

Identifying Social Capital in the Facebook Interface

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ABSTRACT

A number of studies have identified a robust relationship between the use of social network sites, particularly Facebook, and positive outcomes such as social capital. Social network site use is often measured as a function of use frequency, network size, and a range of subjective opinions about the value of the site. This research extends this understanding by exploring the relationship between the use of particular elements of the site and social capital. Our goal in this research is to identify where, in the interface, perceived social capital is most effectively produced and transmitted. We find that, as hypothesized, public, person-to-person communication is positively associated with perceived social capital. Through the use of a structural equation model, we are able to provide in-depth exploration of the relationship between the interface elements and the outcome, perceived social capital.

Author Keywords

Social network sites, social networking, Facebook, privacy, behavioral modeling, social capital

Classification Keywords

H5.3 Group and Organization Interfaces; Asynchronous interaction; Web-based interaction

General Terms

Measurement, theory, design

OUTCOMES OF SOCIAL NETWORK SITE USE

Previous research has identified a relationship between the use of social network sites (SNS) and positive outcomes such as perceived social capital [3, 7, 11, 12]. Acting as a mediator between dispersed groups, the SNS interface enables social awareness, facilitates interpersonal interaction, and allows for the maintenance of ties that may have otherwise gone dormant [7]. Through intensive participation in SNS, individuals may have greater access to informational, emotional, and tangible support. These benefits from the network can either be seen as bridging

social capital or bonding social capital [4, 10].

Studies of Facebook use and social capital have generally identified a relationship between intensity of use and perceived social capital. First identified by Ellison et al. [7], intensity of use is generally measured by a construct composed of observed and latent variables. This measure has proven robust, with replications found in subsequent SNS studies [11,12]. Notably, intensity of Facebook use seems to be most positively associated with perceived bridging social capital, the form of social capital identified with the social, economic, and informational value of diverse, "weak-tie" relationships [10].

Recent work has coupled survey research with system-level observational data in exploring the relationship between Facebook use and social capital [3]. Employing regression analysis, the authors found that friend count was a robust predictor of both bridging and bonding social capital, while measures of directed communication and consumption had mixed results for social capital outcomes. In the following study, we wish to further elaborate the relationship between uses of Facebook and perceived social capital, particularly, the relationship between public and private communication practices within the site and perceived bridging social capital.

INTERACTION IN SOCIAL NETWORK SITES

Communication in SNS is generally executed through a range of interface-driven interactions. Facebook, for example, features chat interaction, a direct message feature, wall posts, and status updates as main interaction elements. Each of these interactions may differ on a number of axes, including the expected amount of content, anticipated response times of message recipients, and public-private visibility of content. This last characteristic is the basis for the taxonomy created for this study. Within these four primary interaction elements (chat, direct message, wall posts, status updates), content is either publicly visible to third parties or visible only to the creator and intended recipient of the content. We classify wall posts and status updates as third-party visible interactions because there is reasonable expectation that they will be observed by individuals other than the intended recipient(s) of the message. We classify chatting and direct messaging as one-to-one communication because the content of the message is only visible to the intended recipient(s).

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We hypothesize that the level of disclosure provides insight into the mechanisms of social capital in a social network site. Private, one-to-one disclosures between individuals may serve to deepen interpersonal bonds in dyad [5,6]. However, in a heterogeneous media environment, it is likely that the bonding effects of one-to-one communication are spread over a range of devices, which may dampen the effects of a single form of media. Our first hypothesis (H1) is that increasing intensity of use of private-one-to-one communication tools in Facebook is associated with greater perceived bridging social capital.

A novel affordance of social network sites is the ability to create persistent public communication within a bound audience [2]. In Facebook, status updates and wall posts have a range of interesting properties. As public statements, they facilitate the construction of personal identity within the peer group [5, 8, 9]. These disclosures serve as identity cues, signaling individual attitudes towards individual ties and the group [6]. Creating wall posts both articulates a tie, and identifies features of the ties to the bounded group. Therefore, we hypothesize (H2) that the increasing intensity of use of third-party visible communication tools in Facebook is associated with greater perceived bridging social capital. Furthermore, we expect that third-party visible communication has a stronger relationship to bridging social capital than first-person communication.

SOCIAL CAPITAL IN THE INTERFACE

As Facebook use has been demonstrated to more strongly predict perceived bridging social capital [7, 11] than bonding social capital, this study focuses on the former relationship.

Methodology

Data for this study were collected through a web questionnaire, distributed to a random sample of 6,000 students at UNC-Chapel Hill. The questionnaire was created using Qualtrics software and contained 40 questions, including those used to gather demographic data. A total of 574 students responded to the questionnaire, resulting in a response rate of 9.6%. Incentives for participation were the chance to win one of three \$20 gift cards, chosen via raffle.

Measures

The general analytic model is presented in Figure 1. We are interested in the relationship between intensity of interface element use and perceived bridging social capital.

Interface Element Intensity

Drawing on the Facebook Intensity Scale [7,11], we created *Interface Element Intensity* scales for Status Updates, Wall Posts, Chatting, and Direct Messaging. The instrument intensity scales were constructed from three items, designed to measure the amount of interface element use, dependence on the interface element for communication purposes, and the effectiveness of the interface element in communication. While the factors of the latent construct were standardized between instruments, the language of the

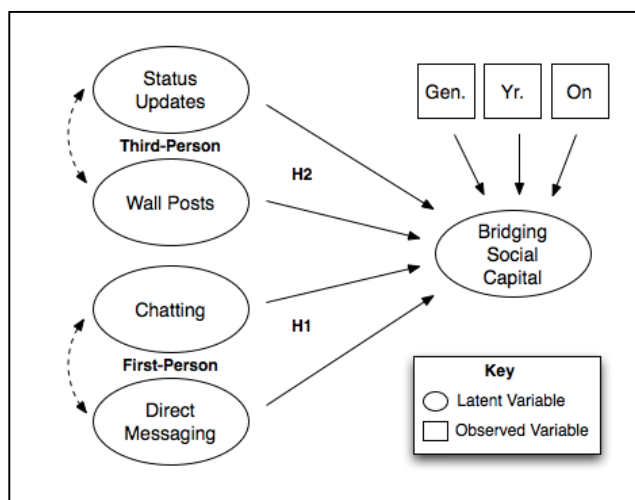


Figure 1: Overview of the analytic model. Intensity of status updating, wall posting, chatting and direct messaging are latent variables. Gender, school year and on-campus status are observed.

questions was varied slightly for question quality. As questions were measured on different scales, responses were standardized prior to analysis. Individual reliability for the four scales was assessed with Cronbach's alpha; reliability ranged between .68 and .71, an acceptable level for a three-item scale.

Bridging Social Capital

Perceived bridging social capital was measured with the bridging social capital scale [7], adapted for UNC-Chapel Hill. This scale measures, among other things, a student's attitudes toward the university, his or her connection to the larger community, and the diversity of connections he or she has established. Reliability for the bridging social capital scale was .91, measured with Cronbach's alpha.

Demographic Measures

Three demographic measures were included in the analysis. Gender is included because the campus population has an unbalanced gender ratio. School year is included, as individuals with more experience on campus may have accumulated more social capital. Residential status (on-campus status) is included because individuals living on campus may have more frequent access to university-related opportunities, thereby potentially increasing social capital.

RESULTS

Of the 574 total responses, the analytic data set was comprised of 557 responses. The average age of the respondent was 19.85, slightly older than the average student (expected: 19, $p=0.000$). Respondents were also more likely to be female (response: 78%, expected: 60%, $p=0.000$), and more likely to live on campus (response: 66%, expected: 47%, $p=0.000$). Respondents tended to be heavy internet users, with eighty percent of respondents using the internet for greater than 10 hours per week.

Measurement Model

In attempting to move from an omnibus measure of activity (the Facebook Intensity Scale) to sub-scales that explore activity within the interface, there are measurement challenges. Particular concern is focused on the reliability of the latent predictive elements (the Facebook interface measures) and potential covariance between the latent predictive elements.

Therefore, we employ structural equation modeling, a technique that provides estimation of latent construct validity through confirmatory factor analysis, as well as a reliable estimation of the predictive model accounting for measurement error. All latent variables (SU, W, C, DM) loaded on a single factor, with the primary factor responsible for greater than 60% of the variance in all cases. Descriptive results, as well as reliability estimates are presented in Table 1.

Regression Model

We then employed structural regression, with the outcome variable slightly modified from the bridging capital scale first described by Ellison et al. [7]. We entered the four

| ID | Question | μ | σ | α |
|------|--|-------|----------|----------|
| SU1 | About how many times do you update your FB status per week? | 1.97 | 1.21 | .707 |
| SU2 | I depend on the status update feature to communicate my thoughts | 2.30 | 1.18 | |
| SU3 | The status update feature allows me to effectively express my ideas | 2.94 | 1.21 | |
| W1 | About how many times per week do you create wall posts? | 2.59 | 1.17 | .684 |
| W2 | I depend on the wall posts feature to communicate ideas | 3.35 | 1.09 | |
| W3 | I can effectively communicate with others using wall posts | 3.98 | .876 | |
| C1 | About how many times per week do you chat over Facebook? | 3.42 | 1.66 | .702 |
| C2 | I depend on the chat feature to connect with other users | 2.56 | 1.33 | |
| C3 | I can effectively communicate with others using the chat feature | 3.21 | 1.27 | |
| DM 1 | About how many times per week do you send direct messages over Facebook? | 1.87 | .916 | .704 |
| DM 2 | I depend on the direct messaging feature to connect with others | 3.43 | 1.15 | |
| DM 3 | I can effectively communicate with others using the direct message feature | 4.11 | .798 | |

SU1, W1, C1 and DM1 scored on following: 1: 1 or less, 2: 2-4 times, 3: 5-7 times, 4:8-10 times, 10: 10 or more times per week. Other questions on a 5 point Likert agreement scale where 1: Strongly agree and 5: Strongly disagree. Scales standardized in measurement model.

Table 1: Results and reliability estimates of the four latent factors.

latent predictive factors (status update, wall post, chat, and direct message) and the three observed covariates (gender, on campus status, and school year) into the regression model, allowing for covariance between the latent predictive factors (Table 2). Results of the regression analysis are presented in Table 3. Model identification is within acceptable criteria, with an RMSEA of 0.059.

In the analysis, we find that wall posting behavior is the only measured interface element that was a significant predictor of perceived bridging social capital ($\beta=.405$, $p=.003$). Of the three observed covariates, gender was the only variable that demonstrated significance. Because the latent factors were standardized to account for differences in the measurement scale, we can interpret the regression output to mean that a one standard deviation movement in an individual's wall posting intensity is associated with a .405 unit increase in an individual's bridging social capital.

Information Consumption and Social Capital

Of the four interface elements measured, wall post was the only significant predictor of perceived bridging social capital. We only find partial support for hypothesis one, and lack of support for hypothesis two. Our theoretical framework strongly couples the interpersonally communicative aspects of social network and bridging capital. That is, the process of social capital accumulation

| | Status | Wall | Chat | DM |
|--------------|---------|---------|---------|--------|
| Wall Post | 0.130* | | | |
| Chat | -0.067* | -0.066* | | |
| Direct Msg. | 0.050* | 0.137* | -0.041* | |
| Gender (1=F) | -0.003 | 0.037* | 0.015 | 0.028* |
| On Campus | 0.052* | 0.034* | -0.033* | 0.012 |
| School Year | -0.100* | -0.090* | 0.116* | 0.006 |

Table 2: Correlations within latent predictors and between observed variables. Starred correlations are significant at $p < .05$.

| Hyp. | Predictor | Coefficient | P-Value |
|------|----------------|---------------|--------------|
| H1 | Status Update | -0.098 | 0.418 |
| H1 | Wall Post | 0.405 | 0.003 |
| H2 | Chat | 0.094 | 0.259 |
| H2 | Direct Message | 0.040 | 0.640 |
| Cov | Gender | -0.189 | 0.005 |
| Cov | On Campus | -0.033 | 0.646 |
| Cov | School Year | -0.004 | 0.885 |

Model Parameters: RMSEA 0.059 (0.053-0.064), SRMR 0.043, Chi Square $p=0.00$. Standardized coefficients.

Table 3: Results of structural equation model predicting bridging capital. Wall posting is the significant predictor, and gender is a significant control variable.

through a SNS is associated with interpersonal communication. Of course, social network sites provide a range of awareness mechanisms that may affect an individual's social capital. For example, an individual that spends more time reading a News Feed may have a better sense of his or her local environment, contributing to increased social capital.

Recent research has identified a potentially negative association between consumptive social network behaviors and bridging social capital [3]. To test for consumption effects, we re-ran our full model, including a latent variable measuring News Feed consumption. The additional measure was not significant ($\beta=.004, p > 0.05$). Of course, the measurement and sample differ substantially from [3].

DISCUSSION

Wall posting is a form of semi-public interpersonal communication that remains fairly novel to SNS. According to [2], the semi-public communication that wall posts allow is one of the defining traits of an SNS. When comparing wall posts to chatting and direct messaging, we see that the one-to-one interaction exists across multiple tools. But why might wall posting emerge as a significant predictor, whereas status updates, another form of semi-public communication, do not?

One explanation might be in the focus of communication afforded by the interface. Wall posts are a primarily one-to-one, semi-public method of communication, whereas status updates are directed towards large, heterogeneous audiences. The nonspecific nature of the audience may be associated with a lack of connection between the poster and the audience, especially if the response to the status update is limited in terms of feedback. This explanation would suggest that more active and focused communication interfaces are predictive of perceived bridging social capital.

Wall posting is highly focused and inherently interactive. When an individual creates a wall post, they signal a relationship with an individual in the public's eye [5]. Furthermore, reciprocal wall posts act as a form of verification signal, providing observers direct evidence of a relationship [6]. The feeling of closeness associated with such a public display of connection may very well be linked to increased feelings of inclusion, awareness, and connectedness - all hallmarks of bridging social capital. Another peculiarity about wall posts is their relatively broad scope of communication. They are the only communication element on Facebook visible to friends' friends. This may be another explanation for the findings.

Conclusion and Limitations

A more thorough understanding of the mechanisms of social capital production and accumulation in SNS would assist site operators, designers, and policy builders [1]. In this work, we explored the relationship between interface elements and the production of perceived bridging social capital. Using structural equation modeling to account for

inherent covariance between interface element use, we found that increasing intensity of wall posting is significantly associated with the accumulation of perceived bridging social capital. Wall posts represent an affordance unique to SNS, enabling a form of semi-public, directed, one-to-one (or more) communication. In future work, we wish to explore mechanisms similar to the wall post in other social network sites, to see if other semi-public, directed, one-to-one interface use is associated with the production of social capital. Similar findings in other sites may indicate perceived bridging social capital is associated with communication interfaces that are both publically visible and direct in their audience.

It is important to note that this research was conducted using only undergraduate college students from a single university. It may be concluded that the cultural norms among participants are relatively homogenous, and that results may differ significantly between groups with differing values concerning networks and social interaction. Other limitations include self-reported measures for use of communication elements that may not be as accurate as data from actual use. Without this hard data, we concluded that self-reported measures were the best alternative. Also, the low response rate could create a non-response bias.

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