Social capital, self-esteem, and use of online social network sites: A longitudinal analysis

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ABSTRACT

A longitudinal analysis of panel data from users of a popular online social network site, Facebook, investigated the relationship between intensity of Facebook use, measures of psychological well-being, and bridging social capital. Two surveys conducted a year apart at a large U.S. university, complemented with in-depth interviews with 18 Facebook users, provide the study data. Intensity of Facebook use in year one strongly predicted bridging social capital outcomes in year two, even after controlling for measures of self-esteem and satisfaction with life. These latter psychological variables were also strongly associated with social capital outcomes. Self-esteem served to moderate the relationship between Facebook usage intensity and bridging social capital: those with lower self-esteem gained more from their use of Facebook in terms of bridging social capital than higher self-esteem participants. We suggest that Facebook affordances help reduce barriers that lower self-esteem students might experience in forming the kinds of large, heterogeneous networks that are sources of bridging social capital.

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1. Introduction

Social network sites constitute an important research area for scholars interested in online technologies and their social impacts, as evinced by recent scholarship in the area (boyd & Ellison, 2007; Donath, 2007; Ellison, Steinfield, & Lampe, 2007; Golder, Wilkinson, & Huberman, 2007; Lampe, Ellison, & Steinfield, 2007; Valkenburg, Peter, & Schouter, 2006). Social network sites (SNSs) are "web-based services that allow individuals to (1) construct a public or semi-public 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). The first social network site was launched in 1997 and currently there are hundreds of SNSs across the globe, supporting a spectrum of practices, interests and users (boyd & Ellison, 2007).

One of the largest social network sites among the U.S. college student population is Facebook, created in February 2004 by Mark Zuckerberg, then a student at Harvard University. According to Zuckerberg, "The idea for the website was motivated by a social need at Harvard to be able to identify people in other residential houses" (Moyle, 2004, Dec. 7). Facebook has become very popular among undergraduates, with usage rates upwards of 90% at most campuses (Lampe, Ellison, & Steinfield, 2006; Stutzman, 2006). It has also stimulated much recent research on various aspects of Facebook use, such as the use of Facebook in academic settings (Hewitt & Forte, 2006) and the demographic predictors of Facebook use (Hargittai, 2007). One strand of research focuses on the outcomes of Facebook use.

Among young adults, relationships with peers are important both for generating offline benefits, commonly referred to as social capital, and for psychosocial development. Social capital is an elastic construct used to describe the benefits one receives from one's relationships with other people (Lin, 1999). Ellison et al. (2007) suggest that intense Facebook use is closely related to

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the formation and maintenance of social capital. In their survey of undergraduates at a large university, Facebook use was found to be associated with distinct measures of social capital, including bridging social capital (which emphasizes the informational benefits of a heterogeneous network of weak ties) and bonding social capital (which emphasizes emotional benefits from strong ties to close friends and family). Moreover, Ellison et al. (2007) found evidence that self-esteem may operate as a moderator of the relationship between social network site use and social capital. That is, young people with lower self-esteem appeared to benefit more from their use of Facebook than those with higher self-esteem. However, with data at only one point in time, it was not possible for Ellison et al. (2007) to establish any time order to the relationships among Facebook use, self-esteem, and social capital.

These findings suggest that more research on the role of social network sites among young adults is needed, since maintaining friendships through SNSs like Facebook may play an important role in psychological development. Arnett (2000) has distinguished the period between ages 18 and 25 as a phase of "emerging adulthood," a liminal period between adolescence and adulthood. Arnett posits that this stage is critical to an individual's adult development because during this time a person builds long term social skills, including those critical for self-dependence, career orientation and relationship maintenance. Other researchers studying the emerging adulthood stage have called for more research on the effect of new media, including social network sites, on adult development and relationships (Brown, 2006). The development and maintenance of friendships during this period has been shown to influence identity formation, well-being and the development of romantic and family relationships over the long term (Connolly, Furman, & Konarksi, 2000; Montgomery, 2005). Social network sites offer a new set of tools to develop and maintain relationships and are thus of particular importance in emerging adulthood.

The present study contributes to prior work on young adults and their use of social network sites by investigating the relationship between Facebook use and bridging social capital over time, using data from a panel of college students who reported on their use of Facebook at two points a year apart. Based on prior work by Ellison et al. (2007), a particular focus was on whether and to what extent users' self-esteem moderates the relationship between Facebook use and social capital outcomes. We specifically focus on Facebook in this study because of its pervasive use on college campuses across the country and increasingly throughout the world. Indeed, estimates of the proportion of students who have joined Facebook on college campuses in the U.S. range between 85% and 95% (Lampe et al., 2006), making it the most important social network site for this particular cohort of emerging adults.

A longitudinal study is warranted in this area of inquiry for two reasons. First, it can help answer questions regarding the appropriate causal direction of influence among key variables — does greater use of a social network site lead to greater social capital, or do those with more social capital simply have a greater incentive to use social network sites? Second, a longitudinal analysis can help shed light on the development of social capital over time among young people, exploring the possibility that social capital can evolve from relationships that began at an earlier point in time.

1.1. Social capital, relationships and Internet use

There are two complementary perspectives on the importance of friendship maintenance, particularly in the U.S. college-aged population. First, relationships help generate social capital (Lin, 1999) and are important components of psychosocial development for emerging adults (Sullivan, 1953). For the college-age populations, sites like Facebook may play a vital role in maintaining relationships that would otherwise be lost as these individuals move from the geographically bounded networks of their hometown. Second, there is also growing evidence that Internet use in general, and social network sites like Facebook in particular, may be associated with a person's sense of self-worth and other measures of psychosocial development, although the positive or negative contributions of Internet use to psychological well-being are hotly debated (Kraut, Patterson, Lundmark, Kiesler, Mukhopadhyay, & Scherlis, 1998; Kraut, Kiesler, Boneva, Cummings, Helgeson, & Crawford, 2002; Shaw & Gant, 2002; Valkenburg et al., 2006).

1.1.1. Relationships and social capital

Although social capital is an elastic term with a variety of definitions in multiple fields (Adler & Kwon, 2002), there is general consensus that it refers broadly to the benefits we receive from our social relationships (Lin, 1999). It can be conceived in negative terms, such as when non-group members are excluded from having access to the same benefits as members (Bourdieu & Wacquant, 1992; Helliwell & Putnam, 2004), but is generally perceived to be positive (Adler & Kwon, 2002). It has been linked to such diverse outcomes as career advancement (Burt, 1997), organizational success (Nahapiet & Ghoshal, 1998), and many other positive social outcomes such as better public health and lower crime rates (Adler & Kwon, 2002). Social capital has also been linked to the psychological and physical well-being of young people. In a wide-ranging review, Morrow (1999) found that despite a lack of consistent definition and measurement, prior work suggests that young people with more social capital are more likely to engage in behaviors that lead to better health, academic success, and emotional development.

The ability to form and maintain relationships is a necessary precondition for the accumulation of social capital. For example, Coleman (1988) describes social capital as resources accumulated through the relationships among people. Lin (1999) extends this notion by emphasizing the importance of developing a social network, considering social capital to arise from "investments in social relations with expected returns" (p. 30) and suggests that the benefits arise from the greater "access to and use of resources embedded in social networks" (p. 30). Bourdieu and Wacquant (1992) define social capital as "the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (p. 14).

1.1.2. Forms of social capital

It is important to distinguish between conceptions of social capital at the individual and relationship level, and conceptions at the community level (Lin, 1999), although we might consider the latter to be an aggregate of the former. For example, community social capital has been viewed as being on the decline in the U.S. for the past several years (Putnam, 2000), a trend associated with increased social disorder, reduced participation in civic activities, and potentially more distrust among community members. On the other hand, greater social capital increases commitment to a community and the ability to mobilize collective actions, among other benefits. At the individual level, social capital allows individuals to capitalize on their connections with others, accruing benefits such as information or support.

Our focus is on individual-level social capital, where research has generally distinguished between two broad types: bonding and bridging social capital (Putnam, 2000). Bonding social capital is found between individuals in tightly-knit, emotionally close relationships, such as family and close friends. Bridging social capital, the focus of the present paper, stems from what network researchers refer to as "weak ties," which are loose connections between individuals who may provide useful information or new perspectives for one another but typically not emotional support (Granovetter, 1983). Access to individuals outside one's close circle provides access to non-redundant information, resulting in benefits such as employment connections (Granovetter, 1973). Although bridging social capital is viewed as an individual-level construct, prior research has conceptualized it in a community context (Putnam, 2000; Williams, 2006). Williams (2006) includes dimensions such as the extent to which people see themselves as part of a broader group and exhibit norms of giving within a broader community in the construct.

1.1.3. Psychological well-being and social capital

Social capital researchers have found that various forms of social capital, including ties with friends and neighbors, are related to indices of psychological well-being, such as self-esteem and satisfaction with life (Bargh, McKenna, & Fitzsimons, 2002; Helliwell & Putnam, 2004). However, most research examining the connections between self-esteem, measures of well-being, and social capital emphasize the importance of family, intimate relationships, and close friends (Bishop & Inderbitzen, 1995; Keefe & Berndt, 1996). There is a need for additional research exploring the potential linkages between psychological well-being and the kinds of weak ties thought to enhance bridging social capital. Constant, Sproull, and Kiesler (1996) argue for such a linkage in their research documenting how people show gains in self-esteem when they provide technical advice to strangers over the Internet.

1.1.4. Internet use, relationship development, and psychosocial well-being

In the past decade, a number of studies have explored how Internet use might be related to psychological and social well-being with mixed results (e.g., Kraut et al., 1998; Kraut et al., 2002; McKenna & Bargh, 2000; Nie, 2001; Shaw & Gant, 2002; Valkenburg & Peter, 2007). Kraut et al. (1998) found that heavier Internet use was associated with various measures of loneliness, depression and stress. They argue that this was because weaker ties generated online were replacing stronger offline ties with family and friends. In a follow-up study, Kraut et al. (2002) found that when examined over a longer period of time, Internet use was no longer associated with decreased communication and involvement with family (and the associated measures of loneliness and depression). Indeed, the effects were generally positive. Of particular interest was their finding that measures of introversion and extraversion moderated the outcomes from Internet use, with extraverts more likely to experience benefits from their Internet use than introverts. Other researchers also argue that Internet use has positive impacts on psychological well-being (Bargh & McKenna, 2004; McKenna & Bargh; 2000; Shaw & Gant, 2002). Bargh and McKenna (2004) attribute this to the increases in online interactions, which mitigate any loss in communication with others due to time spent online. In an experiment, Shaw and Gant (2002) found decreases in perceived loneliness and depression as well as increases in perceived social support and self-esteem following engagement in online chat sessions. In related research, Valkenburg and Peter (2007) found that socially anxious adolescents perceived the Internet to be more valuable for intimate self-disclosure than non-socially anxious respondents, leading to more online communication.

Despite the plethora of research on Internet use in general, research examining the complex relationships between psychological well-being and use of online social network services is scarce. In a notable exception, Valkenburg et al. (2006) found that the more people used social network sites, the greater the frequency of interaction with friends, which had positive benefits on respondents' self-esteem and ultimately their reported satisfaction with life.

While considerable research shows that relationships are important elements of social development for young adults, this is also a time of life when relationships are interrupted as people move from one location to another. Entering college, moving between residences, graduating and entering the professional workforce are all events that could disrupt the maintenance of relationships of people in this demographic (Cummings, Lee, & Kraut, 2006). These individuals have an especially urgent need to be able to maintain connections with their previously inhabited networks while still being open to new experiences and relationships in their current geographical context. Hence, we would expect the Internet-based social networking services to play a role in the maintenance of relationships among this population of users.

1.1.5. Social capital and use of social network sites

Researchers have started to explore the possibilities social network sites have for building social capital among users. Resnick (2001), for example, suggests that new forms of social capital and relationship building will occur in social network sites due to the way that technologies like distribution lists, photo directories, and search capabilities support online linkages with others. Donath and boyd (2004) hypothesize that social network sites could increase the number of weak ties a user might be able to maintain because their affordances are well-suited to maintaining these ties cheaply and easily. In particular, bridging social capital might be

augmented by social network sites like Friendster or Facebook because they enable users to create and maintain larger, diffuse networks of relationships from which they could potentially draw resources (Donath & boyd, 2004; Resnick, 2001; Wellman, Haase, Witte, & Hampton, 2001). In one of the few attempts to examine the effect of social network site use on social capital among young people, Ellison et al. (2007) surveyed users of Facebook at a large Midwestern University. They assessed levels of bridging and bonding social capital as well as "maintained" social capital, a form of social capital that speaks to one's ability to stay connected with members of a previously inhabited community. They found that intensity of Facebook use was a significant predictor of bridging social capital, even after controlling for a range of demographic, general Internet use, and psychological well-being measures. The mean number of friends reported by these participants was between 150 and 200. This relatively high number of friends suggests that these networks consist of larger, less intimate relationships as opposed to tightly-knit small groups. Moreover, Ellison et al. (2007) found that the relationship between Facebook use and bridging social capital was greater for low self-esteem students than for high self-esteem students, a finding that contradicts the Kraut et al. (2002) "rich get richer" finding that high extraversion subjects gained more from their Internet use than low extraversion subjects. Although introversion/extraversion is not the same variable as self-esteem, such findings suggest that there is value in exploring the extent to which an individual's propensity to form relationships can be influenced in some way by their use of social network sites like Facebook.

Ellison et al. (2007) looked only at cross-sectional relationships between Facebook use and the existence of social capital. Facebook use was strongly associated with the existence of bridging social capital, possibly indicating that young adults were using Facebook to maintain large and heterogeneous networks of friends. However, an equally plausible interpretation is that young adults with a large and heterogeneous network of friends had more motivation to manage this network with a service like Facebook. This would also result in a positive correlation, and a cross-sectional study cannot rule out such an explanation. Moreover, even if Facebook use did influence bridging social capital, it is not clear if such impacts are transient or enduring. Hence, the present study focused on the longitudinal effects of Facebook use.

1.2. Summary and hypotheses

We summarize this review of literature with three broad research questions, and a series of hypotheses that are suggested by prior research.

RQ 1. How does Facebook use among a college population change over time? We make no explicit hypotheses here, but a longitudinal study enables an examination of the extent to which Facebook usage increases or decreases over a year among students, as well as the growth or decline in the size of students' online social network.

RQ 2. What is the directionality of the relationship between Facebook use and development of bridging social capital? Based on earlier work conceptualizing bridging social capital as an outcome of social network site use (Donath & boyd, 2004; Ellison et al., 2007), we hypothesize that:

H1. The more intense the use of Facebook, the greater the perceived bridging social capital.

H2. The direction of influence is from Facebook use to bridging social capital rather than from bridging social capital to Facebook use.

RQ 3. How does an individual's psychological well-being influence the relationship between social capital and social network site use? Based on earlier work relating psychological well-being and self-esteem to social capital (e.g., Bargh et al., 2002; Helliwell & Putnam, 2004), we hypothesize that:

H3. The greater the psychological well-being, the greater the perceived bridging social capital.

In addition, given the earlier findings by Ellison et al. (2007), we propose that:

H4. Psychological well-being will moderate the relationship between Facebook use and bridging social capital.

2. Method

A combination of survey methods and in-depth interviews with a small number of students form the core of the data that were used for this study. To test the relationships over time between Facebook use and social capital, survey data were collected at two points in time a year apart. Respondents were all students at a large Midwestern university. Initially, in April of 2006, a random sample of 800 undergraduate students was sent an email invitation from one of the authors, with a short description of the study, information about confidentiality and an incentive for participation, and a link to the survey. Participants were compensated with a $5 credit to a university-administered spending account. The survey was hosted on a commercial online survey-hosting site. We focused on undergraduate users and did not include faculty, staff, or graduate students in our sampling frame. A total of 286 students completed the online survey, a response rate of 35.8%. Demographic information about non-responders was not available; therefore we do not know whether a bias existed in regards to survey participation. However, the demographics of our sample compare favorably to the undergraduate population as a whole with a few exceptions. Female, younger, in-state and on-campus students were slightly over-represented in our sample.

In April of 2007, the survey was re-administered to a new random sample of 1987 undergraduate students as well as to 277 respondents from the previous year. The 2007 survey was hosted on the same survey-hosting website as the 2006 version, and

compensation was limited to an opportunity to win a $50 raffle. A total of 477 usable surveys from the new random sample were obtained, yielding a 24% response rate. We received 92 completed surveys from the 277 prior respondents (33%) from 2006 who were invited to retake the survey. These 92 respondents comprised our "panel" for investigating the potential over time influences of Facebook use.

As a follow-up to the first year survey, we conducted in-depth interviews with 18 students primarily drawn from the April 2006 sample in order to learn more about the ways in which students used Facebook to maintain existing friendships and make new ones. We asked survey respondents if they were willing to be interviewed about their Facebook use in person, and 176 (62%) said yes. We then wrote to a number of these individuals and from those who responded with availability we were able to schedule 10 women and 6 men for in-depth interviews. To achieve more gender balance, we added two men through referrals from interviewees, resulting in a total of 18 interviews. We were particularly interested in how the affordances of Facebook translated into usage strategies that resulted in the kinds of bridging social capital outcomes found in the first survey. Although we do not report an extensive analysis of our qualitative data in this paper, we include quotations from these interviews to help explicate the survey findings and suggest how Facebook use might be operating to influence social capital outcomes.

Table 1 provides sample descriptive characteristics, revealing that the 92 members of the panel sample did not substantially differ from the random samples in each period on the demographic data we obtained. There were also no demographic differences between the 2006 and 2007 samples, despite the somewhat lower response rate in 2007. However, there was significant growth in Internet and Facebook usage from 2006 to 2007 (discussed in the Results section). The statistical analyses we report here focus only on the panel sample, exploring how usage of Facebook in year 1 relates to outcomes in year 2.

2.1. Measures

In addition to demographic measures noted above, the study relied on four sets of measures drawn from Ellison et al. (2007). Independent measures included general Internet use, Facebook use, and two measures of psychological well-being: self-esteem and satisfaction with life. Our dependent measure is bridging social capital. In general, these variables were assessed in 2007 using the same survey items as in 2006. In a few instances described below, some items were reworded, and we had to do some conversion to allow cross-year comparisons.

2.1.1. Internet use

In order to investigate the unique effects of social network site use that might be distinct from other uses of the Internet, we included a measure of general Internet use. Internet use was assessed using a measure adapted from LaRose, Lai, Lange, Love, and Wu (2005), which required respondents to indicate how many hours they actively used the Internet each day during a typical week

Table 1
Summary of descriptive statistics for Facebook panel in 2006 and 2007

	2006 Full sample [a] (N = 288)		2006 Panel (N = 92)		2007 Random sample (N = 481)		2007 Panel (N = 92)	
	M/% (N)	*SD*	*M/% (N)*	*SD*	*M/% (N)*	*SD*	*M/% (N)*	*SD*
Sex								
Male	34% (98)		26% (24)		33% (155)		No change	
Female	66% (188)		74% (68)		67% (312)			
Age	20.1	1.64	20.1	1.36	20.6	2.33	20.99	1.38
Ethnicity								
White	87% (247)		90% (83)		83% (375)		No change	
Non-white	13% (36)		10% (9)		17% (78)			
Year in school [b]	2.55	1.07	2.51	1.04	2.71	1.11	3.34	.89
Home residence								
In-state	91% (259)		91% (83)		92% (428)		No change	
Out-of-state	09% (25)		09% (8)		08% (36)			
Fraternity/sorority member	08% (23)		07% (6)		09% (42)		No change	
Daily hours Internet use [c]	2:56	1:52	2:58	1:52	4:16	4:26	4:04	4:54
Facebook member (%)	94% (268)		98% (90)		94% (440)		No change	
Daily minutes Facebook use [d]	29.48	36.7	32.56	38.96	63.57	53.03	53.76	42.71
Number of Facebook friends [e]	200.62	113.62	223.09	116.36	302.08	217.39	339.26	193.26

[a] Source: Ellison et al. (2007).
[b] 1 = first year, 2 = sophomore, 3 = junior, 4 = senior.
[c] For comparison purposes, the 2006 data were converted from an ordinal scale by assigning the score of the mid-point of each response category (e.g., 1–2 h = 1 h 30 min). In 2007, Internet use was measured by filling in the value in hours and minutes for weekends and weekdays, and then taking weighted average.
[d] For 2006, minutes of Facebook use were converted from an ordinal scale by assigning the mid-point of each response category, where less than 10 = 5 min, 10–30 = 15, 31–60 = 45, 1–2 h = 90, 2–3 h = 150, more than 3 h = 180 min. In 2007, Facebook minutes were measured by filling in the value in hours and minutes for weekends and weekdays, and then taking weighted average.
[e] To compare 2006 and 2007 friends data, the 2006 number of friends was converted from the original 10 point ordinal scale by assigning the score of the mid-point of each response category: 10 or less = 5, 11–50 = 30, 51–100 = 75, 101–150 = 125, 151–200 = 175, 201–250 = 225, 251–300 = 275, 301–400 = 250, more than 400 = 400. In 2007, respondents simply wrote in their estimated number of Facebook friends. Outliers were capped at 800.

Table 2
Summary statistics for Facebook Intensity in panel sample in 2006 and 2007

Individual items and scale	2006		2007	
	M	(SD)	M	(SD)
Facebook Intensity [a] (α_{2006} = .84; α_{2007} = .88) 2007 vs. 2006 t(87) = 4.99, p < .0001	2.81	(.72)	3.12	(.72)
Total Facebook friends [b]	223.09	(116.36)	339.26	(193.26)
Minutes per day on Facebook? [b]	32.56	(38.96)	53.76	(42.71)
Facebook is part of my everyday activity	3.29	(1.23)	3.72	(1.25)
I am proud to tell people I'm on Facebook	3.30	(.84)	3.23	(.90)
Facebook has become part of my daily routine	3.11	(1.30)	3.65	(1.25)
I feel out of touch when I haven't logged onto Facebook for a while	2.36	(1.22)	2.84	(1.23)
I feel I am part of the Facebook community	3.39	(1.02)	3.58	(.97)
I would be sorry if Facebook shut down	3.67	(1.07)	3.74	(1.07)

[a] Total friends and Facebook minutes per day were first transformed by taking the log before averaging across items to create the scale due to differing item scale ranges.

[b] For improved comparison, the new estimates of number of friends and time using Facebook were used in place of the ordinal scale values in 2006. See Table 1 for differences in measurement of Facebook friends and minutes per day on Facebook between 2006 and 2007. Other response categories ranged from 1 = strongly disagree to 5 = strongly agree.

and weekend day. In 2006, respondents selected from a set of options such as 1–2 h (up to a maximum of 10 h), while in 2007, a text box for hours and minutes was provided in order to obtain more exact estimates. The mid-point of the scale was used to estimate actual hours per day for the 2006 data (so 1 h 30 min for the 1–2 h option), and a weighted average of weekend and weekday hours provided a single index of the hours of Internet use per day (see Table 1).

2.1.2. Facebook use

Respondents were first asked if they were Facebook members, and if they answered yes, were presented with a series of questions related to their Facebook usage. These solicited reports of how many minutes they spent using Facebook each day in the past week and how many total Facebook friends they had. As with Internet usage, an important measurement difference between 2006 and 2007 was that in the earlier survey, respondents selected from a set of response categories for each of these measures, while in 2007 they provided direct estimates (see Table 1 notes). To allow a comparison across years and provide a meaningful estimate of both the average number of minutes per day that respondents used Facebook and the reported number of friends, the 2006 ordinal data were converted to the best approximation possible, replacing each 2006 ordinal value on these two measures with the mid-point of the response category. For example, if a respondent in 2006 estimated that they spent between 31 and 60 min using Facebook per day, this was converted to 45 min; if a respondent in 2006 reported having between 151 and 200 friends, this was converted to an estimate of 175 friends.

Following Ellison et al. (2007), we employed a measure of Facebook use called Facebook Intensity. This scale provides a more robust measure of how Facebook is being used than would simple items assessing frequency or duration of use. The measure includes the number of Facebook friends and the amount of time spent on Facebook on a typical day. It further contains a set of six attitudinal items designed to assess the degree to which the respondent felt emotionally connected to Facebook and the extent to which Facebook was integrated into daily activities. Using a 5-point Likert scale, participants rated the extent to which they agreed or disagreed with the following statements: Facebook is part of my everyday activity; I am proud to tell people I'm on Facebook; Facebook has become part of my daily routine; I feel out of touch when I haven't logged onto Facebook for a while; I feel I am part of the Facebook community; I would be sorry if Facebook shut down. Because of the much greater ranges of the number of friends and minutes using Facebook, these items were transformed by taking the log of the original response. Responses to the entire set of

Table 3
Summary statistics for self-esteem and satisfaction with university life in 2006 and 2007

Individual items and scales [a]	2006		2007	
	M	(SD)	M	(SD)
Self-esteem Scale (α_{2006} = .89; α_{2007} = .88) 2007 vs. 2006 t(84) = − .10; ns	4.29	(.55)	4.29	.52)
I feel that I'm a person of worth, at least on an equal plane with others	4.45	(.60)	4.45	(.59)
I feel that I have a number of good qualities	4.43	(.60)	4.52	(.57)
All in all, I am inclined to feel that I am a failure (reversed)	4.23	(.84)	4.24	(.81)
I am able to do things as well as most other people	4.33	(.56)	4.28	(.55)
I feel I do not have much to be proud of (reversed)	4.30	(.75)	4.30	(.77)
I take a positive attitude toward myself	4.23	(.66)	4.18	(.75)
On the whole, I am satisfied with myself	4.08	(.86)	4.09	(.72)
Satisfaction with university Life Scale (α_{2006} = .84; α_{2007} = .89) 2007 vs. 2006 t(84) = .87; ns	3.67	(.67)	3.59	(.75)
In most ways my life at MSU is close to my ideal	3.55	(.93)	3.45	(.93)
The conditions of my life at MSU are excellent	3.68	(.86)	3.61	(.88)
I am satisfied with my life at MSU	3.98	(.71)	3.89	(.84)
So far I have gotten the important things I want at MSU	3.80	(.72)	3.88	(.73)
If I could live my time at MSU over, I would change almost nothing	3.33	(.93)	3.14	(1.04)

[a] Individual items ranged from 1 = strongly disagree to 5 = strongly agree, scales constructed by taking mean of items.

Table 4
Summary statistics for bridging social capital items reported in 2006 and in 2007

Individual items and scales [a]	2006		2007	
	M	(SD)	M	(SD)
Bridging Social Capital Scale (α_{2006} = .86; α_{2007} = .84) 2007 vs. 2006 $t(84)$ = .14; ns	3.87	(.47)	3.87	(.55)
I feel I am part of the MSU community	3.81	(.74)	3.79	(.91)
I am interested in what goes on at MSU	4.02	(.53)	4.01	(.69)
MSU is a good place to be	4.34	(.75)	4.26	(.79)
I would be willing to contribute money to MSU after graduation	3.38	(.90)	3.40	(1.02)
Interacting with people at MSU makes me want to try new things	3.86	(.62)	3.82	(.75)
Interacting with people at MSU makes me feel like a part of a larger community	3.86	(.67)	3.91	(.77)
I am willing to spend time to support general MSU activities	3.71	(.75)	3.73	(.75)
At MSU, I come into contact with new people all the time	4.13	(.62)	4.09	(.70)
Interacting with people at MSU reminds me that everyone in the world is connected	3.68	(.74)	3.78	(.85)

[a] Source: Ellison et al. (2007). Individual items ranged from 1 = strongly disagree to 5 = strongly agree, scales constructed by taking mean of items.

eight items were then averaged to create a Facebook Intensity scale for each survey year of the panel (see Table 2). There was a significant increase in the intensity of Facebook use from 2006 to 2007 (see Table 2).

2.1.3. Psychological well-being measures

As reported in Ellison et al. (2007), self-esteem was measured using seven items from the Rosenberg Self-Esteem Scale (Rosenberg, 1989). Responses were reported on a 5-point Likert scale with a higher score indicating higher self-esteem. As shown in Table 3, the resulting scale was reliable across the two panel years and the mean was unchanged from 2006 to 2007.

Again following Ellison et al. (2007), an amended version of the Satisfaction with Life Scale (SWLS; Diener, Suh, & Oishi, 1997; Pavot & Diener, 1993) was used to measure global cognitive judgments of one's life. We adapted the scale slightly to locate it within the university context so that all respondents would have the same frame of reference. The answers to these questions were reported on a 5-point Likert scale with a higher score indicating greater satisfaction with life at the university. The resulting scale was reliable across the two panel years and the mean was unchanged from 2006 to 2007 (see lower portion of Table 3).

2.1.4. Bridging social capital

Our bridging social capital measure was constructed as described by Ellison et al. (2007). It contained five items adapted from Williams' (2006) *Bridging Social Capital* subscale as well as three additional items intended to place outcomes of bridging social capital in the specific university context in order to reduce variance in respondents' answers and to tie it more directly to a salient context. The items used a 5-point Likert scale, with higher scores indicating greater bridging social capital. The scale was reliable across the two panel years and there was no difference across panel years in the scale mean (see Table 4).

3. Results

The panel design served two broad purposes. First, it helps reveal any changes in Facebook use that might have occurred over the year between data collections. Second, it provides some opportunity to test the direction of causality between our primary independent variable (Facebook Intensity) and dependent variable (Bridging Social Capital).
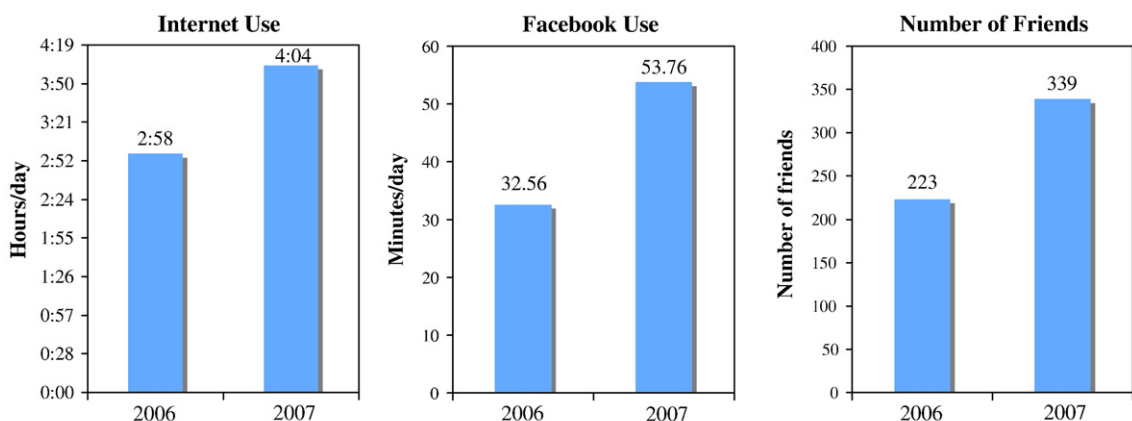
[a]All increases are significant using matched pair *t*-tests: Internet use, $t(91)$ = 2.25, p < .05; Facebook use, $t(84)$ = 4.30, p < .0001; number of friends, $t(83)$ = 9.40, p < .0001.

Fig. 1. Growth in Internet use, Facebook use, and the number of friends on Facebook in the panel of Facebook users[a].
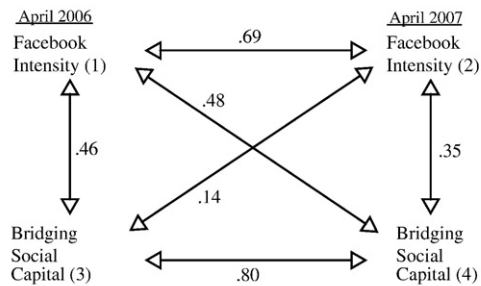
^a Cross-lagged correlations, difference between r_{14} (.48) and r_{23} (.14) using ZPF analysis (z transformed Pearson–Filon statistic), significant (z = 3.52, N = 85, p < .001).
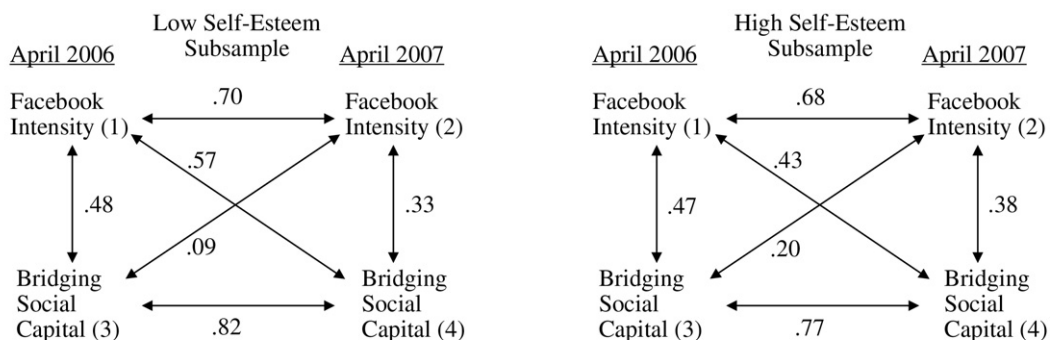
Fig. 2. Cross-lagged correlation analysis showing Facebook intensity and bridging social capital relationships across time period 2006–2007[a].

As shown in Fig. 1, participants reported spending significantly more time per day actively using the Internet in 2007 than in 2006, increasing by over an hour per day, $t(91) = 2.25$, $p < .05$. Facebook use nearly doubled, increasing by roughly 21 min per day on average, $t(84) = 4.30$, $p < .0001$. As one might expect, the number of total friends participants reported having on Facebook also increased, growing by 50% from 223 to 339, $t(83) = 9.40$, $p < .0001$. Clearly, in the year that passed Facebook has become an increasingly important part of students' lives by all measures.

In Ellison et al. (2007), a strong association was found between the intensity of Facebook use and a participant's perceived bridging social capital. They theorized that Facebook use helped students turn latent contacts into real connections, often by reducing the barriers that would otherwise prevent such connections from happening. However, as noted above, an equally plausible argument could be made that those with large networks of contacts would have more reason to use Facebook, reversing the causal direction. To address this question, we completed a cross-lagged correlation analysis on our panel. Fig. 2 shows the cross-lagged correlations that resulted. Facebook use in time 1 is more strongly associated with bridging social capital in time 2 than the alternative lagged correlation between bridging social capital in time 1 and Facebook use in time 2.

Following Kenny (1979) and Raghunathan, Rosenthal, and Rubin (1996), a modified Pearson–Filon z index (known as the ZPF index) was computed to test the significance of the difference in the lagged correlations. According to these researchers, such a test is appropriate when two variables are measured at two points in time without violating assumptions of synchronicity (i.e., at both time points, the variables are measured at the same time) and stationarity (i.e., that the strength of the relationship between the two variables did not change appreciably across time). The ZPF test is further appropriate for analyzing the difference in non-overlapping (i.e., one variable is not being correlated with two other variables) and non-independent (i.e., the variation across time is within subjects) variables. A significant difference was found ($z = 3.52$, $p < .001$), which lends support to the original Ellison et al. (2007) thesis that greater Facebook use leads to increases in bridging social capital.

In order to test the hypothesis that the influence of Facebook use on bridging social capital is moderated by self-esteem, we performed a median split on self-esteem and conducted a cross-lagged correlation analysis on the upper and lower self-esteem sub-samples. The median score for self-esteem was fairly high ($Mdn = 4.29$ on a 5 point scale) and as a result, the difference was not as great as we would have preferred (M for the low self-esteem group = 3.81; M for high self-esteem = 4.70). Nonetheless, the results reveal that the relationship between the lagged intensity of Facebook use and bridging social capital is higher for the lower self-esteem group ($r = .57$) than the high self-esteem group ($r = .43$) (see Fig. 3a and b). This suggests that the interaction effect first

^a For the low self-esteem sample, difference between r_{14} (.57) and r_{23} (.09) results in $z = 3.53$, $N = 39$, $p < .001$.
^b For the high self-esteem sample, difference between r_{14} (.43) and r_{23} (.20) results in $z = 1.65$, $N = 46$, $p < .05$.

Fig. 3. Cross-lagged correlation analysis showing Facebook intensity and bridging social capital relationships for both low[a] and high self-esteem[b] sub-samples across time periods 2006–2007.

Table 5
Summary of regression analysis predicting the amount of bridging social capital in 2007 from lagged (2006) independent variables ($N = 85$)

Independent variables	Scaled beta [a]
Intercept	3.86****
Hours of Internet use a day	0.06
Self-esteem	0.24*
Satisfaction with university life	0.44**
Facebook (FB) intensity	0.42****
Self-esteem by FB intensity [b]	−0.46*
	Before interaction term:
	$F = 10.71$, $p < .0001$, Adj. $R^2 = .32$
	After interaction term:
	$F = 9.76$, $p < .0001$, Adj. $R^2 = .34$

*$p < .05$. **$p < .01$ ***$p < .001$. ****$p < .0001$.

[a] A scaled beta is similar to a standardized beta in that coefficients are scaled to have a mean of 0 and a range of 2.

[b] The satisfaction with life by Facebook Intensity interaction was not significant, so it is not reported for brevity of presentation.

reported by Ellison et al. (2007), in which the social capital gains from Facebook use were greater for low self-esteem students than high self-esteem students, remains evident when examining social capital accumulation a year later. Both cross-lagged correlation analyses resulted in significant ZPF scores, strengthening the case that the use of social network sites *precedes* gains in bridging social capital, particularly for lower self-esteem students.

A final set of analyses looked at the extent to which the prior year's use of Facebook predicted participants' estimates of bridging social capital in year 2 after controlling for general Internet use and the measures of psychological well-being. A lagged regression analysis was used to test the predictive power of the lagged version of Facebook Intensity on bridging social capital.

The results confirm the hypothesis that Facebook use leads to greater bridging social capital after controlling for general Internet use and measures of psychological well-being. As shown in Table 5, general Internet use in 2006 did not exhibit any relationship to bridging social capital in 2007 (scaled beta = .06, *ns*). However, those with higher self-esteem (scaled beta = .24, $p < .05$) and greater satisfaction with life (scaled beta = .44, $p < .01$) at the university in year 1 reported higher bridging social capital in year 2, as expected. Even with these psychological measures in the equation, however, Facebook Intensity in year 1 was a highly significant predictor of bridging social capital in year 2 (scaled beta = .42, $p < .0001$). Moreover, as one would anticipate from the cross-lagged correlation analysis depicted in Fig. 3a and b, there was a significant interaction between Facebook use and self-esteem. The interaction term – the product of Facebook Intensity and self-esteem – was a significant predictor of bridging social capital (scaled beta = − .46, $p < .05$). Fig. 4 reveals the nature of this interaction, contrasting the slope of the coefficient for Facebook Intensity as a predictor of bridging social capital for higher self-esteem vs. lower self-esteem students. The graph illustrates the stronger association between Facebook use and social capital for the lower self-esteem students compared to the higher self-esteem students.

Our interviews with Facebook users complement our survey data and help us to make sense of the pattern of findings reported here. These qualitative data support the notion that "Friending" in Facebook served an instrumental purpose, allowing individuals to keep in touch with a wide network of individuals who might be called upon to provide "favors" in the future. For instance, one participant explained,

"I think [Facebook] is very good for networking…. it's very good. My high school is very into networking…. I guarantee every single person in the high school will make an effort to maintain those Facebook friendships and so that when we're
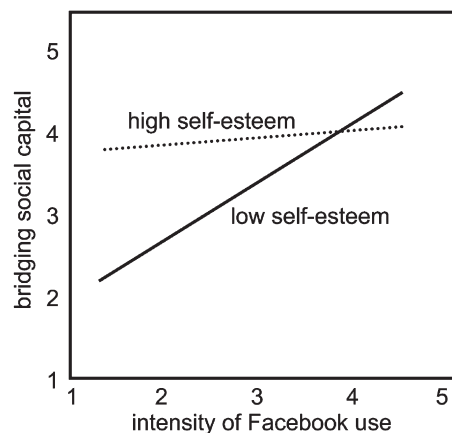

Fig. 4. The interaction between self-esteem and Facebook use in predicting bridging social capital using 2006 self-esteem and Facebook use and 2007 bridging social capital.

all in our forties, go back to our reunion, and we'll still be able to get in touch with each person we know. You know, 'so and so is a doctor.' And, we wouldn't hesitate to call on them for a favor, just because we went to the same high school…."

Additionally, Facebook provides the technical support needed for social interaction to occur. In addition to the bevy of within-system messaging opportunities ("wall" postings, "pokes," and direct messages between users), the system facilitates face-to-face communication and communication through other media through the contact information that is often included in users' profiles. In this way, Facebook serves as a ready-made address book, enabling communication outside the system, as expressed by this participant:

"Honestly, I can't remember what I did before Facebook. It sounds really pathetic, but it's just so easy to access information about people. It's not bad information, it's just instead of, 'do you have this person's phone number?' or, 'oh God, where do they live, they live in this dorm but I need the room number,' it's just so easy to just go on there and find it. And if it's not on there at least you could message them, like, 'I need to drop something off at your room, where do you live?' or 'we're in the same class, can we get together and study?'… It's just so much easier."

A final quote illustrates the way in which Facebook use interacts with users' self-esteem by helping these lower self-esteem users initiate communication with others while avoiding what might be an awkward phone call or receiving information (about a social event, perhaps) from an acquaintance who would not otherwise contact them:

"Well, the only thing that is really nice about it is, I am in a sorority, and it is very convenient … there are so many people in your house, that I don't think you would call all of them. There are people that you are friends with because you see them weekly … and you have a common interest, but I probably wouldn't call all of them. So, it is nice to be [on Facebook], and plus it is really easy to figure out what things you have going on, or what you are supposed to be doing …. People can send a really quick little message. So, it's convenient. It also breaks the ice for certain people, to talk to them, people that you don't necessarily know really, really well, and you might not want to call them up because a phone call could be awkward, but it's really easy to send them a two sentence message."

4. Discussion

Previous work on the role that personal relationships play in the self-esteem of young adults has focused on the role of close, intimate relationships (Bishop & Inderbitzen, 1995; Keefe & Berndt, 1996). Even studies of how the Internet is used to maintain relationships have largely focused on these close connections. However, bridging social capital is related to one's ability to develop and maintain weak ties rather than close connections. We find in this study that not only does bridging social capital have a relationship with self-esteem, but that use of an online social network service – Facebook – interacts with self-esteem to influence bridging social capital.

Our results demonstrate that social network sites can help to address the relationship development and maintenance needs of young adults at a point in their lives where they are moving away from home and into the university. They face challenges in maintaining former connections while being open to potential friendships with a new set of peers encountered through classes, new living arrangements, and other college activities. Facebook, along with other online social network services, plays a role by facilitating the maintenance of close friendships and the distant relationships that help create bridging social capital. The ability to articulate friends from offline social networks allows a Facebook user to maintain lightweight contact with a broad set of acquaintances (see also Subrahmanyam, Reich, Waechter, & Espinoza, 2008-this issue). Features within the site make it easier for users both to broadcast information about their own activities and to engage in a form of social surveillance wherein they can track the activities of a wide set of Facebook "Friends." More importantly, the site provides both the technical and the social infrastructure for social interaction. For example, the tool provides direct technical support for communication through within-application communication (through wall posts, pokes, messages, etc.) and the inclusion of users' contact information. Additionally, by browsing profiles within the site, users can access identity information about others that might spur face-to-face communication (by serving as a resource for information about others' preferences, personal characteristics, etc.). Learning information about one's "latent ties" (Haythornthwaite, 2005) might lower the barriers to initiating communication, both because potential commonalities are revealed and because crucial information about others, such as relationship status, are provided — thus mitigating fears of rejection.

The way in which Facebook might facilitate communication, especially in initial social interactions, and perhaps mitigate fears of rejection may further explain why lower self-esteem students appear to gain more from their use of Facebook than higher self-esteem students. Lower self-esteem students might face more difficulties than high self-esteem individuals in approaching people in their classes or their dormitories, and hence might not form the casual relationships so essential to bridging social capital. A social network site that makes it easier for lower self-esteem students to engage with others outside of their close personal networks can therefore be expected to have a larger effect for them than for higher self-esteem students.

Our findings regarding bridging social capital also provide a new perspective on Facebook "Friends." Although at first glance, the high number of Facebook friends (mean of 223 in 2006 and 339 in 2007) might suggest a collection of superficial, shallow relationships, the characteristics of this network are precisely what we would expect to see in a network built to support bridging social capital. Facebook networks appear to be large and thus heterogeneous — a collection of "weak ties" (Granovetter, 1973) well-

suited to providing new information. Donath and boyd (2004) suggest that social network sites may better support a large, heterogeneous network, an observation which is supported by data reported here as well as network-level data (Lampe et al., 2007).

Another interesting finding in this work is the increase in the Facebook Intensity (FBI) measure between 2006 and 2007 (*M*s = 2.81 and 3.12, respectively). While the mean number of friends reported could be a sign of longevity of participation on the site, the increase in the FBI measure is a more robust indicator of its growing importance to the respondents. We interpret the increase to mean that Facebook has occupied a more central role in supporting the maintenance of social relationships among the undergraduates we studied. While other explanations are possible, we feel that this explanation matches the data presented here.

Returning to the issue of causality, these findings do suggest that Facebook use is related to the generation of bridging social capital in a meaningful way. Particularly, the cross-lagged correlation analysis findings depicted in Figs. 2 and 3 are more consistent with the notion that Facebook leads to gains in bridging social capital than it is with the notion that pre-existing social capital levels drive Facebook use. Additionally, the regression analysis (Table 5) demonstrates that even when accounting for other factors, lagged Facebook use relates to increases in bridging social capital. However, since there was no random assignment or experimental control of variables in this study, we recognize that we cannot claim true causality with these results. However, it should be noted that social capital and how it is generated is a notoriously difficult research area to address, and it is unlikely that experimental studies can capture social capital meaningfully outside of game theoretic simulations. Studies like the present one, in which use in-context is studied over time, are an important and appropriate way to address questions of social capital generation and maintenance.

These findings can be summarized in terms of the hypotheses that were proposed. The hypothesis that greater Facebook use would result in greater bridging social capital (H1) was supported. The fact that Facebook use significantly predicted bridging social capital even after controlling for general Internet use supports the notion that there are unique affordances of online social network services, and the relationship to social capital is not an artifact of general Internet activity. Tools like friend lists, wall posting, messaging, and tagging help social network site users maintain distant relationships and weak ties. Moreover, this relationship holds after accounting for the effects of self-esteem and satisfaction with life on bridging social capital. The hypothesis (H2) that the direction of the effect is from Facebook use to bridging social capital and the results of the cross-lagged correlation analysis and lagged regression also support this view. We previously articulated the reasons why this may be true, given the role online social network services like Facebook can play in facilitating lightweight contact with weak ties, social surveillance, and through providing social and technical support for social interaction. The proposal that self-esteem and satisfaction with life would relate to bridging social capital (H3) was indeed supported. However, we were more interested in seeing whether Facebook use accounted for variation in bridging social capital over and above the effects of these psychological variables, and it did. Finally, H4 proposed that self-esteem and satisfaction with life would shape the way that Facebook use affected bridging social capital. This moderating effect holds for self-esteem, but was not supported for satisfaction with life. The interaction effect between self-esteem and Facebook use in predicting bridging social capital as depicted in Fig. 4 is consistent with the interpretation that Facebook use serves to reduce the barriers to interacting with weak ties for those with lower self-esteem. The fact that this held up with a year-long lag between the independent and dependent measures is noteworthy, and supports the kind of causal interpretation offered.

The study does have important limitations. Only one social network site – Facebook – was examined, limiting generalization of the findings to all such services. This limitation is mitigated by the overwhelming popularity and pervasive use of Facebook on university campuses. Among this population, this is the primary social network site in use. We also only examined users at one university, and there may be differences across institutional settings that we are not able to capture.

5. Conclusion

There are several opportunities for future work in this area. First, the panel of Facebook users should be continued over time, to further explore the relationship between Facebook use and social capital. Additionally, the ability to create applications within Facebook using their open application programming interface (API) offers opportunities for more experimental work related to the generation of social capital. More research should also be done to see if groups other than young adults are receiving the same social capital benefits that we see here.

Emerging adults are using Facebook to maintain large, diffuse networks of friends, with a positive impact on their accumulation of bridging social capital. Although it is tempting to consider these large networks of acquaintances as shallow, in reality these connections have true potential for generating benefits for Facebook users. Moreover, online social network services appear to offer important affordances, especially for those who otherwise face difficulties in forming and maintaining the large and heterogeneous networks of contacts that are sources of social capital.

References

Adler, P., & Kwon, S. (2002). Social capital: Prospects for a new concept. *Academy of Management Review, 27*, 17–40.
Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*, 469–480.
Bargh, J. A., & McKenna, K. Y. (2004). The Internet and social life. *Annual Review of Psychology, 55*, 573–590.
Bargh, J. A., McKenna, K. Y., & Fitzsimons, G. M. (2002). Can you see the real me? Activation and expression of the "true self" on the Internet. *Journal of Social Issues, 58*, 33–48.
Bishop, J., & Inderbitzen, H. (1995). Peer acceptance and friendship: An investigation of their relation to self-esteem. *The Journal of Early Adolescence, 15*, 476–489.
Bourdieu, P., & Wacquant, L. (1992). *An invitation to reflexive sociology.* Chicago, IL: University of Chicago Press.
boyd, d. m., & Ellison, N. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication, 13*, 210–230.

Brown, J. (2006). Emerging adults in a media-saturated world. In J. Arnett, & J. Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century* (pp. 279–299). NY: American Psychological Association.

Burt, R. (1997). The contingent value of social capital. *Administrative Science Quarterly*, *42*, 339–365.

Coleman, J. S. (1988). Social capital in the creation of human capital.*The American Journal of Sociology*, *94*, S95–S120 (Supplement).

Connolly, J., Furman, W., & Konarksi, R. (2000). The roles of peers in the emergence of heterosexual romantic relationships in adolescence. *Child Development*, *17*, 1395–1408.

Constant, D., Sproull, L., & Kiesler, S. (1996). The kindness of strangers: The usefulness of electronic weak ties for technical advice. *Organization Science*, *7*, 119–135.

Cummings, J., Lee, J., & Kraut, R. (2006). Communication technology and friendship during the transition from high school to college. In R. E. Kraut, M. Brynin, & S. Kiesler (Eds.), *Computers, phones, and the Internet: Domesticating information technology* (pp. 265–278). New York: Oxford University Press.

Diener, E., Suh, E., & Oishi, S. (1997). Recent findings on subjective well-being. *Indian Journal of Clinical Psychology*, *24*, 25–41.

Donath, J. (2007). Signals in social supernets. *Journal of Computer-Mediated Communication*, *13*, 231–251.

Donath, J. S., & boyd, d. (2004). Public displays of connection. *BT Technology Journal*, *22*, 71.

Ellison, N., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication*, *12*, 1143–1168.

Golder, S., Wilkinson, D., & Huberman, B. A. (2007). Rhythms of social interaction: Messaging within a massive online network. In C. Steinfield, B. Pentland, M. Ackerman, & N. Contractor (Eds.), *Proceedings of the third international conference on communities and technologies, Michigan State University* (pp. 41–66). London: Springer.

Granovetter, M. S. (1973). The strength of weak ties. *Amerian Economic Review*, *78*, 1360–1480.

Granovetter, M. S. (1983). The strength of weak ties: A network theory revisited. *Sociological Theory*, *1*, 201–233.

Hargittai, E. (2007). Whose space? Differences among users and non-users of social network sites. *Journal of Computer-Mediated Communication*, *13*, 276–297.

Haythornthwaite, C. (2005). Social networks and Internet connectivity effects. *Information, Communication & Society*, *8*, 125–147.

Helliwell, J. F. K., & Putnam, R. D. K. (2004). The social context of well-being. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *359*, 1435–1446.

Hewitt, A., & Forte, A. (2006, November). Crossing boundaries: Identity management and student/faculty relationships on the Facebook. Poster presented at the ACM Special Interest Group on Computer-Supported Cooperative Work, Banff, Canada.

Keefe, K., & Berndt, T. (1996). Relations of friendship quality to self-esteem in early adolescence. *The Journal of Early Adolescence*, *16*, 110–129.

Kenny, D. A. (1979). *Correlation and causality.* New York: Wiley-Interscience..

Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues*, *58*, 49–74.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukhopadhyay, T., & Scherlis, W. (1998). The Internet paradox: A social technology that reduces social involvement and psychological well-being. *American Psychologist*, *53*, 1017–1032.

Lampe, C., Ellison, N., & Steinfield, C. (2006, Nov.). A face(book) in the crowd: Social searching vs. social browsing. Paper presented at the ACM Special Interest Group on Computer-Supported Cooperative Work, Banff, Canada.

Lampe, C., Ellison, N., & Steinfield, C. (2007, April). A familiar face(book): Profile elements as signals in an online social network. *Proceedings of the SIGCHI conference on human factors in computing systems. San Jose, CA* (pp. 435–444). New York: ACM.

LaRose, R., Lai, Y. J., Lange, R., Love, B., & Wu, Y. (2005). Sharing or piracy? An exploration of downloading behavior. *Journal of Computer-Mediated Communication*, *11*, 1–21.

Lin, N. (1999). Building a network theory of social capital. *Connections*, *22*, 28–51.

McKenna, K., & Bargh, J. (2000). Plan 9 from cyberspace: The implications of the Internet for personality and social psychology. *Personality and Social Psychology Review*, *4*, 57–75.

Montgomery, M. J. (2005). Psychosocial intimacy and identity: From early adolescence to emerging adulthood. *Journal of Adolescent Research*, *20*, 346–374.

Morrow, V. (1999). Conceptualizing social capital in relation to the well-being of children and young people: A critical review. *Sociological Review*, *47*, 744–765.

Moyle, K. (2004, Dec. 7). *Internet helps people connect with past friends. University Wire.* Retrieved July 8, 2008, from http://www.dailyevergreen.com/story/10828

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *The Academy of Management Review*, *23*, 242–266.

Nie, N. (2001). Sociability, interpersonal relations, and the Internet: Reconciling conflicting findings. *American Behavioral Scientist*, *45*, 420–435.

Pavot, W., & Diener, E. (1993). Review of the Satisfaction with Life Scale. *Psychological Assessment*, *5*, 164–172.

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community.* New York: Simon & Schuster.

Raghunathan, T. E., Rosenthal, R., & Rubin, D. B. (1996). Comparing correlated but nonoverlapping correlations. *Psychological Methods*, *1*, 178–183.

Resnick, P. (2001). Beyond bowling together: Sociotechnical capital. In J. Carroll (Ed.), *HCI in the new millennium* (pp. 647–672). New York: Addison-Wesley.

Rosenberg, M. (1989). *Society and the adolescent self-image (revised ed.).* Middletown, CT:: Wesleyan University Press.

Shaw, B., & Gant, L. (2002). In defense of the Internet: The relationship between Internet communication and depression, loneliness, self-esteem, and perceived social support. *CyberPsychology & Behavior*, *5*, 157–171.

Stutzman, F. (2006, Oct.). An evaluation of identity-sharing behavior in social network communities. Paper presented at the International Digital Media Arts Association and the Miami University Center for Interactive Media Studies CODE Conference, Oxford, OH.

Subrahmanyam, K., Reich, S., Waechter, N., & Espinoza, G. (2008). Online and offline social networks: Use of social networking sites by emerging adults.*Journal of Applied Developmental Psychology*, *29*, 420–433 (this issue).

Sullivan, H. (1953). *The interpersonal theory of psychiatry.* New York: Norton.

Valkenburg, P. M., & Peter, J. (2007). Preadolescents' and adolescents' online communication and their closeness to friends. *Developmental Psychology*, *43*, 267–277.

Valkenburg, P. M., Peter, J., & Schouten, A. P. (2006). Friend networking sites and their relationship to adolescents' well being and social self-esteem. *CyberPsychology and Behavior*, *9*, 584–590.

Wellman, B., Haase, A. Q., Witte, J., & Hampton, K. (2001). Does the Internet increase, decrease, or supplement social capital? Social networks, participation and community commitment. *American Behavioral Scientist*, *45*, 436–455.

Williams, D. (2006). On and off the 'net': Scales for social capital in an online era. *Journal of Computer-Mediated Communication*, *11*, 593–628.