Privacy in Interaction: Exploring Disclosure and Social Capital in Facebook

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Abstract

In this paper, we explore the relationship between Facebook users' privacy concerns, relationship maintenance strategies, and social capital outcomes. Previous research has found a positive relationship between various measures of Facebook use and perceptions of social capital, i.e., one's access to social and information-based resources. Other research has found that social network site users with high privacy concerns modify their disclosures on the site. However, no research to date has empirically tested how privacy concerns and disclosure strategies interact to influence social capital outcomes. To address this gap in the literature, we explored these questions with survey data (N=230). Findings indicate that privacy concerns and behaviors predict disclosures on Facebook, but not perceptions of social capital. In addition, when looking at predictors of social capital, we identify interaction effects between users' network composition and their use of privacy features.

Introduction

Social network sites (SNSs) enable users to connect and interact with proximate and distant ties, and the communication features of these sites lower barriers for requesting and providing support. Resources such as information or social support are often framed as instantiations of social capital, and researchers have identified positive relationships between perceptions of social capital and various measures of Facebook use, including users' network composition and specific forms of engagement with that network (e.g., Burke, Kraut, and Marlow 2011; Ellison, Steinfield, and Lampe 2011a). However, privacy attitudes and behaviors play a critical role in whether individuals choose to engage with and share content within a network (Lampinen, Tamminen, and Oulasvirta 2009). Privacy concerns may have a direct impact on whether users exchange information and resources with their network. For example, Hogan (2010) argues that, given the increasing diversity of users' online networks, some SNS users may only share content appropriate for *all* their connections. However, limiting disclosures to one's Facebook network, due to network diversity or other reasons, may negatively impact the extent to which users may access social capital resources. For instance, a user who chooses not to disclose a medical diagnosis via the site will be less likely to receive supportive messages from her Facebook network.

This study extends previous work by analyzing the relationship between Facebook users' privacy attitudes and behaviors, their site engagement, and their perceptions of bonding and bridging social capital. This is done through two sets of analyses: first, we build and test a path model to empirically test previous theoretical work (Ellison, Vitak, Gray, Steinfield, and Lampe, 2011c) which argues that disclosures are a necessary requirement for accruing social capital on SNSs but that this relationship may be mediated by users' willingness to disclose on the site. We then incorporate variables that assess the role that users' engagement with their networks and network composition play in predicting social capital, while accounting for privacy considerations.

Literature Review

Previous studies examining uses of and outcomes derived from SNSs have examined social capital, privacy, and Facebook communication practices, but have done so in separate analyses. This study contributes to the literature by integrating two important threads within human-computer interaction (HCI) scholarship on SNS use: privacy and social capital outcomes.

Facebook and Social Capital

Social capital is the total actual or potential resources individuals have access to through their social network (Bourdieu 1985). Social capital includes physical (e.g., driving a friend to the airport), emotional (e.g., giving a friend a hug), and informational (e.g., giving a friend advice about a big decision) resources, among others. Social capital can be understood as an *investment* in one's personal network (Lin 2001) with expected returns at some future point; in other words, reciprocity is a key component of social capital. Resource requests and offers occur through both offline and online channels and may vary based on the nature of the relationship. Social capital

benefits may be mobilized through simple membership in a network, but as Burt (1992) notes, one's network position can result in greater or less access to resources. For example, individuals who bridge two otherwise unconnected networks may control information diffusion between those networks, a potentially powerful position.

Network composition is often related to the kind of resources embedded in one's social network. In small, densely connected networks, such as that of a tight-knit family, there is often a high level of access to social and emotional support. Putnam (2000) refers to these social support resources as *bonding social capital*. That said, the homogeneity associated with close ties makes them less likely to provide new ideas or information. Therefore, larger, more loosely connected networks with many clusters and cross-cutting ties are more likely to provide access to diverse perspectives and non-redundant information. These types of networks are typically associated with *bridging social capital* (Burt 1992).

Research has documented a positive link between individuals' use of Facebook and their perceptions of social capital (Burke, Marlow, and Lento 2010; Burke et al. 2011; Ellison et al. 2011a). The site structure enables the creation and maintenance of "social supernets" (Donath 2007)—large-scale networks enabled by technology—and provides users with numerous public and private communication channels through which to request and offer resources to network members. As a whole, the literature suggests that social capital is not only a function of users' network composition (i.e., Facebook "Friends"), but also relates to their specific engagement practices on the site (i.e., how they interact with these "Friends").

Relationship Investment on Facebook

Whereas the literature suggests a relationship between several forms of Facebook-based engagement and perceptions of social capital, the mechanisms through which Facebook use and social capital are associated have not been explicated. Burke et al. (2011) examine the role of directed communication, a scale that includes six metrics such as the number of wall posts, comments, and "likes" received from Facebook Friends. They found that *directed communication* (to a specific person) was associated with greater social capital benefits than *broadcasting* updates to one's entire network.

Recent work (Ellison, Vitak, Gray, Lampe, and Brooks, 2011b) extends Burke et al.'s (2011) and Ellison et al.'s (2011a) findings with the development of a measure that captures the extent to which individuals signal investment in relationships with their friends by way of responding to Facebook-mediated requests for social or informational support and acknowledging meaningful events in their lives (e.g., a friend's birthday). These responses can be seen as a form of "social grooming"—signals of attention that promote feelings of trust and closeness (Dunbar 1996). Responding to a question from a Friend serves a social grooming function as well as a technical one. Interactions between two users help train the Facebook algorithm, potentially increasing the visibility of each in one another's News Feed (which users may or may not be aware of). Finally, thinking about the generalized reciprocity that marks social capital exchange (Lin 2001), these "giving" behaviors should increase expectations of receiving support provisions in the future. In other words, responding to Facebook Friends' requests should elevate the likelihood of one's own requests being answered in the future. Therefore, we believe that responding to others, especially if is done in a public channel, may influence users' perceptions of their access to resources such as bridging and bonding social capital.

Privacy and Disclosure on SNS

In "nonymous" (e.g., Zhao et al. 2008) online spaces such as SNSs, where personal identity is highly prominent, privacy is a critical component in determining how and with whom users interact. In highly contextual spaces such as SNSs, privacy should be considered as a fluid process where individuals selectively control access to information about themselves by regulating their social interactions (Altman 1975). On SNSs, this regulation can occur in a number of ways. For example, users may designate their profiles as "Friends only," which limits access to their profile to only those users with whom they have formally connected. Most SNSs also enable tailoring of content distribution so that individual updates or photos can be shared with a subset of one's total network. Preliminary research examining this strategy has found that users employing segmented privacy settings report larger Facebook networks and higher perceived bridging and bonding social capital than those who do not use this feature (Ellison et al., 2011c).

Some of the earliest work on privacy and SNSs identified a disconnect between users' privacy concerns and their disclosures on the site (Acquisti and Gross 2006; Speikermann et al. 2001), in what some have labeled a "privacy paradox" (Barnes 2006). More recent research suggests that privacy and disclosures are more closely related, with complicated tradeoffs between privacy, intention, and disclosure (Stutzman and Kramer-Duffield 2010; Krasnova et al. 2010). When considering Facebook specifically, evolution in the relationship between privacy concerns and disclosures may be a result of changes in the site's structure during the last six years, and the increasing diversity of users' networks as a result. Network diversification can lead to context collapse, whereby various clusters of individuals with whom one has a relationship (e.g., high school friends, coworkers, family) are grouped together under a single label (e.g., Facebook Friends; Marwick and boyd 2011). One strategy for managing context collapse is for users to actively distribute content to specific subsets of their network, a challenging proposition given that most SNSs are oriented toward broadcasting to the entirety of one's network.

When considering the relationship between privacy and disclosures in light of context collapse, users adopt a range of strategies for minimizing risk. Lampinen et al. (2009,

2011) describe both behavioral and mental strategies for group context management. Users engaging in behavioral strategies may actively employ site features to control access to disclosures by limiting their network size, limiting access to specific parts of their profile, or creating friend lists to distribute content to subsets of their friend network—while keeping these disclosures hidden from others. Conversely, individuals that employ mental strategies may choose to limit disclosures to only content they deem appropriate for *all* network members, in a process known as the lowest-common-denominator approach (Hogan 2010).

Disclosure, Privacy, and Social Capital on FB

Research examining the relationship between Facebook use and social capital has generally ignored the role that privacy plays in users' decision-making process regarding content shared through the site. As has been argued previously (Ellison et al., 2011c), if one considers social capital to be the resources obtained through interactions with one's social network, Facebook users must be willing to make these resource requests—i.e., disclose—in order for their networks to respond appropriately. Clearly, privacy concerns may serve as a barrier to some disclosures, especially if the resource request is more personal in nature (such as a person requesting emotional support following the death of a family member), and therefore the effects of privacy attitudes and behaviors on disclosures in a SNS are important to investigate.

Recent work has demonstrated evidence of the relationship between privacy and social capital in the SNS context, finding that use of segmented privacy settings on Facebook—such as limiting access to specific updates or to one's profile more generally—is positively correlated with perceptions of social capital (Ellison et al., 2011c). This finding may reflect the fact that the ability to partition one's online network and distribute content only to a specific audience makes users more comfortable disclosing certain kinds of information to their network. In the design community, there are a number of active research streams exploring the most effective ways to manage contexts within SNSs, with the goal of producing rule sets or interfaces that actively foster the sharing of content to intended, trusted audiences (e.g., Farnham and Churchill 2011; Kelley et al. 2011; Ozenc and Farnham 2011)

The design of features that manage the complexity of heterogeneous networks may encourage users to maintain a larger network of connections, which has important social capital implications. These diverse networks would be more likely to represent ties and resources valuable to the user, containing information such as employment opportunities. However, privacy controls such as the "Circles" deployed in Google+ may have positive and negative social capital implications, as they limit access and disclosures to certain subsets of an individual's network. As suggested by other researchers, the relationship between privacy and social capital may indeed be "paradoxical" in that privacy can both cost and enhance social capital in context.

The Study

In this research we draw on survey data to analyze the relationship between SNS privacy, disclosure practices, network composition and engagement, and social capital outcomes. In doing so, we provide new insight into the complex relationships among attitudes and behaviors that have the potential to either constrain or increase the social capital benefits of SNS use.

Method

In April 2011, a random sample of 2,500 undergraduate students at a large, Midwestern university were invited, via email, to participate in an online survey about their use of online communication tools. As incentive for participation, all participants were invited to enter their email address for a raffle of ten $15 Amazon gift cards. The total number of usable responses amounted to 230 for a response rate of 9.2% following AAPOR definition one (AAPOR, 2008). This response rate is consistent with other recent studies employing online surveys of college students (e.g., Yoder and Stutzman 2011). Respondents were 67% female and 33% male, had an average age of 21.16 (*SD* = 4.37), and 95% used Facebook. Compared to the population of students, women are overrepresented in this sample.

Survey Content

Our survey was comprised of scales for bridging and bonding social capital, a variable called Signals of Relational Investment (SRI), privacy concerns, various measures of Facebook engagement and use, privacy settings, and demographics. Unless otherwise noted, scale items were measured on a five-point Likert type scale (1 = Strongly Disagree, 5 = Strongly Agree).

Bridging social capital (10 items, α = .877, *M* = 3.87, *SD* = .60), adapted from previous research (Williams 2006), indicates perceptions of bridging resources, measuring the extent to which participants feel they interact with a diverse set of people, engage in diffuse reciprocity, and have a view of themselves as a member of a broader group. For this study, the 10 items were prefaced by the following instructions: "For the next series of questions, think about your entire social network, including relatives, close and distant friends, coworkers and acquaintances." Sample items include: "Interacting with people in my social network makes me interested in things that happen outside of my town" and "I am willing to spend time to support general community activities."

*Bonding social capital (*10 items, α = .865, *M* = 3.88, *SD* = .64), adapted from previous research (Williams 2006), captures one's ability to mobilize solidarity and one's access to emotional support and limited resources. As in the case of the bridging social capital items, individuals were asked to think about their entire social network. Sample items include: "If I needed an emergency loan of

$100, I know someone in my social network I could turn to" and "The people I interact with in my social network would be good job references for me."

Signals of Relational Investment (Ellison et al., 2011b) (SRI; 5 items, α = .80, M = 3.71, SD = .71) reflects users' intent to respond to Facebook Friends' resource requests. While not explicitly stated in the items, it is assumed that these responses typically take the form of directed communication, such as comments on status updates, although communication outside Facebook or via other Facebook channels (such as private messaging) is also possible. Sample items include: "When I see someone asking a question on Facebook that I know the answer to, I try to respond" and "When I see someone asking for advice on Facebook, I try to respond."

Network diversity (24 items, α = .90, *M* = 4.06, *SD* = .51) attempts to capture network diversity by assessing users' access to various types of people and resources within their social network. The 24 items were preceded by the following instructions: "Please think about all of your social connections. How easy would it be for you to find someone who…" Sample options include: "knows a language you are interested in learning," "has a political belief system that differs from your own," and "can help you fix your computer." Items were measured on a five-point scale (1 = Very Difficult, 5 = Very Easy).

Facebook use variables include time spent on the site (*M* = 97.25 minutes, median = 60, *SD* = 113.29; "In the past week, on average, approximately how many minutes PER DAY have you spent actively using Facebook?"); network size (*M* = 476, median = 450, *SD* = 290.59; "Approximately how many TOTAL Facebook Friends do you have?"); and the number of "actual" Friends in one's network (see Ellison et al., 2011a; *M* = 150, median = 100, *SD* = 147.20; "Approximately how many of your TOTAL Facebook Friends do you consider actual friends?").

We created a variable measuring the ratio of "actual Friends" to total Friends in a Facebook network (*M = .362, SD* = .277, median = 27.3%). Finally, we created an original scale, *Facebook disclosures* (4 items, *α* = .80, *M* = 2.39, *SD* = 1.14) to capture the extent to which Facebook users share information with their Facebook network. Sample items include: "When I'm having a bad day, I post about it on Facebook" and "When I have an accomplishment I'm proud of, I share it on Facebook."

Privacy behaviors included dichotomous measures of engagement with two privacy settings on Facebook: (1) *Friends only privacy settings*, with 72% of the sample reporting using this setting; and (2) *Segmented privacy settings*, with 68% of the sample responding "yes" to the item, "Have you ever changed the privacy settings so that only some of your Facebook Friends can view specific types of content (e.g., wall, photos, notes)?"

Privacy concerns (7 items, α = .84, *M* = 1.81, *SD* = .53) is a measure adapted from Stutzman et al.'s (2011) privacy attitudes scale that probes SNS users' concerns about potential privacy risks associated with participation in these sites, such as "cyberstalking" and "hacking." We included three additional items to tap into Facebook users' concerns about private information being revealed publicly on their profile as well as concerns about potential or current employers viewing incriminating content about them online. Items were measures on a three-point scale (1 = Not Concerned, 3 = Very Concerned).

Control variables. We controlled for sex (women = 1) and age. We included a self-esteem scale (Rosenberg 1989; 7 items, α = .91, *M* = 4.16, *SD* = .66) as a control variable because research has established self-esteem as a strong predictor of perceptions of social capital (Burke et al. 2010; Ellison et al. 2011a).

Hypotheses

We explore the relationship between privacy attitudes and behaviors, disclosures, and accrued social capital in the social network site Facebook. While there is a large body of literature exploring the relationship between use of social network sites and positive outcomes (e.g., social capital), the effects of privacy and disclosure behavior on positive outcomes are under-studied.

Privacy, disclosure, and positive outcomes

The accrual of social capital in a SNS is a function of one's activity and network composition on the site (Burke et al. 2010; Ellison et al. 2011a). Being able to access the embedded supportive possibilities of one's network via Facebook requires disclosure. However, one's willingness to disclose in a social network site may be affected by one's attitudes towards privacy and one's use of privacy controls. We hypothesize that:

H1A: Bridging social capital is a function of disclosure on social network sites, and disclosure is a function of privacy attitudes and behaviors.
H1B: Bonding social capital is a function of disclosure on social network sites, and disclosure is a function of privacy attitudes and behaviors.

Social capital and relational investment

By engaging in forms of directed communication such as replying to Facebook Friends' requests for information or writing "Happy Birthday" on their wall, individuals engage in a form of social grooming that serves multiple purposes. In addition to the disclosures that individuals broadcast to their network through public channels such as status updates, interactions between network members are also critical to individuals' perceptions of social capital (Lin 2001). Because these responses are likely to come in forms that are seen by the recipient's network, these behaviors may lead to expanded networks via Friends of Friends, and may increase the likelihood of access to resources in the future due to norms of generalized reciprocity. Therefore, we expect that engagement in SRI will positively predict users' perceptions of bridging and bonding social capital.

H2A: Bridging social capital is significantly and positively related to Signals of Relational Investment.
H2B: Bonding social capital is significantly and positively

related to Signals of Relational Investment.

Network composition and privacy management

As Ellison et al. (2011a) demonstrate, the accrual of social capital in social network sites is a function of network composition, particularly the number of "actual" Friends in the site. However, a simple measure of actual Friends is challenging in heterogeneous networks; for example, an individual with 20 close Friends out of 25 total Friends may feel more comfortable about disclosing than an individual with 20 close Friends out of 800 total Friends. Therefore, we explore network composition using a ratio measure that captures the proportion of actual Friends to total Friends in a social network site. We propose there is an interaction between the composition ratio and use of privacy settings in the accrual of social capital. In particular, we explore the interaction between friend ratio and use of privacy settings (measured as having a Friends only profile), and Friend ratio and use of privacy settings for network segmentation (measured as employing Facebook friend lists to segment content sharing). As these analyses are exploratory in nature, we do not specify directionality in the effect, but rather simply test for the presence of a significant relationship.

H3A: There is a significant interaction between friend ratio and the use of Friends only privacy settings in the accrual of bridging social capital.
H3B: There is a significant interaction between friend ratio and the use of Friends only privacy settings in the accural of bonding social capital.
H4A: There is a significant interaction between friend ratio and the use of segmented privacy settings in the accrual of bridging social capital.
H4B: There is a significant interaction between friend ratio and the use of segmented privacy settings in the accrual of bonding social capital.

Analysis

Path Models

To test hypotheses 1A and 1B, we employed a path analysis to explore the relationship between privacy attitudes and behavior, disclosure activities, and social capital. Path analysis is an extension of multiple regression analysis that allows exploration of hypothesized directional relationships between variables. While path analysis can be used to supplement causal analysis, it is important to note that our analysis is associational in nature.

The construction of the path models follows a two-step approach. In the first step, disclosure, measured by the Facebook disclosure scale, is regressed on privacy attitudes (privacy concerns scale) and privacy behavior (use of segmented privacy settings). In the second step, social capital is regressed on privacy attitudes, behavior, and disclosure. In both cases, we find support for a direct effect of privacy attitudes and behaviors on disclosure and disclosure on social capital, upholding hypotheses 1A and 1B. The regression estimates are reported in Table 1, and the path models are presented in Figures 1 and 2.

Notably, we do not find direct effects of privacy attitudes or behaviors on social capital, which indicates that the relationship between privacy and social capital is mediated by one's ability to disclose successfully on the SNS. In other words, to reap the benefits of SNS use, one must disclose on the site, and one's ability to disclose is a function of privacy attitudes and behaviors. This analysis must be approached carefully as it is not causal, has a limited specification (it tests only the basic relationship and is not carefully controlled), and has low explanatory power (R^2s are below .1). To improve this analysis, we conducted a more robust specification of the model, focusing on the importance of engagement, network composition, and privacy in the accrual of social capital.

Hierarchical Regression Analysis

We employed hierarchical OLS regression analysis to

Step	1	2	1	2
DV	Bridging SC		Bonding SC	
Privacy Attitudes	0.13* (0.11)	0.03 (0.08)	0.15** (0.11)	-0.11 (0.08)
Privacy Behaviors	0.18** (0.13)	0.13 (0.09)	0.19* (0.13)	0.10 (0.10)
Facebook Disclosure		0.22*** (0.49)		0.26*** (0.05)
Constant	2.69*** (0.22)	3.13*** (0.21)	2.61*** (0.22)	3.33*** (0.22)
Observation	211	211	203	203
R-squared	0.059	0.079	0.069	0.089
E	0.97	0.96	0.96	0.95

Standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05

Table 1: Summary of Path Regression

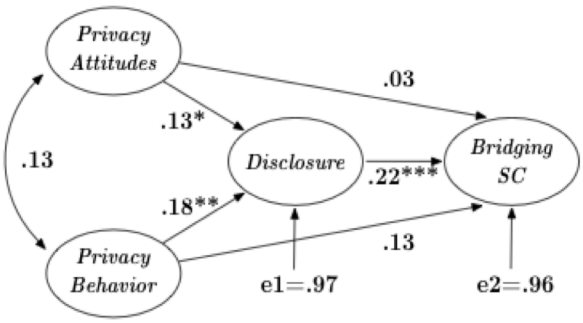

Figure 1. Path Model for Bridging Social Capital

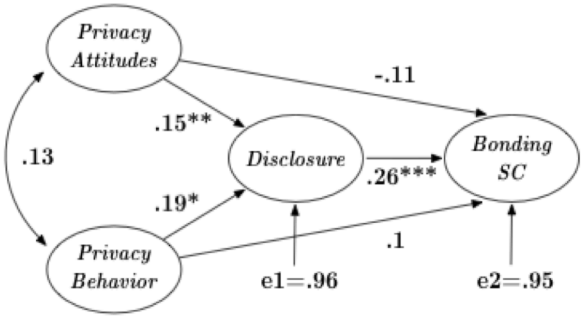

Figure 2. Path Model for Bonding Social Capital

explore hypotheses 2-4. In both the bridging and bonding models, we utilized the same four-step approach, adding (1) controls, (2) Facebook-specific variables; (3) privacy concerns, use of a Friends only profile, and an interaction between the friend ratio and Friends only privacy status; and (4) use of segmented privacy settings (replacing Friends only) and an interaction between the friend ratio and segmented privacy settings.

The logic for these regressions follows the hypothetical specification. The first step of the regression establishes the baseline for the model. In the second step, we explore the impact of SRI (Signals of Relational Investment), which provides insight into the relationship between social capital and these signals of attention in Facebook. In the third and fourth steps, we explore the impact of two separate types of privacy settings, with an interaction effect, on the outcome. As this analysis is exploratory, we do not specify a directional effect for the predictions. However, we note that the use of Friends only profiles and segmented privacy settings operate quite differently in the context of social capital. Whereas changing one's activities to be visible to Friends only may lessen constraints on disclosure within a defined set of ties, the use of segmented privacy settings on some kinds of content may limit the audience of this content.

Hypotheses 2A and 2B: SRI

We report the results of all models in Table 2. We find SRI is a significant positive predictor of both bridging and bonding social capital, with the effect being stronger for bridging social capital. Therefore, we find support for hypotheses 2A and 2B.

Hypotheses 3A and 3B: Friends only

In step three, we add the privacy concerns scale, the binary variable measuring use of a Friends only profile, and the interaction between use of a Friends only profile and the Facebook friend ratio. The interaction effect is significant and positive for bonding social capital, but not bridging, providing support for H3B only. We find that individuals with higher proportions of actual Friends in their networks that employ a Friends only profile report greater bonding social capital than those who have set their profile to be publicly visible to individuals beyond their "Friends" on the site. Practically speaking, individuals that limit their audience and have a high proportion of actual Friends in their network will be the prime beneficiaries of the bonding outcomes of SNS use, perhaps because they feel more free to disclose to this group.

Hypotheses 4A and 4B: Segmented privacy settings

In step four, we include the privacy concerns scale, the

Step	1	2	3	4	1	2	3	4
DV	Bridging Social Capital				Bonding Social Capital			
Sex (1=Female)	0.13* (0.08)	0.07 (0.08)	0.05 (0.08)	0.06 (0.08)	0.05 (0.07)	0.02 (0.07)	0.00 (0.08)	0.03 (0.08)
Age	-0.02* (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Self-Esteem	0.29*** (0.06)	0.30*** (0.06)	0.31*** (0.06)	0.32*** (0.06)	0.51*** (0.06)	0.51*** (0.05)	0.50*** (0.06)	0.51*** (0.06)
Network Diversity	0.46*** (0.07)	0.42*** (0.08)	0.42*** (0.08)	0.39*** (0.08)	0.35*** (0.07)	0.26*** (0.07)	0.25*** (0.07)	0.25*** (0.08)
SRI		0.22*** (0.07)	0.24*** (0.07)	0.22*** (0.07)		0.13** (0.07)	0.15** (0.07)	0.13** (0.07)
Minutes on FB/Day		0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)		0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
FB Disclosure Scale		-0.01 (0.06)	-0.03 (0.06)	-0.02 (0.06)		0.04 (0.05)	0.04 (0.05)	0.04 (0.06)
FB Friend Ratio		-0.02 (0.13)	-0.39 (0.27)	0.49* (0.27)		0.39*** (0.13)	-0.19 (0.28)	0.39 (0.26)
Privacy Concerns Scale			0.12* (0.07)	0.09 (0.07)			-0.05 (0.07)	-0.06 (0.07)
Friends-Only Status (1=Y)			-0.23 (0.14)				-0.20 (0.14)	
RatioXFriendsOnly Interaction			0.49 (0.31)				0.73** (0.31)	
Segmented Privacy Settings (1=Y)				0.32** (0.13)				0.02 (0.13)
RatioXSegmented Interaction				-0.68** (0.31)				-0.01 (0.30)
Constant	1.08*** (0.36)	0.25 (0.40)	0.24 (0.43)	-0.02 (0.41)	0.37 (0.35)	0.18 (0.38)	0.51 (0.41)	0.29 (0.41)
Observations	208	193	191	191	202	186	184	184
R-squared	0.34	0.43	0.45	0.46	0.43	0.52	0.53	0.52

Standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05

Table 2. Hierarchical Regression Estimates for Bridging and Bonding Social Capital.

binary variable measuring the use of segmented privacy settings, and the interaction between segmented privacy settings and friend ratio. We find support for hypothesis 4A, noting that both the main effect and interaction effect for segmented privacy settings are significant. Notably, while the use of segmented privacy settings is positively and significantly associated with bridging social capital, the interaction effect is significant and negative. That is, we find that individuals with higher proportions of actual Friends in their networks that employ segmented privacy settings tend to have lower perceptions of bridging social capital than those who are not employing these settings. This finding is not surprising, in that individuals with a high proportion of actual Friends and who segment disclosures may be less likely to engage with the wide variety of social media content associated with bridging social capital. That is, users who have a high proportion of actual Friends and segment their networks may be less likely to be exposed to the diverse content and novel interactions associated with bridging social capital. We do not find support for hypothesis 4B.

Discussion

This study bridges two separate streams of research related to how people engage with SNSs and the potential benefits that can be accrued through use of sites such as Facebook. We show that people's attitudes and behaviors regarding privacy, their disclosures and interactions on SNSs, and the resources that can be derived through these sites have a complex, interdependent relationship. Furthermore, we show that one's network composition—operationalized in this study as the ratio of "actual" Friends to total Friends on Facebook—interacts with users' engagement in various privacy-enhancing behaviors when predicting users' perceptions of both bonding and bridging social capital.

In the first analysis, we found support for a directional relationship between privacy attitudes and behaviors, disclosure in Facebook, and social capital. In conducting this analysis, we demonstrate that the relationship between privacy and social capital is mediated by disclosure, and that privacy does not act exogenously to constrain social capital outcomes. While this finding is inherently limited due to its simple specification and limited explanatory power, it is insightful for designers as it demonstrates that individuals with different privacy needs can equally reap social capital benefits of participation in social network sites. Although we do not claim causality, we observe that privacy's relationship to social capital is indirect, having more of an impact on the behaviors that lead to social capital exchanges. Concerns about sharing information and engaging in strategies to protect one's content are more likely to be the deciding factor in whether a disclosure is made through a public channel on Facebook, which will subsequently impact whether network members will respond. These interactions constitute social capital in action, and our findings shed insight into the *process* of social capital accrual, not just the outcomes.

Next, we ran a series of hierarchical regression analyses incorporating privacy, disclosures, interaction with one's network (SRI), and network characteristics. What emerged from these analyses provides some additional support to the privacy paradox argument that has previously been made for both the Internet generally and SNSs specifically. The significant interaction effects between one's friend ratio and specific privacy behaviors suggests that privacy and social capital are indeed related in ways that have not previously been examined. If users want to extract the greatest benefits from their network, it is important that they are interacting with that network, as seen in the strong positive beta for SRI in both models. SRI assesses behaviors such as responding to Friends' request and engaging in social grooming activities.

When looking at the model predicting bonding social capital, we find that perceptions of bonding are higher for those with a high actual-to-total friend ratio when they restrict their profile to Friends only. As bonding social capital is associated with provisions of emotional support and, generally, more intimate relationships, it makes sense that users with tight-knit Facebook networks may feel more comfortable disclosing, and enacting this privacy strategy may lead them to be more open in their requests for various resources. These intimate networks should contain higher levels of trust, which is associated with more open sharing and thus offers of support.

When looking at the model predicting bridging social capital, a different picture emerges. First, we find a positive relationship between the actual-to-total friend ratio, suggesting that when users' networks include a greater percentage of closer ties, they have greater perceptions of bridging social capital. This may seem counter-intuitive at first, but it may be useful to think of relationships on a spectrum from strong to weak. While weak ties provide benefits in terms of diverse people and information, ties that are too weak are unlikely to respond to a resource request. Looking at the interaction, we find that these more tight-knit networks who employ segmented privacy settings to limit content have lower bridging than those who do not partition access to content. One potential explanation for this finding is that by restricting access, resource requests may not be reaching the proper audiences who would be able to respond accordingly.

SRI was a significant predictor of both bridging and bonding social capital. While the direction of the relationship is indeterminate in this analysis, SRI has a stronger coefficient in relation to bridging social capital than to bonding. Conscious signals of attention on the site are more powerful for weak ties, as opposed to strong ties, who no doubt share multiple channels of interaction.

Many SNSs are now engaging in design processes intended to help people segment their audience and allow users to control who sees their content. Because bonding social capital is more strongly associated with individuals who have a high actual-to-total Friends ratio and have employed Friends only privacy settings, tools could be created to enhance content sharing within known, limited

audiences. Recently, Facebook and Google+ introduced user-friendly limited sharing functionality within their platforms. These tools may provide opportunities for accruing bonding social capital via the disclosure process outlined in this paper.

Limitations

Our research explores perceived privacy behaviors in our sample, and many of our measures of interest are not discernable from behavioral data such as server-level logs. Our research questions thus necessitate the use of self-report data. Our findings are associational in nature and findings should not be interpreted as causal. Finally, as is common with survey research, response to our solicitation was low, but in line with comparable studies. In this work, we have attempted to follow best-practice social science research methods (e.g., random sampling), which strengthens the contribution in light of these limitations.

Conclusion

When people use social network sites like Facebook, they have the opportunity to access resources such as emotional support and novel information. However, people also have concerns about privacy that may limit how much they are willing to disclose to their Facebook networks. By surveying Facebook members about their attitudes towards and use of the site, we have shown that those who engage in activity with their Friends feel they have more access to resources. We have shown that privacy concerns on their own may not affect people's perceptions of access to bridging and bonding social capital; however, privacy does have a relationship with one's willingness to disclose information, which both positively and negatively affects social capital perceptions. Our approach highlights the complex and interactive nature of these relationships in ways earlier research does not. As SNS designers work to make their sites more valuable to users, they must address—and engage—this new privacy paradox.

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