Building Stronger Ties With Alumni Through Facebook to Increase Volunteerism and Charitable Giving

Harmonie Farrow
Texas Christian University

Y. Connie Yuan
Cornell University

This research explores how strength of network ties, as fostered by the use of a social network site, Facebook, (a) influences alumni attitudes toward volunteering for and making charitable gifts to their alma mater, and (b) fortifies consistency between attitude and behavior. After exploratory interviews and participant observation, a survey of 3,085 alumni was conducted for hypothesis testing. Structural equation modeling analysis revealed: First, active participation in Facebook groups positively predicted strength of network ties along 2 dimensions: frequency of communication and emotional closeness. Second, both dimensions of tie strength influenced actual behavior, albeit via different routes. The paper also contributes to attitude change research in showing that strength of network ties can help ensure consistencies between attitude and behavior.

Keywords: social networking sites, tie strength, attitude-behavior consistency.


American universities and nonprofit institutions rely on a three-pronged system of support: money raised from services provided, government funding, and private donations (Young, 2003). As the cost of education continues to climb and the government appropriates more money away from education for welfare and medical programs (Elliot, 2006), educational institutions increasingly have to rely on private donations. According to the Council for Aid to Education (2009), 27.5 percent of all private donations to higher education institutions in 2007 came from alumni, second only to donations made by charitable foundations at 28.8 percent, making it vitally important for universities to implement strategies to routinely engage and solicit their alumni. In addition, it is also in the interest of universities and nonprofit organizations to recruit potential volunteers in addition to donors because people volunteering for nonprofit organizations are also more likely to make charitable gifts to them (Freeman, 1997; Webb, 2002).

Past research shows that individuals are more likely to actively engage in volunteering for or giving to an organization if that organization is a part of their social network (Brady, Schlozman, & Verba, 1999; Wilson, 2000). This is because individuals are more likely to hear about volunteer or charitable giving opportunities through interpersonal channels than through the mass media (Klandermans &
Oegema, 1987; Wilson, 2000), and such personal solicitations are more compelling (Brady et al., 1999; Wilson, 2000). Several studies (Klandermans & Oegema, 1987; Schervish & Havens, 1997) have also demonstrated the importance of developing a strong relationship between the nonprofit organization and the individual in obtaining acquiescence to a solicitation. While social network ties are important for universities to solicit their alumni to give back to the alma mater, it is difficult for many universities to maintain strong ties with the entirety of their large alumni populations through conventional high-cost methods of direct mailing, phone calls and face-to-face interactions. This research explores the role of new social media in overcoming these challenges to support strong connections with alumni.

Specifically, building on research on strength of network ties, and on attitude and behavior, this study seeks to determine if belonging to university alumni groups on Facebook increases the creation and maintenance of strong social network ties among alumni and between alumni and the university. Different from many existing studies which tend to pay more attention to finding correlates of frequent SNS usage or of charitable behavior, this study builds on persuasion research to explore how and why SNS usage influences the formation and maintenance of network ties and attitudes, which in turn influence behavior. Research on compatibility between attitude and behavior (Eagly & Chaiken, 1993) yielded mixed results about whether attitudes can indeed predict corresponding behaviors. While earlier persuasion research focused more on psychological factors, e.g. the role of self-efficacy, we explored in this study how different dimensions of tie strength, including frequency of communication and emotional closeness, enhance social influence and help ensure consistency between attitude and behavior. By unpacking the differential impacts of frequency of communication and emotional closeness on attitude and behavior, the results of our study have the potential of providing more detailed insight into how SNS applications can benefit nonprofit organizations.

This research contains two phases at a large university in the northeastern United States. First, an exploratory study, which consisted of interviews with 12 university alumni and participant observation in three university alumni groups on Facebook, was conducted to better understand how and why alumni currently use Facebook and how this affects their relationships to other alumni and the university. The results of this exploratory study were used to inform the second phase of research, which consisted of an electronic survey that obtained responses from 3,085 out of 11,281 alumni contacted.

Social Network Sites

SNSs such as Friendster, MySpace, LinkedIn, and Facebook are low-cost tools that can promote the creation and maintenance of strong social network ties by increasing the frequency of communication with and the emotional closeness to other individuals. SNSs are "web-based services that allow individuals to 1) construct a public or semipublic profile within a bounded system, 2) articulate a list of other users with whom they share a connection, and 3) view and traverse their list of connections and those made by others within the system" (boyd & Ellison, 2007, p. 211). Some SNSs, such as MySpace, were designed to facilitate the formation of new online connections between individuals with similar interests, but many more, such as Friendster, LinkedIn and Facebook, are designed with the primary purpose of establishing or maintaining contact with members of offline networks in an online format (boyd & Ellison, 2007; Ellison, Steinfield, & Lampe, 2007).

A large body of research has been conducted on the ability to create or maintain social network ties through social network sites. These studies show that SNSs are low-cost tools for promoting stronger ties and the production of social capital by overcoming physical distances (Bargh & McKenna, 2004; Ellison et al., 2007; Quan-Haase, Wellman, & Witte, 2002), reaching large audiences (Bargh & McKenna, 2004), and increasing the frequency of communication (Ellison et al., 2007; Hampton & Wellman,
Such network benefits are particularly strong when online social interactions supplement existing offline relationships (Boyd & Ellison, 2007; Hampton & Wellman, 2003; Quan-Haase et al., 2002). As such, SNSs potentially provide a low-cost, supplemental means of communication for universities to help alumni maintain strong network connections.

Tie Strength & Social Network Sites

Research has shown that network ties, depending on their strength, are beneficial for individuals in a variety of ways, for instance, providing social support (Granovetter, 1983; Haythornthwaite, 2005) and comfort (Krackhardt, 1992), new information and contacts (Burt, 1987; Haythornthwaite, 2005), and so on. Granovetter originally defined the strength of a tie as a “combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie” (Granovetter, 1973, p. 1361). Marsden and Campbell (1984) sought to disentangle these various concepts, and found that there are two distinct aspects or indicators of tie strength: time or frequency spent in a relationship, and the depth or closeness of the relationship.

Several studies have suggested that SNSs can increase the strength of ties among their members along both dimensions of tie strength (Ellison et al., 2007; Hampton & Wellman, 2003; Haythornthwaite, 2005). Studies of an undergraduate population (Ellison, et al., 2007) and a local community neighborhood (Hampton and Wellman, 2003) both showed that membership in an online social network associated with a pre-existing offline network lead to increases in the frequency of communication on-and offline. The same study of undergraduate students showed that intensity of Facebook usage had an effect on an individual’s perception of emotional closeness to members of their pre-existing offline social network (Ellison, et al., 2007). Wu, DiMicco and Millen’s (2010) study of IBM’s internal SNS also concluded that active participation in a SNS increases the perception of emotional closeness among individuals.

The findings that SNSs contribute to stronger network ties along both dimensions are in large part due to technological affordances that distinguish SNSs from other types of computer-mediated communication, such as e-mail. Research on SNSs has shown that in contrast to e-mail, where information is pushed out to audience members from a single author, SNSs allow users to actively seek out or pull in information about individuals with whom they share an offline connection (Boyd & Ellison, 2007; Ellison et al., 2007; Lampe, Ellison, & Steinfield, 2006). Additionally, on SNSs like Facebook, individuals can peruse the messages posted by their friends and their friend’s friends (Boyd & Ellison, 2007; Lampe et al., 2006), allowing instant access to a large number of different opinions and authors. Finally, upon joining an SNS, users create a unique profile (Boyd & Ellison, 2007), which they use to keep in touch with friends. Unlike some modes of computer-mediated communication, which change as individuals move, such as telephone numbers or e-mail addresses, individuals update, but do not usually completely change, their SNS profiles between various life stages (Ellison et al., 2007), making it easier to find old friends and maintain contact with existing ones over a longer period of time.

In the first stage of this study, we interviewed 12 alumni, 4 male and 8 female participants, to learn about their usage of Facebook groups. Participant’s ages ranged from 23 to 56 and averaged 36. The interviews were conducted in person or on the phone and lasted between 20 and 70 minutes. All interviews were recorded, transcribed, and analyzed using the constant comparative method of qualitative analysis (Glaser & Strauss, 1967). Several key patterns and concepts emerged in regards to how alumni think about their connection to the university, volunteering, and charitable donations. A number of these alumni highlighted the aforementioned differences in technological affordances as a benefit to belonging to an alumni group on Facebook. One woman, who is actively involved with her
university’s sorority chapter group on Facebook commented that after graduation, it is much easier to get in touch with sorority sisters via Facebook than e-mail because many of them change their e-mail addresses. Because photos and information documenting changes in friends’ lives are updated and shared on a regular basis and in a central place, SNSs provide a more convenient way than other communication media for friends to stay in touch despite differences in time and location. Based on the above-mentioned findings from other studies, as well as our participant-observation and exploratory interviews, we would anticipate that active participation in alumni groups on Facebook would increase the strength of ties within the university alumni network along both dimensions, such that:

Hypothesis 1: University alumni who are active members of alumni groups on Facebook will experience a greater frequency of communication with other alumni than alumni who are not active members of alumni groups on Facebook.

Hypothesis 2: University alumni who are active members of alumni groups on Facebook will have a stronger perception of emotional closeness to university alumni than alumni who are not active members of alumni groups on Facebook.

As two of the strongest indicators of tie strength, frequency of communication and emotional closeness are closely intertwined. However, in a quantitative review of different dimensions of tie strength across multiple studies, Marsden and Campbell (1984) found that frequency of communication could function as a predictor of closeness because frequent communication breeds familiarity, which is fundamental for the development of trust and interpersonal closeness. Following this logic, we would expect to see an increase in emotional closeness to other university alumni with increases in frequency of communication between network actors, such that:

Hypothesis 3: University alumni with an increased frequency of communication within the alumni network will have a stronger perception of emotional closeness to other university alumni than alumni with less frequent communication within the alumni network.

Recent research has shown that relationships established between and among individuals with common interests online can form meaningful and enduring online communities (Fayard & DeSanctis, 2005) in which members may exhibit intense feelings of camaraderie, empathy, and support in the online spaces (Preece & Maloney-Krichmar, 2005). University SNSs can facilitate the development of such communities because, functioning as foci of activities (Feld, 1997), they provide a platform for alumni to stay connected with one another, and to share and explore their common interests in giving back to the university through either volunteering activities or financial contributions.

Such connections with other alumni over time can strengthen alumni’s feelings of connectedness with the university in general. During an interview, one alumna described how friendships made while in school foster feelings of camaraderie and support for the university community on a higher level, and how Facebook highlights that impact by arraying each individual friendship. For this alumna, it is not a set of buildings on campus, but the relationships that she made, and maintains on Facebook, that defines the university. The closer the relationship with her friends from school, the closer she feels to the university community. Based on these arguments and observations, the following hypothesis is proposed:

Hypothesis 4: University alumni who have a stronger perception of emotional closeness to other university alumni will have a stronger perception of emotional closeness to the university than alumni with a weaker perception of emotional closeness to other university alumni.
The Impact of Tie Strength on Attitude and Behavior

Much of the literature on nonprofit organizations that suggests that network connections have an influence on an individual’s volunteer and charitable giving behavior (Freeman, 1997; Schervish and Havens, 1997; Wilson, 2000; Wilson & Musick, 1999), focus on finding correlates of volunteering and charitable giving behaviors, without paying much attention to exploring why such behaviors happen. Building on previous persuasion research, this study explores how alumni’s attitudes toward volunteerism and charitable giving influence their actual behavior, and how SNS usage influences the formation of such attitudes through building stronger ties with alumni.

We propose that frequent communication supported by SNSs activities can facilitate the formation of positive attitude toward volunteerism and charitable giving for the following reasons. As discussed earlier, different from alumni newsletters and e-mails typically sent to alumni monthly or quarterly via an alumni office on a fixed time interval, SNSs allow all members to access and share information from a variety of sources and see a variety of posts or arguments about a particular topic in one location and around the clock. According to the elaboration likelihood model of persuasion (Petty & Cacioppo, 1986), for the less motivated, low-involvement audience, the sheer number of posts or messages exchanged on SNSs can directly influence attitude formation because, the number of arguments can on its own function as strong heuristic cues of persuasion (Chaiken, 1980; Chaiken & Stangor, 1987; Chaiken & Trope, 1999) indicating the popularity of a topic. Bandwagon effect is also more likely to be observed among these people when they feel obliged to join the crowd upon observing others’ actions. For the more motivated, high-involvement audiences, a large number of public postings on SNSs may encourage posting quality arguments because members may be more mindful of their messages when their messages are not anonymous. Moreover, when different information sources provide repeated exposure to the same message from different perspectives, the message can become more comprehensible, which is critical for highly involved audiences who, taking the central route of information processing (Petty & Cacioppo, 1986), tend to systematically examine all arguments before forming an attitude. Taken together, frequent communication can have effects on both low- and high-involvement audiences via different routes. Such frequent communication on Facebook implies a stronger reinforcement of alumni’s attitudes toward volunteerism and charitable giving when SNSs allow motivated alumni connect with each other across years and location. Based on these findings about attitude formation and the technological affordances of SNSs, it is hypothesized that:

Hypothesis 5a: University alumni with increased frequency of communication within the alumni network will have a stronger positive attitude toward volunteering for the university than alumni with less frequent communication.

Hypothesis 5b: University alumni with increased frequency of communication within the alumni network will have a stronger positive attitude toward charitable giving for the university than alumni with less frequent communication.

Persuasion research finds that the formation of attitude is driven by not only cognitive processes as discussed above (Eagly & Chaiken, 1993; Zanna and Rempel, 1988), but also affective processes. Affective processes are based on repeated emotional conditioning and the reinforcement of feelings towards a behavior (Eagly & Chaiken, 1993). This reinforcement of feelings is often influenced by the strength of the interpersonal relationship between the person who is conditioning and the person being conditioned (Johnson & Grayson, 2005). Therefore, the emotional closeness between the alumnus and the university should have an impact on the alumnus’ receptivity to repeated emotional conditioning,
especially if messages exchanged among alumni are affective as well as emotional. Again, we would expect this to be especially true with alumni communication on SNSs because of the public display of positive affect. Prior to SNSs, relationships between the university and alumni were maintained through alumni newsletters or e-mails. Most messages communicated via these communication channels are informational in nature, updating alumni on current events. In contrast, posts on Facebook alumni groups can be both informational and affective. Moreover, because the affective messages are exchanged among peers, they carry an authenticity that targeted e-mails sent from the university do not, and are hence more persuasive in shaping attitude. Again because all the posts are on public display, SNS members can reinforce each other’s positive attitude toward the university. If alumni honestly exchange messages about the importance of volunteering for or giving to the university, we would expect to see that alumni with close relationships to the university would have a more positive attitude toward volunteering for and giving to the university:

Hypothesis 6a: University alumni with stronger perceptions of emotional closeness to the university will have a stronger positive attitude toward volunteering for the university than alumni with weak perceptions of emotional closeness to the university.

Hypothesis 6b: University alumni with stronger perceptions of emotional closeness to the university will have a stronger positive attitude toward charitable giving to the university than alumni with weak perceptions of emotional closeness to the university.

It is important to consider how the social ties that alumni can form via SNSs might influence alumni’s attitudes toward volunteering for and making charitable gifts to the university. It is also in the best interest of the university to understand how, via fostering positive attitude toward volunteerism and charitable giving, strong social ties can translate into actual volunteering and charitable giving behavior. Many studies have been conducted on the relationship between attitude and behavior. While attitude and behavior are compatible, consistency between attitude and behavior is not always observed (Ajzen & Fishbein, 1977; Eagly & Chaiken, 1993). Ajzen and Fishbein (1980) pointed out in their theory of reasoned action that self-efficacy can play a major role in influencing whether a person will behave in ways that are consistent with his or her attitude. Take charitable giving as an example. Income and age can be major self-efficacy factors influencing whether people with a positive attitude toward giving will actually give. We anticipate that motivated high-income, older alumni will give more because they are more likely to have extra income at their disposal, because when people have adequate resources, they want to engage in behaviors that are consistent with their attitudes so as to reduce cognitive dissonance. In the context of the current research, we anticipate higher consistency between attitudes and behavior - provided that people have adequate resources - because frequent communication as supported by the usage of social media provide repeated stimuli for classic conditioning (Bandura, 1986), through which the connection between attitude and behavior can be fortified. It is hypothesized:

Hypothesis 7: University alumni with stronger positive attitudes toward volunteering for the university will be more likely to engage in actual volunteer behavior for the university than alumni with less positive attitudes toward volunteering for the university.

Hypothesis 8: University alumni with stronger positive attitudes toward charitable giving to the university will be more likely to engage in actual charitable giving behavior for the university than alumni with less positive attitudes toward charitable giving to the university.

The hypotheses were combined into a single model displayed in Figure 1.
Figures 1 Conceptual model of the impact of membership to university alumni groups on Facebook on the strength of social network ties, volunteerism and charitable giving

Method

Sample and Procedure
The first stage of the study consisted of interviews and participant observations. In the second stage of the study, a large-scale survey study was conducted. To collect the survey data, a URL for the survey was sent out by the university Office of Alumni Affairs and Development as a follow-up study to a survey they conducted 6 months earlier among all alumni. To avoid oversurveying the whole alumni population, a subsample of the whole alumni population, 11,281 university alumni in total, was contacted for this study. The electronic survey remained open for responses for 34 days and one reminder e-mail was sent 21 days after the survey opened. 3,085 alumni completed the survey for a response rate of 27.3 percent. 1,648 of the survey respondents were male, 1,398 were female (45%) and 39 declined to identify. Survey respondents’ ages ranged from 22 to 97 and averaged 48.5. Comparing statistics between our sample and the whole alumni population, our sample had 6% more female respondents than the whole alumni population, but almost an identical age average (48.6).

Survey Measures
To measure the key variables in this study, several scales were adapted from existing literature to fit the context of this study. The survey was pilot tested by 13 university alumni, 5 male and 8 female, whose ages ranged from 23 to 54 and averaged 32. Minor modifications to survey questions were made per their comments. The scales used for each variable in the model are described in the subsequent paragraphs.

Actual charitable giving behavior was assessed by seven items adapted from the 2005 PCUAD Alumni Attitude Study (Performance Enhancement Group, Ltd., 2005). Behavioral items asked
university alumni to identify in the past year how much money they had given to the university, and to what areas, ranging from academic areas (e.g., University Library) to student life. The sum of the money given to all seven areas was used to measure actual charitable giving behavior.

*Attitude toward charitable giving* was measured by six items adapted from the 1990 American Citizen Participation Survey (Verba, Schlozman, Brady, & Nie, 1990), the 2005 PCUAD Alumni Attitude Study (Performance Enhancement Group, Ltd., 2005) and alumni interviews. Attitudinal measures of charitable giving include “I think alumni should provide financial support for the university if they have the money” and were measured on a 7-point scale where 1 = *strongly disagree* and 7 = *strongly agree*. The Cronbach’s alpha of this scale was .90.

*Actual volunteer behavior* was assessed by eight items adapted from the 1990 American Citizen Participation Survey (Verba, Schlozman, Brady, & Nie, 1990). Behavioral measures of volunteerism asked alumni to indicate how many hours they had volunteered for activities or clubs such as the “University Alumni Admissions Ambassador Network” over the past year. Responses were measured on a 7-point scale where 1 = 0 hours and 7 = 50 or more hours. The sum of the hours volunteered for all eight activities was used to measure actual volunteer behavior.

*Attitude toward volunteerism* was assessed by four items adapted from the 2005 PCUAD Alumni Attitude Study (Performance Enhancement Group, Ltd., 2005) and alumni interviews. Attitudinal measures of volunteerism, such as “I think alumni should volunteer for the university if they have the time,” were measured on a 7-point scale where 1 = *strongly disagree* and 7 = *strongly agree*. The Cronbach’s alpha of this scale was .89.

*Active membership in university alumni groups on Facebook* was measured by an item adapted from Ellison et al. (2007). Respondents were asked to identify how many university alumni groups on Facebook they are active in and the affiliation of those groups (ex. class year, athletic teams, etc.).

*Frequency of communication with other alumni* was measured by five items assessing individuals’ rates of participation in various forms of communication with other university alumni. The items were adapted from the 2005 PCUAD Alumni Attitude Study (Performance Enhancement Group, Ltd., 2005). An example of an item is “How often do you usually talk to other university alumni face-to-face?” The items were assessed on a 7-point scale where 1 = *never* and 7 = *almost every day*. The Cronbach’s alpha of this scale was .84.

*Emotional closeness to university alumni* was measured by 10 items adapted from the Sense of Community Index 2, a revised and more reliable version of the original Sense of Community Index, one of the most common scales used to measure the psychological sense of community (Chavis, Lee, & Acosta, 2008; Obst & White, 2004) and interviews with university alumni. Examples of these items include “If he or she asked me, I would help another university alumni.” Respondents’ level of agreement with all 10 statements were measured on a 7-point scale where 1 = *strongly disagree* and 7 = *strongly agree*. The Cronbach’s alpha of this scale was .91.

*Emotional closeness to the university* was measured by five items adapted from the Sense of Community Index 2 (Chavis, Lee, & Acosta, 2008) and interviews with university alumni. An example of an item assessing an individual’s connection to the university includes “I am proud to have attended the university.” Responses were measured on a 7-point scale where 1 = *strongly disagree* and 7 = *strongly agree*. The Cronbach’s alpha of this scale was .91.

**Analysis**

The hypotheses summarized in Figure 1 were tested using structural equation modeling (SEM) in LISREL 8.8. Compared to path analysis, structural equation modeling has the advantage of providing simultaneous estimation of all structural coefficients, their corresponding significance tests, and global
tests of the adequacy of the entire model (Joreskog & Sorbom, 1996). To assess the overall model fit analysis, $\chi^2$ goodness-of-fit statistic is commonly used, where a nonsignificant value indicates good fit of the model to the data. Since $\chi^2$ tends to stay significant in large samples ($N > 1,000$) regardless of the actual fit of the model (Kline, 2005), other fit indices are also reported to show how well the specified model accounts for the data. These indices include the root mean-squared error of approximation (RMSEA), the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), and the comparative fit index (CFI). RMSEA values less than .05 typically indicate good fit. GFI, AGFI, and CFI indices should range from 0 to 1.00, with values of .90 and above representing good fit. Both standardized and unstandardized regression coefficients for the hypothesized structural relations are reported along with their statistical significance in the figures. The reporting of hypothesis testing results, however, used unstandardized regression coefficients only, following the recommendations from the SEM research community (e.g. Kline, 2005; SEMNET posts). The alpha level for all tests was set at .05.

The LISREL 8.8 program also provides a modification index for each possible parameter that was not specified in the original theoretical model. A large modification index indicates that model fit would likely be improved by the addition of that path to the model (Joreskog & Sorbom, 1996). Modification indices are usually employed in conjunction with theory to determine whether the addition of any paths to the model is defensible. A typical procedure is to delete nonsignificant paths if such deletion is theoretically defensible, and then to add theoretically defensible paths that have large modification indices one at a time. (Kline, 2005). All of these recommended procedures were followed in the model modification. However, out of the concern for space, only the results of the initial and the final models are reported.

Results

Data Screening and Preparation

Before conducting SEM tests, the variables were screened for skewness and kurtosis in distribution. All but one variable, age, was not normally distributed. The histogram revealed a near uniform distribution of this variable from the 20s to the 70s, along with 3.4 percent of respondents aged between 80 and 93. Since none of the typical data transformation techniques, e.g. square root, inverse, logarithm, etc, is effective in reducing skewness and/or kurtosis of uniformly distributed data, age was dummy-coded into two categories, with 1 = above 40, and 0 = less than or equal to 40, because the below-40 age group had a nearly equal number of active and nonactive participants in alumni groups on Facebook, while nonactive participants significantly outnumbered active participants in the above-40 age group. Using PRELIS, data imputation was also conducted to replace missing values with most probable values selected by other participants of similar characteristics. The final sample size for model testing was 2,665, after list-wise deletion. Descriptive statistics and zero-order correlation coefficients are displayed in Table 1. Following the recommendations from the SEM research community (e.g., Joreskog & Sorbom, 1996), both mean and standard deviations were added as input data along with the correlation matrix so that a covariance matrix could be calculated and used for SEM modeling.

The Measurement Model

Following the two-step procedure recommended by Kline (2005), the fit of a measurement model was tested first before testing the fit of the structural model. The measurement model examines whether each item in a scale is a good indicator of an underlying construct, which is designated with a circle in Figure 1. As summarized under Model 1 in Table 2, the $\chi^2$ value for the baseline model was 8,958.41 ($df = 284, p < .05$). The significant $p$ value indicated a less than adequate fit between the overall model
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Actual charitable giving behavior</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2. Attitude toward charitable giving</td>
<td>.32**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>3. Actual volunteer behavior</td>
<td>.34**</td>
<td>.19**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4. Attitude toward volunteerism</td>
<td>.22**</td>
<td>.63**</td>
<td>.32**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5. Age</td>
<td>.19**</td>
<td>.05**</td>
<td>.03</td>
<td>—11**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6. Income</td>
<td>.23**</td>
<td>.09**</td>
<td>.12**</td>
<td>.06**</td>
<td>.22**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>7. Family members are alumni</td>
<td>.17**</td>
<td>.06**</td>
<td>.10**</td>
<td>.05*</td>
<td>.18**</td>
<td>.10**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8. Number of university alumni groups active in on Facebook</td>
<td>.03</td>
<td>.10**</td>
<td>.16**</td>
<td>.18**</td>
<td>—37**</td>
<td>—13**</td>
<td>—05**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>9. Frequency of communication with other alumni</td>
<td>.12**</td>
<td>.17**</td>
<td>.28**</td>
<td>.29**</td>
<td>—38**</td>
<td>—08**</td>
<td>.07**</td>
<td>.33**</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>10. Emotional closeness to other alumni</td>
<td>.14**</td>
<td>.34**</td>
<td>.20**</td>
<td>.47**</td>
<td>—26**</td>
<td>—05*</td>
<td>.09**</td>
<td>.20**</td>
<td>.60**</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>11. Emotional closeness to the university</td>
<td>.21**</td>
<td>.55**</td>
<td>.24**</td>
<td>.65**</td>
<td>—18**</td>
<td>.03</td>
<td>.06**</td>
<td>.20**</td>
<td>.35**</td>
<td>.61**</td>
<td>—</td>
</tr>
<tr>
<td>M</td>
<td>.74</td>
<td>4.39</td>
<td>1.43</td>
<td>4.46</td>
<td>48.54</td>
<td>4.85</td>
<td>.73</td>
<td>.53</td>
<td>1.85</td>
<td>5.07</td>
<td>5.49</td>
</tr>
<tr>
<td>SD</td>
<td>.95</td>
<td>1.43</td>
<td>3.49</td>
<td>1.40</td>
<td>17.36</td>
<td>2.61</td>
<td>.97</td>
<td>1.18</td>
<td>1.31</td>
<td>1.51</td>
<td>1.32</td>
</tr>
<tr>
<td>Cronbach’s α</td>
<td>—</td>
<td>.90</td>
<td>.89</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.84</td>
<td>.91</td>
</tr>
</tbody>
</table>
Table 2  Summary of Fit Indicators

<table>
<thead>
<tr>
<th>Models</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$p$</th>
<th>RMSEA</th>
<th>GFI</th>
<th>AGFI</th>
<th>CFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Baseline measurement model*</td>
<td>8958.41</td>
<td>284</td>
<td>.00</td>
<td>.11</td>
<td>.79</td>
<td>.75</td>
<td>.96</td>
</tr>
<tr>
<td>2. Baseline structural model</td>
<td>2399.70</td>
<td>147</td>
<td>.00</td>
<td>.08</td>
<td>.92</td>
<td>.88</td>
<td>.96</td>
</tr>
<tr>
<td>3. Revised structural model</td>
<td>1166.59</td>
<td>141</td>
<td>.00</td>
<td>.05</td>
<td>.96</td>
<td>.94</td>
<td>.98</td>
</tr>
<tr>
<td>4. Alternative model 1: Reversed the directions of all the hypothesized relationships in the model</td>
<td>4138.68</td>
<td>152</td>
<td>.00</td>
<td>.10</td>
<td>.87</td>
<td>.81</td>
<td>.94</td>
</tr>
<tr>
<td>5. Alternative model 2: Reversed the directions of the links between the attitudinal and behavioral measures</td>
<td>Model does not converge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: RMSEA = root mean squared error of residuals; GFI = goodness of fit index; AGFI = adjusted goodness of fit index; CFI = comparative fit index.

*The control variables were not included in the test of the measurement model.

and the observed data. However, because the $\chi^2$ value is sensitive to large sample sizes, other fit indices play a more crucial role in deciding the overall fit of the model. Yet, the GFI fit index was .79, and AGFI was .75, all indicating a poor model fit. Only CFI was .96, above the conventional value of .90. Finally, the RMSEA fit index was .11, much higher than the conventional criterion of .05, again indicating poor model fit.

The poor overall fit can happen despite good reliability of each individual scale as reported earlier. The reason was that the measurement model evaluated all the measurement scales simultaneously; and under such a condition, cross-loadings of one measurement item over multiple constructs can compromise the overall model fit. To improve model fit, therefore, items that cross-loaded on more than one construct were deleted because significant cross-loadings imply that the item is not a clean measurement of either of the two constructs that it loads on. For instance, the item “I have shared important events with alumni” loaded significantly on both the construct measuring emotional closeness with alumni and frequency of communication with alumni, and was hence deleted from the measurement model. Second, items with relatively low factor loadings were deleted from the measurement model because a low loading indicates that the item is a poor measurement of the underlying construct (Kline, 2005). For instance, only 36% of variance in frequency of communication with alumni via synchronized chat was explained by the underlying construct measuring frequency of communication with alumni, indicating that this indicator was not a good measurement of the underlying construct. As a side effect, trimming cross-loaded and unreliable items also helped improve the parameter/sample size ratio to ensure robustness of modeling results (Kline, 2005). Finally, covariance between error terms was freed up for estimation between those items and constructs that shared similar traits that could not be explained by the latent constructs specified in the model. For instance, the error covariance between the attitudinal measure of volunteerism and of charitable giving was freed for estimation; so was the error covariance between the behavioral measures of these two constructs.

After implementing these procedures step by step, the fit of the resulting measurement model improved significantly. The resulting $\chi^2$ value was 484.86 ($df = 72$, $p < .05$), which was still significant. However, other fit indices, which play more crucial role in deciding the overall fit of the model when the sample size exceeds 1000, all met conventional criteria. Specifically, the GFI fit index was .98, AGFI was .96, CFI was .99, exceeding the .90 conventional criterions; and the RMSEA fit index was .05, also meeting the conventional criterion of .05, and again indicating good model fit.
Tests of the Hypothesized Conceptual Model

After achieving an adequate fit of the measurement model, structural links among constructs were added to create a full structural model for hypothesis testing. In addition, three control variables, including age, income, and the number of immediate family members that are also university alumni, were included in the model. They were treated as observed exogenous variables for the model, along with the number of SNS alumni groups that a participant had joined. 

Frequency of communication with alumni, emotional closeness with alumni, emotional closeness with the university, attitude toward volunteerism, and attitude toward charitable giving were modeled as latent constructs using the measurement model produced above. The results for the global tests of the hypothesized conceptual model are presented in Table 2 as the “baseline model.” The $\chi^2$ value was 2399.70 ($df = 147, p < .05$). The significant $p$ value indicated a less than adequate fit between the overall model and the observed data, which again should be taken with a grain of salt given the large sample size of the current study. Other fit indices revealed mixed results: While GFI (.92) and CFI (.96) indices supported adequate model fit, AGFI (.88) and RMSEA (.08) did not meet conventional values.

The results of the statistical tests for the individual paths, including the magnitude and significance of the coefficients, are displayed in Figure 2. To avoid overcrowding the figure, the links from the control variables to endogenous factors, as well as the arrows depicting the measurement models, are not included in the figure. Both standardized and unstandardized regression coefficients are reported, with the standardized coefficients reported in parentheses. Following the recommendations from the SEM community (Kline, 2005, and various posts on SEMNET discussion lists); however, the results described below used the unstandardized regression coefficients. Hypothesis 1 proposed that active participation in alumni groups on Facebook would predict frequency of communication with other alumni. Controlling

![Figure 2](image-url)
for the impact of income, age, and the number of alumni family members, the unstandardized regression coefficient was .17 (s.e. = .02, t = 8.74, p < .05). Therefore Hypothesis 1 was supported. In addition, we also proposed that both the active participation in alumni groups on Facebook (Hypothesis 2) and frequency of communication with other alumni (Hypothesis 3) would predict emotional closeness to alumni. Results showed support for both hypotheses: B\text{Hypothesis2: SNS membership} = .06, s.e. = .02, t = 2.71, p < .05; and B\text{Hypothesis3: frequency of communication} = .75, s.e. = .02, t = 30.95, p < .05. Hypothesis 4 predicted a positive relationship between emotional closeness to alumni and emotional closeness to the university. The unstandardized regression coefficient was .69 (s.e. = .02, t = 33.42, p < .05), supporting this hypothesis.

About attitude toward volunteerism, Hypothesis 5a predicted a positive impact of frequency of communication on this variable, and Hypothesis 6a predicted a positive impact of emotional closeness to the university on this variable. The unstandardized regression coefficient was .04 (s.e. = .02, t = 1.78, p > .05) for frequency of communication, rejecting Hypothesis 5a; and .56 (s.e. = .03, t = 21.35, p < .05) for emotional closeness to the university, supporting Hypothesis 6a.

About attitude toward charitable giving, Hypothesis 5b predicted a positive impact of frequency of communication on this variable, and Hypothesis 6b predicted a positive impact of emotional closeness to the university on this variable. The unstandardized regression coefficient was −.04 (s.e. = .03, t = −1.12, p > .05) for frequency of communication, rejecting Hypothesis 5b; and .73 (s.e. = .04, t = 19.73, p < .05) for emotional closeness to the university, supporting Hypothesis 6b.

Finally, Hypothesis 7 predicted a positive relationship between attitude toward volunteerism and actual participation in volunteer activities. The unstandardized regression coefficient was .70 (s.e. = .03, t = 24.72, p < .05), supporting Hypothesis 7. In parallel, Hypothesis 8 predicted a positive relationship between attitude toward charitable giving and actual charitable giving behaviors. The unstandardized regression coefficient was .30 (s.e. = .13, t = 23.39, p < .05), supporting Hypothesis 8.

**Model Revisions**

Analysis of the overall model-fit indices along with the tests of individual hypotheses indicated that opportunities existed for improving the model. Hence, the baseline model was modified in two ways. First, nonsignificant paths in the baseline model were removed, including the direct paths from frequency of communication to attitude toward volunteerism (rejected Hypothesis H5a) and to attitude toward charitable giving (rejected Hypothesis 5b), etc. Second, based on the sizes of modification indices, direct links were added from frequency of communication with other alumni to volunteer participation (B = .55, s.e. = .03, t = 18.24, p < .05), and from frequency of communication with other alumni to charitable giving activity (B = .20, s.e. = .02, t = 11.33, p < .05). In addition, direct links were also added from active participation in alumni groups on Facebook to charitable giving behavior (B = .34, s.e. = .03, t = 12.14, p < .05), and active participation in alumni groups on Facebook to engagement in actual volunteering behavior (B = .06, s.e. = .02, t = 3.62, p < .05). Conceptually, the above-described removals and additions of links among variables in combination support the argument that behavior can be activated without the mediation effect of attitude, which have also been observed in existing research on attitude change (Eagly & Chaiken, 1993; Zanna and Rempel, 1988), and the impact of social influence (Deutsch & Gerard, 1955; McCauley, 1989). About the control variables, age significantly impacted both the attitude (B = .35, s.e. = .04, t = 8.99, p < .05) and the actual behavior (B = .56, s.e. = .03, t = 16.29, p < .05) of charitable giving, as well as volunteer participation (B = .76, s.e. = .05, t = 14.04, p < .05). Finally, income also had a significant impact on charitable giving (B = .25, s.e. = .01, t = 17.63, p < .05). The results of this final model are summarized in Figure 3.
After adding these links, the overall fit of the model improved substantially. As reported in Table 2, the $\chi^2$ value for the revised structural model was 1166.59 ($df = 141$, $p < .05$). GFI (.96), AGFI (.94) and CFI (.98) all exceeded the conventional value of .90, indicating improved fit. Also, the RMSEA dropped to .05, identical with the conventional cutoff value of .05. In this final model, the different paths explained 16% of variance in frequency of communication with other alumni, 41% variance in emotional connectedness to alumni, 50% of variance in emotional connectedness to the university, 52% of variance in attitude toward volunteerism, 44% of variance in attitude toward charitable giving, 59% of variance in volunteer participation, and 47% variance in charitable giving.

**Alternative Models**

Because in SEM multiple models may fit the data equally well, alternative models were also tested following Kline’s (2005) recommendation to ensure that the model reported in Figure 3 fit the data best. In the first alternative model, attitudinal and behavioral measures of charitable giving and volunteerism, along with the frequency of communication and the emotional closeness measures of tie strength were used to predict alumni group memberships on Facebook. Basically, this model completely reversed all the causal order between Facebook membership and the other variables. The fit of the resulting model dropped significantly, even after removing some nonsignificant paths. The $\chi^2$ value was much larger 4138.68 ($df = 152$, $p < .05$), with a difference in degree of freedom of only 11. Other fit indices all revealed bad model fit: Except for CFI (.94), none of the remaining indices, including GFI (.87) AGFI (.81) and RMSEA (.10), met conventional standards of good model fit. In the second set of
alternative models, only the relationships between attitude and behavior for both volunteerism and charitable giving, was reversed one relationship at a time because past research on the relationship between attitude and behavior showed that people may retrospectively form an attitude after they have taken the action to justify their behavior (Eagly & Chaiken, 1993). For both tests, the resulting model produced nonpositive definite covariance matrices that prevented proper model convergence in maximum likelihood estimation, indicating that the pattern of our data did not support the reserved relationship between attitude and behavior. Taken together, the results from these alternative models provided us greater confidence in the adequacy of the structural model reported in Figure 3.

Discussion

The theory of the strength of ties and the empirical support for the increased frequency of communication on online networking sites indicate that SNSs are viable tools for individuals to maintain strong ties with one another. Building on previous research that focused on the relationship between SNSs and strength of ties (Ellison et al., 2007; Hampton & Wellman, 2003), and the psychology of attitudes (Eagly & Chaiken, 1993), this study empirically tested how SNSs affect the different dimensions of tie strength in the context of a nonprofit institution, which in turn influence attitude and behavior toward giving back to a nonprofit organization.

Based on the theory of the strength of ties, several hypotheses were developed and tested regarding how SNS use among university alumni is related to volunteerism and charitable giving. Consistent with the predicted model, level of active SNS usage increased tie strength directly along the communication frequency dimension (Hypothesis 1) and both directly and indirectly along the emotional closeness dimension (Hypothesis 2 and Hypothesis 3). These results are consistent with previous research which has suggested that SNSs increase tie strength, and provide support for Marsden and Campbell’s (1984) argument that the frequency of communication dimension of tie strength is a predictor of the emotional closeness dimension of tie strength. The hypothesis linking emotional closeness to alumni and emotional closeness to the university (Hypothesis 4) was supported and consistent with online community research (McMillan and Chavis, 1986; Sarason, 1977).

Hypotheses were also tested on the effects of both dimensions of tie strength on attitudes toward and actual behaviors of volunteerism and charitable giving. As predicted in the model, increased emotional closeness to the university leads to stronger positive attitudes toward volunteerism for (Hypothesis 6a) and charitable giving to the university (Hypothesis 6b). Somewhat different from the predicted model, higher communication frequency did not positively predict attitudes toward volunteerism or charitable giving (Hypothesis 5a and Hypothesis 5b), but did positively predict actual volunteer and charitable giving behavior. In both cases, attitude predicted actual behavior for volunteerism (Hypothesis 7) and charitable giving (Hypothesis 8). Moreover, comparing the size of the regression coefficients measuring the impact of frequency of communication on the attitudes toward both volunteerism and charitable giving, and the coefficient measuring the impact of emotional closeness on the two attitude measures, the results showed that building emotional connections is much more important than the sheer number of contacts in fostering positive attitudes because the coefficients for the former were significantly bigger in magnitude.

Conceptual Implications

The analysis and final model revealed some interesting information about the impact of SNSs on volunteer and charitable giving behavior. First, we found a direct impact of SNS usage on charitable giving and volunteering behaviors. The conceptual model predicted that SNSs would have an indirect
effect on volunteer and charitable giving behavior as mediated by the dimensions of tie strength and attitude formation. However, the finding of a small, but significant, direct impact of active use of alumni groups on Facebook and volunteer and charitable giving behavior showed the technical affordance of a communication technology on its own can bring about significant changes in behavior. For instance, in the recent disaster relief effort to help Haitian earthquake survivors, the effective usage of mobile phone technology helped the Red Cross raise over $35 million from across the nation (Wortham, 2010). In our case, the direct impact of Facebook membership on actual behavior showed the power of technical affordances of social media. By providing easier access to volunteer and giving opportunities, such as event invitations or links to websites where a donation can be made at their fingertips, alumni are more likely to donate directly.

Second, our study revealed the importance of differentiating the frequency of communication and the emotional closeness dimension of tie strength when studying network connections. The conceptual model predicted that both dimensions of tie strength would have an indirect impact on volunteer and charitable giving behavior via attitude formation. The data showed no significant relationship between the frequency of communication and attitude towards either volunteerism or charitable behavior, but did reveal that the frequency of communication has a direct impact on volunteer and charitable giving behavior. Taken together, while these findings were different from our hypotheses, they are nevertheless consistent with social influence research in which scholars have found that social behavior can result from two processes, including compliance and internalization (Deutsch & Gerard, 1955; McCauley, 1989). Compliance occurs when individuals conform behaviorally in response to group pressure and out of fear of recrimination. Internalization occurs when individuals privately accept other group members’ attitudes, behavioral norms, beliefs, and construction of events, typically because of high attraction to the group. Compliance produces shared patterns of behavior but not shared cognitions, whereas internalization produces convergence in both behaviors and attitude. In the context of the current research, the finding of a direct effect of frequency of communication on actual charitable giving shows that even in the absence of internationalization of the values or attitudes about the importance of giving back to the university, compliance out of group pressure or network externality alone can motivate actual contribution. Also consistent with previous social influence research (Yuan, Fulk, et al., 2005), we found that emotional closeness significantly contributed to the internationalization of positive attitudes toward the university. Because internalized attitudes are more stable, compatible behaviors are more likely to be observed. Hence it is not surprising that we found consistencies between attitudes and behaviors for both charitable giving and volunteerism, even after such self-efficacy variables as age and income were controlled. Overall, this study shows the power of tie strength in sustaining positive attitude and ensuring consistency between attitude and behavior.

Practical Implications

SNSs have specific technological affordances that separate them from other types of computer-mediated communication used by university advancement offices, such as e-mail and electronic newsletters. Both scholars and practitioners have long realized that social media, like Facebook, can be a low-cost communication tool that nonprofit organizations can use to mobilize participation and contribution because they are free, allow users to initiate membership on their own, gather information from various sources and actively participate in discussions with one another. Our research further showed that in addition to being low-cost, social media is also very efficient because participation in SNSs alone can potentially influence actual behavior via three different ways, including both the direct impact resulted from the sheer affordance of the technology, and the indirect effects out of social compliance (triggered by frequent communication) and/or internalization (resulted from emotional closeness). Worthy of
mentioning here is that the nonprofit organizations, including the one that we studied, are only starting to adopt the tool to support a variety of their initiatives, and most existing nonprofit groups on SNSs are grassroots efforts started by the participants themselves.

Limitations and Future Research
One of the obvious limitations of this study is that it was conducted on a single SNS, Facebook, within a single alumni community. Therefore the generalizability of the results of this study to other SNSs or communities is yet to be established in future studies. To address this limitation, future research should focus on other SNSs to determine if certain characteristics of the SNS have more or less of an impact on the strength of ties. SNSs are beginning to focus on nonprofit organizations (e.g. Jumo), however, Facebook is currently one of the most popular SNSs for alumni to connect on. Unfortunately, Facebook does not allow the direct study of its content other than what is observable at any given time. Therefore it is impossible to study what has been posted systematically. As a result, positive attitudes shared among alumni cited in this research come primarily from anecdotal observation and self-reports. Finally, this research is based on a one-time survey, so it is difficult to firmly establish causality. Although neither of the alternative models, in which the direction of causal relationships were reversed, produced a fitter model than the final model, longitudinal data collected from the initial introduction of an SNS to a community surrounding a nonprofit organization is nevertheless desired to provide full support to the directionality of the hypothesized relationships.

Conclusion
As government funding for nonprofits becomes increasingly scarce, nonprofit institutions are relying more heavily on private donations. These donations are given more readily by individuals who are actively involved with and feel close to the organization in need. Through their ability to increase the frequency of communication and strengthen social ties, especially among individuals with existing offline relationships (boyd & Ellison, 2007; Hampton & Wellman, 2003; Quan-Haase et al., 2002), social network sites provide a potential means for universities to maximize their donor potential.

Notes
1 See Boyd and Ellison (2007) for a comprehensive history and timeline of SNSs.
2 Subsequent research has suggested that there may be as many as seven different dimensions of tie strength (Gilbert & Karahalios, 2009), but most of these additional suggested dimensions are considered by Marsden and Campbell (1984) to be predictors, or characteristics of a relationship that are associated with, but not dimensions of, tie strength.

References


### About the Authors

**Harmonie Farrow** is the Director of Student and Young Alumni Programs for Annual Giving at Texas Christian University. She has spent the past five years working in development for nonprofit and higher education institutions including Cornell University, the Cancer Resource Center of the Finger Lakes and Texas Christian University. Ms. Farrow received her M.S. in communication from Cornell University. Her research interests focus on how nonprofit organizations can best utilize emerging media technology to advance their causes.

**Address:** TCU Annual Fund, TCU Box 297440, Fort Worth, TX 76129. (Email) harmonie.farrow@tcu.edu (Tel) 817.257.6906.

**Y. Connie Yuan** is an Associate Professor in the Department of Communication at Cornell University. She received her Ph.D. from the University of Southern California. Dr. Yuan’s research focuses on social networks, communication technology, knowledge management and computer-supported distributed work in organizations. She has recently received funding from the National Science Foundation to study how the development of network relations and the usage of communication technology influence the transfer and retention of organizational knowledge via the development of transactive memory systems. She has received best papers or distinguished article awards from the annual conferences of the Academy of Management and the National Communication Association. Her work has been published in *Communication Research, Human Communication Research, the Information Society, Journal of the American Society for Information Science and Technology, and Journal of Computer-Mediated Communication*, among others. She is on the editorial board of *Journal of Applied Communication Research* and *Journal of Computer-Mediated Communication*.

**Address:** 308 Kennedy Hall, Department of Communication, Cornell University, Ithaca, NY 14853. (Email) yy239@cornell.edu (Tel) 607-255-2603. Please send all correspondence to the second author of the paper.