average, participants reported 37% of their total Facebook Friends were "actual" friends. Finally, time spent on Facebook (M=33.89 minutes, median=15, SD=47.90) was measured through the open-ended item, "In the past week, on average, approximately how many minutes

PER DAY have you spent actively using Facebook?" We specified "actively" to avoid responses that included time spent with the site open but inactive.

Control variables. In addition to gender (dichotomous), age (continuous), and education (ordinal), we included self-esteem as a control variable in our regressions because it has been a significant predictor of social capital in similar studies (Ellison et al., 2007, 2011; Steinfield et al., 2008). Self-esteem (Cronbach's α=.86) was measured through seven items from the Rosenberg Self-Esteem Scale (Rosenberg, 1989) and had a mean score of 4.33 (*SD*=.56) . Also in line with previous research, we included Weekly Internet Use as a control variable. This measure uses a weighted mean of two items (time spent using the Internet on a typical weekday and a typical weekend day). The mean time spent using the Internet per day was 3 hours, 10 minutes (*SD*=2 hours, 46 minutes).

Findings

Our analysis focuses on the relationship between two main predictor variables—actual friends on Facebook and engagement in Facebook Relationship Maintenance Behaviors — and both general and Facebook-specific bridging social capital. To test the relationship between these two forms of bridging social capital, control variables, and the predictors we describe above, we ran a series of nested OLS regressions.

In the regression predicting Facebook-specific bridging social capital, the control variables accounted for 5.4% of the variance, with gender (β=.207, p<.001) and self-esteem (β=.098, p<.05) emerging as significant, such that women and those with higher self-esteem reported higher perceived Facebook bridging social capital. The addition of the Facebook usage variables—minutes on Facebook, total Facebook Friends, and actual friends—increased the R^2 to .131, with minutes (β=.144, p<.01) and actual friends (β=.218, p<.001) positively predicting

Facebook bridging social capital, supporting H1a. Finally, the addition of Facebook Relationship Maintenance Behaviors (β=.569, p<.001) increased the model's R^2 to .394 and provided support for H2a. Full results are presented in Table 2.

--TABLE 2 ABOUT HERE--

In the regression predicting general bridging social capital, the control variables accounted for 9.3% of the variance; as with Facebook-specific bridging social capital, gender (β=.182, p<.001) and self-esteem (β=.255, p<.001) were significant predictors. The addition of the time and Friends variables increased the R^2 to .168. Total Facebook Friends (β=.118, p<.05) emerged as a significant predictor in this model; however, the impact of actual friends (β=.190, p<.001) on general bridging social capital was stronger, supporting H1b. Adding Facebook Relationship Maintenance Behaviors to the model increased the R^2 to .229, and the significant positive relationship between FRMB and bridging social capital (β=.278, p<.001) provided support for H2b. See Table 3 for the full regression model.

--TABLE 3 ABOUT HERE--

Our research question probed the relationship between the number of "actual" friends and users' engagement in relationship maintenance activities (FRMB), as they relate to bridging social capital. First, we conducted an OLS regression (see Model 4 in Tables 2 and 3) using the same variables as used in previous analyses as well as an interaction term (actual friends by FRMB). The interaction term was significant in both the general (β=-.571, p<.05) and Facebook-specific (β=-.857, p<.001) bridging models, suggesting that the impact of FRMB on bridging social capital may be moderated by users' reported number of actual friends in their Facebook network. The significant negative term indicates that for Facebook users who report fewer actual friends on Facebook, greater engagement in FRMB was correlated with a larger

increase in bridging social capital than for users who reported more actual friends on the site.

To further examine this finding, we conducted a simple slopes analysis (Aiken & West, 1991). We observed effects of FRMB on bridging social capital at three levels of actual friends: (1) reported value, (2) reported value minus one standard deviation, and (3) reported value plus one standard deviation. Results indicated that FRMB's influence on both Facebook-specific and general bridging social capital significantly differed across the three measurement points for actual friends. For all three levels, greater engagement in FRMB was correlated with higher perceived bridging social capital (see Figure 1). However, those with the fewest actual friends saw the greatest gains in bridging social capital as their engagement in FRMB increased. An analysis of variance shows this difference across the three levels of actual friends is significant for Facebook-specific bridging social capital, $F(82)=33.67$ $p<.001$, and trends towards significance with general bridging social capital, $F(86)=3.204$ $p=.077$.

--FIGURE 1 ABOUT HERE--

To test our final hypothesis comparing Facebook users' and non-users' perceptions of social capital, we ran an independent samples t-test comparing users' and non-users' general bridging social capital scores. The t-test revealed that Facebook users ($M=3.80$, $SD=0.55$) reported higher general bridging social capital than non-FB users ($M=3.57$, $SD=0.63$), $t(592)=-3.96$, $p<.001$, supporting H3. Independent samples t-tests comparing Facebook users and non-users across a number of variables (gender, ethnicity, education, income, age, self-esteem, and weekly Internet use) showed that only age, $t(584)=5.783$, $p<.001$, was significantly different between groups, with Facebook users ($M=43.88$, $SD=10.91$) being younger than non-users ($M=50.16$, $SD=9.90$). However, when age was included as a control in a regression model with Facebook use as the independent variable and general bridging social capital as the dependent

variable, it was non-significant. This suggests that while age might be related to Facebook use, it does not play a significant role in explaining differences in perceived bridging social capital.

Discussion

In this study, we explore the relationship between bridging social capital and two components of Facebook use through survey data collected from a sample of U.S. adults. We employed two separate measures of bridging social capital—one assessing the benefits associated with interactions with one's network of Facebook Friends and the other focusing on one's interactions with his or her entire social network. Confirming and expanding on previous studies of Facebook use (e.g., Burke et al., 2011; Ellison et al., 2011), our results show significant positive relationships between these measures of bridging social capital and both the number of "actual" Facebook friends participants report that they have and their engagement in Facebook Relationship Maintenance Behaviors (FRMB). FRMB assesses the extent to which subjects report they engage in activities that signal attention to and purposefully cultivate relationships on the site; these activities include responding to Friends' implicit or explicit resource requests and writing "happy birthday" on a Friend's Wall.

This study contributes to our understanding of the interpersonal dynamics of SNS use by (1) identifying how users' engagement in the social grooming behaviors identified above relate to perceptions of bridging social capital—both within their Facebook Friend network and their social network more broadly—and explicating the interpersonal, structural, and attention-filtering dynamics which contribute to this relationship; (2) exploring the differences between perceived total and "actual" Friends on the site in regards to bridging social capital outcomes; and (3) examining differences in perceptions of general bridging social capital between users and non-users of the site.

Considered in conjunction with previous research on this topic, these findings provide insight into the mechanisms through which bridging social capital is cultivated and the role that Facebook-enabled communication practices may play in this process. Our bridging social capital measure, adapted from Williams (2006), captures the extent to which participants feel that interacting with their social network promotes "outward thinking" and allows them to encounter new ideas, experiences, and people. Scholarship on the information diffusion properties of network structures (Granovetter, 1973; Burt, 1992) suggests one explanation for the relationship between Facebook use and perceptions of bridging social capital: because weaker ties are more likely to be bridging ties, the bridging social capital benefits of Facebook use may lie in technical features of the site that lower the cost of maintaining and communicating with a larger network of weak ties. SNS scholars point to other relevant affordances, such as the fact that SNSs enable users to request informational or other resources from these connections (Gray, Ellison, Vitak & Lampe, 2013). Similarly, the identity information available about users (for instance, in the profile) helps make these exchanges visible, persistent, and meaningful (Ellison et al., 2011). However, our findings suggest that understanding social capital dynamics in the context of SNS use may entail a more complex calculus that considers not just the number and strength of one's ties, but also issues of visibility and attention, subjective—and perhaps idiosyncratic—distinctions between "actual" and non-actual Friends, and specific communication behaviors that reshape information flow across networks by enabling participants to gain access to Friends of Friends. In other words, it is not enough to just list connections on the site; rather, individuals must engage in intentional behaviors that signal, "I am paying attention to my network" – behaviors that contribute to expectations of reciprocity. In the following section, we describe the implications of FRMB on social capital in three domains—

interpersonal, structural, and technical—before turning to a discussion of our findings regarding actual friends and differences between users and non-users.

Facebook Relationship Maintenance Behaviors and Social Capital. Our focus on relationship maintenance behaviors highlights their potentially important role in binding networks in meaningful ways and creating an environment in which social capital-enhancing exchanges can flourish. First, engaging in FRMB enables users to explicitly signal they are attending to specific individuals in their network and are available for reciprocal interactions. We argue these activities may signal attention within a system in which attention cues must be explicitly constructed, and these signals of attention maintain relationships and serve to activate expectations of reciprocity.

Second, Facebook enables interactions with users outside of one's articulated Friend network through communication affordances such as comments on a mutual Friend's status update, a network-spanning communicative act that enables users to interact with Friends of their Friends. Recent empirical work on voting behavior finds that users who learned via the site that their Facebook Friends voted were more likely to vote themselves, and that this message was influential even for Friends of Friends (Bond et al., 2012). Interactions with Friends of Friends may increase the extent to which individuals feel they have access to diverse individuals, are interested in the greater world, and see themselves as part of a larger community—elements of bridging social capital articulated by Williams (2006) when developing the scales adapted for this study.

Third, although paying attention to individuals in one's network is important in offline contexts as well, the specific socio-technical context of SNSs means the attention-signaling behaviors captured by our FRMB measure help shape users' experiences on the site and

specifically the content that is filtered into and out of their News Feeds. Given that many users have hundreds of Friends on Facebook, engaging in these behaviors serves to signal attention to *specific ties* within one's network on an interpersonal level, but it also serves a technical purpose within the specific context of Facebook. Responding to a Friend's request for advice not only signals willingness to help, but also may indirectly increase the visibility of one's content in others' News Feeds because interactions between individuals are treated as a signal of relevance by the News Feed algorithm (Newman, 2011). The content that appears in one's News Feed is a function of a proprietary algorithm created by Facebook to increase the visibility of relevant posts and to decrease the visibility of those more likely to be uninteresting. Thus, behaviors captured by the FRMB scale may elevate the visibility of users who engage in them.

As an example of how these interpersonal, structural, and attention-filtering (technical) domains may interact, consider the act of commenting on a Friend's status update. Comments are fairly common: Hampton et al. (2011) found that more than half of adult American Facebook users comment on Friends' updates at least once a week. Although our FRMB items do not specify the channel users employed to respond to broadcasted requests (with the exception of the "happy birthday" item), a common response to the kinds of status update requests described in the FRMB items would be in the form of a comment. As we argue above, commenting on a Friend's post signals an investment in the relationship, and reciprocated interactions are a primary component in the generation of social capital. However, the specific features of SNSs, namely the public nature of interactions, may also play a role in these processes. Comments on Friends' posts may be more likely to generate bridging social capital than status updates or other broadcasting behaviors because these comments have the potential to be seen by all of the poster's Friends and thus constitute an effective strategy for accessing "Friends of Friends." In

this way, the behaviors included in our scale may amplify the "bridging" function of the site by providing an opportunity for Friends of Friends to interact. Importantly, commenters on Friends' posts are presented to this extended network not as total strangers, but rather as individuals with at least one shared social connection, which, as Donath and boyd (2004) suggest, may signal trust and serve as a tool for verifying legitimacy. Furthermore, these Friends of Friends can often obtain personal information about one another via the user profile, helping to establish common ground (Lampe, Ellison, & Steinfield, 2007) and potentially encouraging them to activate these latent ties and convert them to weak and bridging ties (Ellison et al., 2007, 2011; Haythornthwaite, 2005). Perhaps some of the "benefits of Facebook Friends" (as discussed by Ellison et al., 2007) are actually embedded in interactions with *Friends of Friends* and the relationships these interactions may cultivate.

This work contributes to our understanding of how mediated communication practices support relationship maintenance, and how these interactions contribute to social capital accrual and development. Other than the "happy birthday" item, our FRMB items intentionally did not specify the channel through which responses were communicated, in order to capture responses that occurred offline as well as within the Facebook environment. While future research should confirm these speculations, based on media multiplexity research (Haythornthwaite, 2005), we assume that weaker ties are more likely to respond via the site, whereas stronger ties may use other channels. For instance, prompted by a Friend's complaint about a bad day, it is more likely that weaker ties who respond would do so through a comment or Facebook message, whereas closer ties may respond through the site or via a telephone call, private email, or in-person visit. In order to more fully understand the mechanism by which FRMB is related to social capital, future work should employ more nuanced measures that probe which channels—both on

Facebook and elsewhere—are being used to engage in these relationship maintenance behaviors.

Actual Friends. The connection between these relationship maintenance behaviors and the number of "actual friends" in one's Facebook network was another focus of this study. Through a series of analyses, we found that the relationship between FRMB and bridging social capital is moderated by the number of actual friends a user reports in their network. In other words, as engagement in FRMB increased, users with fewer actual friends reported higher perceived bridging social capital—both Facebook-specific and general—than users with more actual friends. This may be because those with fewer "actual" friends are performing FRMB with Facebook Friends they do not consider actual friends. These weaker connections in their network might represent more diverse values, informational resources stores, and networks (Granovetter, 1973). Additionally, by interacting with these "non-actual" friends through more public, visible channels on the site, users might gain access to the Friend networks of these non-actual friends and the richly diverse set of perspectives and information they likely represent.

Users vs. Non-Users. Finally, our comparisons between users and non-users offers insight into the extent to which Facebook use supports the development of bridging social capital above and beyond other factors, such as general Internet use. Our adult sample enables us to explore differences between Facebook users and non-users, which few studies on SNS use and social capital have done, either because they included only Facebook users (Burke et al., 2010, 2011) or employed undergraduate samples with very high adoption rates (e.g., Ellison et al., 2007). Early work (e.g., Hargittai, 2007) was able to explore these differences, but most current undergraduate populations do not allow for these comparisons. Because our sample of adults included a significant number of non-users, we were able to compare the general social capital scores for these groups. We found that Facebook users reported significantly higher perceptions

of general bridging social capital than their Facebook-abstaining peers. Third-variable explanations, such as differences in education or income, did not contribute to these differences. We believe that the adults in our sample who used Facebook were able to take advantage of the lowered transaction costs provided by the site in regard to interacting with weaker ties, thus accessing the more diverse perspectives those weaker ties represent.

Although the mean difference in bridging social capital measures was not large (3.80 for users vs. 3.57 for non-users on a five-point, Likert-type scale), we expect that over time this gap between users and non-users may widen. Currently, 67% of all online U.S. adults use SNSs (Duggan & Brenner, 2013) and Facebook's userbase continues to become more diverse (Facebook Data Team, 2009b). As these trends continue, the increased heterogeneity of the userbase might better enable individuals to connect with and exchange information with diverse others on the site. Additionally, users may increase their usage of the site due to network effects and the appeal of connecting with individuals from multiple dimensions of their lives (neighbors, family, professional contacts, etc.) on a single platform. Of course, privacy concerns and discomfort with the collapse of social contexts that can accompany these more diverse Friends networks may have the opposite effect, dampening use or leading to a lowest-common-denominator approach in which users post only the most banal content (Hogan, 2010), thus curtailing the social capital mechanisms we describe.

Limitations. Limitations to this study include the fact that our measure of social capital may not have adequate construct validity; future research in this area should develop new measures of social capital and validate existing measures. As this research study was cross-sectional, we are unable to demonstrate that social capital is an outcome of the activities we measure or the cause of these behaviors; thus, future research should employ a longitudinal

approach, which might provide more insight into the directionality of these relationships. More nuanced FRMB measures, especially if combined with behavioral measures accessible from server-level data, would give us a better sense of how to interpret high scores and could add support to our interpretation of these data. Additionally, we cannot make definitive claims about the exact nature of "actual" friends due to our measure of this construct, which intentionally did not provide participants with a definition of what constituted an actual friend. Future work should probe user conceptions of actual friends and whether this is determined by visibility, closeness, recency of last interaction, or other related concepts. Due to space constraints, we do not consider bonding social capital in this piece, but future research may wish to explore the relationship between our maintenance behaviors and this other important form of social capital. Finally, our sample limits the generalizability of our findings, as these individuals differed from the population of U.S. adults in several ways; this work should be replicated with other samples.

In summary, this research shows that actively engaging with one's Facebook network—both through responses to Friends' requests and posting content directly on a Friend's wall—is positively linked to higher levels of bridging social capital. Importantly, our findings regarding general bridging social capital extend work in this area because they imply that engaging in specific practices related to Facebook use have the potential to shift perceptions regarding access to social resources, even within a more general (not just Facebook-specific) context. We argue that behaviors captured by the Facebook Relationship Maintenance Behaviors scale serve a relationship maintenance function by signaling attention and contributing to expectations of reciprocal assistance, enabling individuals to access networks outside of their own, and reshaping attention filters within the system. Although future research should empirically assess our claims regarding the specific dynamics of these exchanges, the significant statistical relationship

between FRMB and perceptions of bridging social capital suggests that responding to implicit or explicit requests from Friends plays a key role in social capital processes, on and off the site.

Conclusion

In this paper, we extend our knowledge of the social capital implications of social network site use through both the identification of specific SNS-enabled relationship maintenance behaviors that predict general and Facebook-specific bridging social capital gains and through a comparison of bridging social capital perceptions between Facebook users and non-users. We believe that the social and technical affordances of Facebook make it easier for individuals to invest in and extract social resources from their network and to access Friends of Friends, who might provide novel informational resources. Most importantly, these findings highlight the importance of actively managing, grooming, and maintaining one's network, suggesting that social capital is not generated simply by the existence of connections on a SNS, but rather is developed through small but meaningful effort on the part of users as they engage in relationship maintenance behaviors such as responding to questions, congratulating or sympathizing with others, and noting the passing of a meaningful day. This work contributes to our understanding of relationship maintenance activities in social networks and suggests that the true benefit of social network sites may not just be the technical connections they make possible, but by creating an environment in which meaningful communicative exchanges, and the potential social capital benefits they embody, can flow.

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Table 1: Means and Standard Deviations for Facebook Relationship Maintenance Behavior Scale (N=471)

Items[1]	*M*	*SD*
When I see a friend or acquaintance sharing good news on Facebook, I try to respond.	3.70	.94
When I see a friend or acquaintance sharing bad news on Facebook, I try to respond.	3.46	.99
When I see someone asking for advice on Facebook, I try to respond.	3.27	.99
When a Facebook friend has a birthday, I try to post something on their wall.	3.71	.1.06
When I see someone asking a question on Facebook that I know the answer to, I try to respond.	3.64	.93
Full Scale (α=.901):	3.55	.83

[1] Scale ranges from 1=Strongly Disagree to 5=Strongly Agree

Table 2: OLS Regression Predicting Facebook-Specific Bridging Social Capital

	Model 1: Controls	Model 2: Time & Friend Variables	Model 3: FRMB	Model 4: Interaction
	Standardized Betas (t-scores)			
Gender: Women	.207 (4.29)***	.172 (3.67)***	.052 (1.28)	.045 (1.14)
Ethnicity: White	.008 (0.17)	.022 (.483)	.041 (1.07)	.043 (1.14)
Age	-.130 (-2.70)**	-.029 (-.586)	-.006 (-.141)	.013 (.314)
Education	-.029 (-.602)	-.015 (-.324)	.018 (.460)	.026 (.667)
Self-Esteem	.098 (2.07)*	.061 (1.33)	.047 (1.22)	.038 (.995)
FB Mins Per Day		.144 (2.93)**	.000 (.012)	.007 (.172)
Total FB Friends		.023 (.410)	.001 (.018)	-.009 (-.205)
Actual Friends		.218 (4.04)***	.137 (3.02)**	.967 (3.93)***
FRMB			.569 (13.52)***	.657 (13.46)***
Interaction: Actual Friends by FRMB				-.857 (-3.43)***
Constant	n/a (7.96)***	n/a (7.16)***	n/a (2.68)**	n/a (1.69)
F-test	*F*(427)=5.87***	*F*(427)=9.07***	*F*(427)=31.88***	*F*(427)=30.61***
Adjusted R^2	**.054**	**.131**	**.394**	**.409**

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

Table 3: OLS Regression Predicting General Bridging Social Capital

	Model 1: Controls	Model 2: Time & Friend Variables	Model 3: FRMB	Model 4: Interaction
	Standardized Betas (t-scores)			
Gender: Women	.182 (3.92)***	.162 (3.59)***	.101 (2.27)*	.099 (2.23)*
Ethnicity: White	-.006 (-.138)	.011 (.261)	.025 (.597)	.029 (.688)
Age	-.056 (-1.21)	.056 (1.17)	.069 (1.49)	.083 (1.79)
Education	-.024 (-.519)	-.021 (-.465)	-.006 (-.131)	.001 (.019)
Self-Esteem	.255 (5.59)***	.219 (4.94)***	.212 (4.97)***	.204 (4.78)***
FB Mins Per Day		.077 (1.63)	.009 (.181)	.009 (.187)
Total FB Friends		.118 (2.17)*	.106 (2.03)*	.107 (2.05)*
Actual Friends		.190 (3.62)***	.150 (2.94)**	.701 (2.65)**
FRMB			.278 (5.94)***	.337 (6.21)***
Interaction: Actual Friends by FRMB				-.571 (-2.13)*
Constant	n/a (10.28)***	n/a (9.44)***	n/a (6.75)***	n/a (5.96)***
F-test	$F(440)=10.04$***	$F(440)=12.10$***	$F(440)=15.52$***	$F(440)=14.54$***
Adjusted R^2	**.093**	**.168**	**.229**	**.235**

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

Figure 1: Simple Slopes Interaction Between Number of Actual Friends and FRMB on Bridging Social Capital