Users and Nonusers: Interactions between Levels of Facebook Adoption and Social Capital

Cliff Lampe
School of Information
University of Michigan
105 S. State St.
Ann Arbor, MI 48109
cacl@umich.edu

Jessica Vitak
College of Information Studies
University of Maryland
4105 Hornbake Bldg, South Wing
College Park, MD 20742
jvitak@umd.edu

Nicole Ellison
School of Information
University of Michigan
105 S. State St
Ann Arbor, MI 48109
enicole@umich.edu

ABSTRACT
Although Facebook is the largest social network site in the U.S. and attracts an increasingly diverse userbase, some individuals have chosen not to join the site. Using survey data collected from a sample of non-academic staff at a large Midwestern university (N=614), we explore the demographic and cognitive factors that predict whether a person chooses to join Facebook. We find that older adults and those with higher perceived levels of bonding social capital are less likely to use the site. Analyzing open-ended responses from non-users, we find that they express concerns about privacy, context collapse, limited time, and channel effects in deciding to not adopt Facebook. Finally, we compare non-adopters against users who differ on three dimensions of use. We find that light users often have social capital outcomes similar to, or worse than, non-users, and that heavy users report higher perceived bridging and bonding social capital than either group.

Author Keywords
Facebook; social network sites; social capital; technology adoption

ACM Classification Keywords
H.5.3. Group and Organization Interfaces – Web-based Interaction

INTRODUCTION
Social network site (SNS) use has grown significantly in the United States in recent years. In 2005, only 8% of U.S. Internet-using adults were members of an SNS, but by 2011 that percentage had grown to 65% [30], largely dominated by membership on Facebook. However, that leaves 35% of that population who have chosen not to join a SNS. While some of this lack of adoption may result from lack of access to Internet tools or a lack of skills associated with using these services, differences between adopters and non-adopters of SNSs may also be explained by differences in individual characteristics and motivations. Given the growing body of literature that suggests SNS use is associated with benefits such as social capital gains [6, 15, 44] and increases in well-being [45], we feel it is important to better understand patterns around non-adoption and social capital and self-esteem patterns associated with no use, low use, and high use of the site.

CSCW '13, February 23–27, 2013, San Antonio, Texas, USA.

While there have been multiple studies of SNS users in college populations [21, 24], in general adult populations [6, 17], and in organizations [38, 42], these studies have focused on current users, rather than on differences between users and non-users of these sites. In one notable exception, Hargittai [21] examined differences between undergraduate users and non-users of SNSs. She identified demographic predictors of site use and looked not only at adoption vs. non-adoption but also differences among specific sites (e.g., Facebook vs. MySpace). Likewise, recent longitudinal research by Brandtzaeg [5] looking at Norwegian's Internet use over a three-year period found that, compared with non-users, SNS users have more face-to-face interactions, more acquaintances, and higher bridging social capital, although they also report higher loneliness.

There have been multiple models of technology adoption proposed in the literature [1, 10, 11, 18, 46], many of which have been applied to social software use in an organizational setting. However, compared to organizational groupware adoption patterns, we expect social media sites like Facebook will be associated with different usage and adoption patterns given the greater selection of tools available and differences in user characteristics and site features. A common theme in models of technology adoption points to the complex interplay between features of the system, social structures like norms and influence, and individual demographic and cognitive factors like motivation, literacy, and efficacy [11]. It is also unclear from this literature what adoption means. For example, simply creating a Facebook account is unlikely to have the same effects as using it regularly.

In what ways are Facebook users and non-users different, and how are heavy users distinct from light users? To answer those questions, we conducted a survey of non-academic staff at a large university. Given that Facebook use can be quite heterogeneous, we look at both heavy and light users of Facebook, comparing their characteristics to each other as well as to non-users and identifying social capital and well-being outcomes associated with these different levels of use.

LITERATURE REVIEW

SNS use is growing across a diverse set of people. In the United States, 65% of Internet-using adults have a profile on a SNS [30]. When looking at specific age demographics, those in the 30-49 age range increased from 25% adoption in 2008 to 70% in 2011, and those in the 50-64 bracket went from 11% in 2008 to 51% in 2011. While this is a notable increase in use over a short amount of time, 35% of Internet-using adults still have not joined a SNS. As another example of the changes in this area, Twitter was used daily by only 2% of Internet-using Americans in November 2010, yet by May 2012 was used by 8% daily and 15% overall, with even more stark increases in use by young adults, residents of urban areas, and African Americans [40].

How and why people use Facebook is important because research has shown a wide range of potentially positive outcomes from that use [50]. Facebook use has been associated with increases in social capital [15], political mobilization [43] and participation [22, 48]; information seeking both within organizations [31, 42] and in more everyday settings [25, 32]; and in educational settings [4, 27, 37].

SNSs can fill a variety of user needs, and multiple studies have applied the Uses and Gratifications perspective to account for the heterogeneous ways in which people use Facebook. For example, Joinson [23] applied this approach to understand how Facebook members used the site, finding some users were mainly interested in interpersonal communication, while others were more invested in picture sharing or playing games. Also applying a Uses and Gratifications lens, Papacharissi and Mendelson [33] showed how different motivations were associated with levels of social capital reported by Facebook users. Smock et al. [41] studied how college students' uses of and gratifications derived from Facebook were associated with use of and efficacy toward different Facebook features.

How individuals use the site to connect with others, and who these connections are, also varies across users. Hampton et al. [20] conducted phone surveys with Facebook users, and matched those survey responses with Facebook server data. They found that "most people get more than they give" in relation to attention from others because a small group of power users are actively engaged in behaviors like commenting, liking, and tagging the content of others. Backstrom et al. [2] used Facebook server data to show how users divided attention (as measured by Wall posts, messages, and profile views) across their Facebook network and found heterogeneous strategies that were stable by individual. Some people would spend their attention on a small group of people in their network, while others would spread their attention more equally across connections. Similarly, Ellison et al. [15] found that Facebook users employed three different "connection strategies" regarding who they connected with on the site, and these practices had implications for users' perceived social capital levels. Burke et al. [6] found that people who did not actively engage with their networks had higher levels of reported loneliness and lower social capital outcomes. Brandtzaeg [5] divided SNS users into five use clusters based on how they described their site behaviors (e.g. Lurkers, Socializers, Debaters, Sporadics and Advanced) and found difference in loneliness and bridging social capital between those groups. The heterogeneity of motivation to use and type of use likely means that people have different outcomes resulting from their participation.

Given the increasing percentage of the population across demographics that have started to use Facebook, non-adoption is an issue that becomes increasingly important, as these non-adopters may be opting out of significant opportunities for communication. The studies described above have identified a range of potential positive outcomes and new ways of interacting with social systems, enabled by these tools. Understanding why users choose not to participate in these opportunities may help to identify the impact of non-adoption. Additionally, it is clear that Facebook use is far from monolithic, and comparing non-users of the site to users as a single block may miss some subtleties in that variety of use. We have identified three types of use to compare users across—non-users, light users, and heavy users—which we see as a first step in adding nuance to the perception of Facebook participation.

Technology Adoption

Why might some people adopt a site like Facebook while others do not? What differences exist between those who log in multiple times a day versus those who go days without checking in? Researchers have identified several models of why people adopt technology in general, and social software more specifically. Grudin [18, 19] looked at adoption of groupware in organizational settings and found that issues like network effects and difficulty in evaluating outcomes of use had an effect on overall adoption of groupware. In particular, he highlights the importance of not designing socio-technical systems where there is a "disparity between who does the work and who gets the benefit" and describes the cost-benefit analysis that groupware users make when they decide whether to use a technology. DeSanctis and Poole [11] describe Adaptive Structuration Theory, pointing to a complex interplay between individual, group and technological features that predict when a technology will be developed. Diffusion of Innovations Theory [35] adopts a social learning perspective, proposing that people adopt a technology after observing others (especially influential others) using that technology and receiving benefit from it.

Often used to explore organizational-level adoption, a common model of information technology adoption is the Technology Acceptance Model (TAM) [10, 46], which argues that people assess two major dimensions of a technology as they decide whether to adopt it: perceived ease-of-use and perceived usefulness. In this model, potential users evaluate the tension between how hard or easy a system is to use versus the benefits they can receive from the system. In relation to the decision about whether or not to use Facebook, TAM would predict that people are assessing two aspects of the site when making adoption decisions: how difficult Facebook is to use and the possible benefits (or usefulness) of site use. The original work on TAM focused on how information technology could facilitate work processes, but more recent studies have also looked at social benefits of adoption [9]. Although TAM has often been accused of over-simplifying the adoption process [3] and being overly-embedded in rational choice paradigms [28], it does provide a baseline model for describing some of the factors that may influence adoption.

Adoption of Facebook

Few studies have looked at how people decide whether or not to adopt social media in general, or Facebook in particular. Hargittai [21] did early work looking at how factors like race, gender, and socio-economic status affected adoption of multiple SNS platforms. She found, for example, that Facebook users were more likely to be White and from more affluent socio-economic backgrounds. However, these data were collected in 2006 when Facebook was still limited to university networks and, as shown above, there has been a large-scale changes in the SNS userbase since they were collected. Brandtzaeg [5] has done a more recent study looking SNS users and non-users, as well as comparing different categories of Facebook users. He found that bridging social capital is different between users and non-users, but used a measure of social capital that assess network diversity, rather than outcomes from connections. In addition, while he did not directly measure bonding social capital, he found that Facebook users had more acquaintances and more face-to-face interactions with their close friends than non-users.

One reason there has been little work exploring non-adopters of Facebook is because research in this area has been dominated either by studies of undergraduate students, a population that does not typically include enough non-users to support comparative analyses, or by studies that are based on Facebook server-level data, which are limited to Facebook users. While the Pew Internet & American Life Project has provided multiple descriptive studies of SNS use [20, 39, 40], few of them involve multivariate analysis of relationships between variables.

METHODS

In order to compare characteristics of Facebook users and non-users, we invited, via email, a random sample of 2149 non-academic staff at a large, Midwestern university to participate in an online survey regarding their use of online communication tools in February 2011; all participants were also invited to provide an email address to be entered into a raffle for one of ten $15 Amazon gift cards. We received usable responses from 614 people; after removing undelivered invitations, the response rate was calculated to be 28.9%. Of that sample, 22% (134) were not Facebook members. Our sample – non-academic staff members of a university – presumably have Internet access on campus (at campus computer labs if not in their local workplace) and thus constitute an appropriate sample for exploring motivations for non-use that does not stem from lack of access. In addition to their presumed access at the workplace – a college campus – the vast majority of our sample (93.8%) reported having an Internet-connected computer at home. Thus access is unlikely to be the primary reason why they do not use the site.

Unless otherwise noted, all scale variables detailed below were measured using Likert-type response options ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Variables Measured for Members and Non-members

Our survey instrument included demographic, psychological, and perception-based measures in order to test differences between Facebook members and non-members. Across the entire sample, participants were more likely to be female (66%), White (83%) and 45 years old on average (SD = 11). They reported spending a median of 3.49 hours per day on the Internet, and 72.1% had a college degree or higher. Ninety-five percent reported having access to high-speed Internet, and 90% had a computer in the home.

Internal use characteristics

Internet Self-Efficacy [29] captures individuals' perceptions of their ability to understand a variety of Internet-based concepts and perform various Internet-based tasks. The 7-item scale (M = 3.68, SD = .80) was highly reliable (α = .93).

Self-esteem has consistently shown to be related to Facebook users' engagement with the site (e.g., [13, 15]). In this study, we included Rosenberg's [36] 7-item Self-Esteem Scale (α = .86, M = 4.33, SD = .56) to capture individuals' self-esteem.

Perception of Facebook's Usefulness

Perceptions of Facebook's Usefulness is an original scale (two items; α = .91, M = 3.60, SD = .88) intended to capture both Facebook users' and non-users' perceptions of Facebook's general utility ("Facebook is a useful site" and "I see benefits in joining Facebook").

Social capital

Participants were asked a series of questions to capture their perceived access to social capital resources through interactions with members of their social network. Social capital is often delineated into two types: bridging social capital, which is characterized by access to new people and ideas, inclusivity, and expanded world views; and bonding social capital, which typically includes more dense networks of support that are inward-looking in nature and more likely to be associated with emotional support and more significant forms of mobilization (such as a large financial loan) Putnam [34]. Bridging social capital is important for mobilizing generalized reciprocity—the belief that people do good things for a person or society without specific expectation of repayment (e.g., donating blood)—while bonding social capital is key to specific reciprocity and mobilizing solidarity within a group.

The scales used in this survey were adapted from Williams' [49] Internet Social Capital Scales (ISCS), with participants instructed to "think about your entire social network, including relatives, close and distant friends, coworkers and acquaintances" when reporting their level of agreement with statements such as "Interacting with people in my social network makes me want to try new things" and "There are several people in my social network I trust to help solve my problems." Note that in contrast to other versions of these scales, we did not specify a particular context (such as the original scales' "offline" and "online" contexts) in order to use the same items for both Facebook users and non-users. The bridging social capital measure (10 items, $\alpha = .88$; $M = 3.74$, $SD = .58$) captures aspects including contact with diverse others and feeling part of a broader group, while the bonding social capital scale (10 items, $\alpha = .84$, $M = 3.49$, $SD = .63$) is focused on social and emotional support as well as "big favors."

Variables Measured for Facebook Members Only

Previous research suggests that use of Facebook is strongly heterogeneous for members [20]. In order to compare different levels of use with non-use, we asked Facebook users questions related to three different dimensions of Facebook use. We created categorical variables for light and heavy types of each type of use by grouping the lowest and highest quartile of each of the variables.

Time spent on Facebook

The amount of time someone spends using Facebook is a standard measure of overall use that has been used in other Facebook research [7, 8, 16]. In this study, Facebook members were asked to respond to a question which asked, "In the past week, on average, how many minutes PER DAY have you spent actively using Facebook?" We were careful to indicate that we were interested in active use, as opposed to just having the site open on one's screen. On average, users reported spending 34 minutes on the site per day (median = 15, $SD = 47.90$). The lowest quartile of reported use was 5 minutes per day or less, while the highest quartile of reported use was 45 minutes or more per day.

"Actual" and Total Friends on Facebook

Other work [15] has found that in determining the effects of network size on social capital, the number of "actual friends" respondents report having in their Facebook network was a stronger predictor of outcome measures such as social capital than the total number of Facebook connections one has made. The authors speculated that actual friends are likely to be "individuals with whom the user has a stronger offline connection" and that users may configure their settings to hide content from "non-actual" friends (and, conversely, may also have their content hidden from these individuals), potentially minimizing the social capital benefits associated with "non-actual" friends. Another factor contributing to this lack of visibility is technical: Facebook's algorithm hides content from some Friends, and non-actual Friends (weaker ties) are probably more likely to be categorized as irrelevant to a particular user (and thus hidden). In this survey, Facebook users were asked, "Approximately how many TOTAL Facebook friends do you have?" and "Approximately how many of your TOTAL Facebook friends do you consider actual friends?" On average, respondents reported having 76 actual friends (median = 40, $SD = 101$) and 207 total Friends (median = 120, $SD = 288$); therefore, examining median responses, Facebook users reported that approximately one-third of their total Facebook network was comprised of actual friends. Similar to [15], we did not define what "actual friends" meant in order to tap into individual understandings of friendship.

Signals of Relational Investment (SRI)

SRI is a scale comprised of five items related to the respondents' reported likelihood of engaging in behaviors that signal attention to specific Friends in their Facebook network. This scale ($\alpha = .901$, $M = 3.55$, $SD = .83$) has been used in previous work [14, 26] and has been validated through confirmatory factor analysis ($X^2 = 7.91$, $p > .05$; RMSEA = .05; CFI = 1.00; GFI = .99). SRI probes the extent to which subjects report that they "try to respond" to Friends when they post requests for information and advice or make less explicit articulations of social support needs, such as posting about having a bad day. A fifth item in the scale asks about posting "happy birthday" on a Friend's Wall. We argue [14, 26] that responding to these requests constitute relationship maintenance activities, in that users are explicitly signaling that they are attending to specific individuals in their network and engaging in a mediated form of "social grooming" [12] with these specific ties. Previous research [26] found SRI to be highly correlated with perceptions of bridging social capital, and similar attention-signaling behaviors such as commenting on Friends' updates have been shown to be related to social capital [6]. Breaking reported SRI into quartiles, the lowest quartile had a value of 3.20 or less on the scale, while the highest quartile had a value of 4.00 or higher.

RESULTS

In order to explore how Facebook non-users are different from users, we present three analyses. First, we conduct a binary logistic regression comparing non-users against all users in our sample, to identify high-level differences between these two groups. Next, we present data from open-ended responses from non-users responding to a question about why they don't use Facebook. Finally, we present three ANOVAs highlighting differences between non-users of Facebook and either light or heavy users.

Predicting Members and Non-members

In order to determine which individual characteristics were associated with whether a participant reported being a Facebook member or not, we employed binary logistic regression (see Table 2), which shows how each independent variable affects the likelihood that someone responded either yes or no to being a Facebook member. Of the demographic variables described above, only age was a statistically significant predictor of membership. Being older had a slightly negative association with being a member of Facebook, which is consistent with descriptive studies of overall SNS use [30]. A correlation matrix of non-demographic variables included in this model are presented in Table 1.

Internet efficacy, self-esteem, and bridging social capital were not significantly related to the likelihood of being a Facebook member in this model; however, two variables were significant in this model. First, the more strongly one agreed with statements about how useful Facebook was, the more likely s/he was to use the site. Second, in an unexpected finding given previous literature on this topic, bonding social capital was a strong **negative** predictor of being a Facebook member.

Qualitative Data from Non-Users

The 134 participants who reported not having a Facebook account were asked to explain why they had chosen to refrain from participating in Facebook. The majority (91%) provided a response, which we then analyzed through an iterative process to establish a taxonomy of reasons for non-use. First, a research assistant on the project read through each of the responses and identified six main categories of responses. The second author then reviewed the categorization scheme and collapsed two of the categories due to redundancy: a category called "Not interested" was collapsed into the "Lack of interest" category, in light of the conceptual overlap between these categories and the fact that many responses spanned these codes. Finally, all responses were reviewed for correct categorization. The five final categories were: time constraints, the impersonality of communication online, privacy concerns, context collapse, and a general lack of interest. When responses reflected multiple themes, this was reflected in the coding process (i.e., they received multiple codes).

As a whole, a dominant theme of these responses evoked the sense that using the site was not worth it – either due to the costs (in time or effort) of site use, the lack of value associated with site use, or the sense that even if using Facebook did involve some positive outcomes, they did not outweigh the negative outcomes of use. For instance, one participant wrote, "I tried it a couple of times, and while there are very clear benefits to Facebook, I found that it wasn't for me in terms of time spent using it." Similarly, another noted, "[The site] creates more social problems than it's worth." While some remarked on its value for sharing information or for communicating with younger family members who use the site as their "major method of communication," they ultimately identified as non-users. Below we describe each of these themes in more detail.

	Self Esteem	FB Usefulness	Bridging	Bonding
Internet Efficacy	0.10**	0.11**	0.07*	0.04
Self Esteem		0.01	0.17**	0.19**
FB Usefulness			0.28**	0.14**
Bridging				0.38**
Bonding				

Table 1: Kendall's Tau correlations of variables for both users and non-users. * <.05 **<.01

Variable name	Beta	S.E.	Sig	Exp (B)
Sex (Male)	-0.179	0.293	0.542	0.836
Age	**-0.043**	**0.014**	**0.004**	**0.961**
Ethnicity (NonWhite)	-0.515	0.360	0.152	0.598
Education	-0.065	0.123	0.598	0.937
Weekly Internet Use	-0.025	0.050	0.616	0.976
Internet Efficacy	0.336	0.185	0.069	1.400
Self Esteem	-0.294	0.237	0.216	0.746
Facebook Usefulness	**1.344**	**0.163**	**0.001**	**3.833**
Bridging SC	0.323	0.286	0.259	1.381
Bonding SC	**-0.463**	**0.223**	**0.038**	**0.630**
Constant	-1.67	1.571	0.915	0.846

Table 2: Binary logistic regression predicting likelihood of being a Facebook member. Nagelkerke R^2 = 0.36. Bolded lines are significant predictors at a .05 alpha or lower.

Time Constraints. Many participants referenced their busy schedules and suggested that using Facebook would require more time and energy than they had available. Some noted the "time suck" aspect of use, with one saying, "I believe it is a huge waste of time and it takes away from productivity in the workplace." Several specifically referenced spending extensive time on their computers for work and wanting to avoid doing the same while at home. For example, one participant said, "I feel that I do not have time to be online, work, and spend time with my family."

Channel Effects. Participants noted what they perceived to be the impersonal nature of interactions facilitated by the site, and some compared Facebook interactions to having face-to-face interactions with a friend, which they saw as more authentic, private, and personal. For example, one participant wrote, "I feel these types of interactions to be extremely impersonal. I would much rather speak to another person; much more can be accomplished through a simple conversation." Another noted, "I prefer talking face to face or on the phone. My personal friends deserve a private conversation." Some highlighted what they saw as differences between "real" friendships and those found online, as this participant explained: "I find Facebook 'relationships' and social interactions to be superficial and a gossip mine. I would prefer to have real relationships with a smaller group of people. I feel secure with who I am and don't need 8,000 'friends.'"

Privacy. Privacy concerns played a role in many non-users' comments. Perhaps fueled by media stories describing the privacy concerns associated with Facebook and other social media, participants voiced concerns about sharing private data in they perceived to be a public space. For some, even knowledge of the privacy settings was not enough: "Personally, I think it's creepy. Even with the privacy guards in place, people can stalk you from your friends' sites." Others referenced privacy concerns explicitly, with comments like "They [Facebook] are in the business of making money, not securing my privacy… I am not a product to be sold" or which referenced "Facebook's disregard for users privacy and concerns."

Context Collapse. Context collapse concerns have been identified in previous studies of Facebook users [47]. Context collapse encapsulates users' desire to maintain boundaries between various dimensions of their identity, which some users see as increasingly difficult as the number of people using the site grows. This concern was directly mentioned by only two participants, although others indirectly referenced related concerns. Participants' comments specifically referenced the desire to separate professional and personal aspects of their identity: "too much overlap between work and personal life on Facebook" and "Professional reasons—to keep boundaries around my personal and professional lives." A third participant indirectly referenced a related issue: one of time management. The participant wrote, "time on the PC after work, be it Facebook or something else, takes away from time with my spouse and children. I try to be available while at home and 'on-task' at work." In a related comment, one participant didn't want to signal to his/her children that Facebook was a desirable activity by having an account: "I discourage my 13-year-old and 11-year old from joining such sites (because I distrust that their peers and maybe they, themselves, behave as well on-line as they do in face-to-face interactions), so I don't want to make it seem desirable to them." While these comments fall outside more narrow conceptualizations of context collapse, they do echo concerns about aspects of one's identity or online behaviors spilling into other dimensions of one's life.

Lack of Interest. For some participants, there was simply no compelling reason for them to join the site. They failed to "see any value in sharing the minutiae of my daily life with a bunch of strangers and seeing their asinine comments or whether they 'like' my statements" and did not want to "display [their] personal lives for everyone to see." One participant commented, "I don't want 'one more place' to have to check mail at," while another said, "[I] don't see how it could add value to my life." Several people simply said, "Not interested." Lack of interest may be a cover for more complex concerns about use, like those described above. In cases where people had concerns like privacy or context collapse, and potentially a mix of concerns, they might find it simpler to frame their concerns as a lack of interest.

Comparing Non-Members with Light and Heavy Users

In comparing non-users of Facebook to users, we are intentionally simplifying the concept of "use," looking only at adoption vs. non-adoption. Other studies, however, have shown that Facebook use is quite heterogeneous [23, 33]. Thus in this section we break out use into two levels and compare them to each other and to non-users in order to gain a more nuanced understanding of different kinds of users. In this section we describe analyses examining responses from three types of participants: non-users, light users, and heavy users of the site.

Variables		SRI		FB Time		Actual Friends	
		Mean	F	Mean	F	Mean	F
Age	Non	49.74[a]	15.21***	49.74[a]	37.78***	49.74[a]	53.85***
	Light	46.12[b]		47.85[a]		49.32[a]	
	Heavy	43.19[c]		39.46[b]		39.07[b]	
Education	Non	5.01[a]	2.09	5.01[a]	1.26	5.01[a]	0.25
	Light	5.14[a]		5.05[a]		5.08[a]	
	Heavy	4.92[a]		4.87[a]		5.08[a]	
Weekly Internet Use	Non	2.96[a]	0.44	2.96[a]	7.88***	2.96[a]	8.66***
	Light	3.08[a]		2.44[a]		2.60[a]	
	Heavy	3.24[a]		3.73[b]		3.95[b]	
Internet Efficacy	Non	3.43[a]	7.49***	3.43[a]	11.07***	3.43[a]	11.32***
	Light	3.72[b]		3.67[b]		3.58[a]	
	Heavy	3.78[b]		3.91[c]		3.89[b]	
Self Esteem	Non	4.34[a]	0.18	4.34[a]	0.82	4.34[ab]	4.76**
	Light	4.30[a]		4.27[a]		4.20[a]	
	Heavy	4.34[a]		4.36[a]		4.41[b]	
FB Usefulness	Non	3.12[a]	127.09***	3.12[a]	86.63***	3.12[a]	82.96***
	Light	3.44[b]		3.53[b]		3.48[b]	
	Heavy	4.11[c]		4.11[c]		4.06[c]	
Bridging Social Capital	Non	3.57[a]	28.10***	3.57[a]	17.50***	3.57[a]	27.31***
	Light	3.57[a]		3.57[a]		3.53[a]	
	Heavy	3.98[b]		3.95[b]		4.00[b]	
Bonding Social Capital	Non	3.64[a]	10.82***	3.64[a]	6.01**	3.64[a]	25.53***
	Light	3.42[b]		3.39[b]		3.22[b]	
	Heavy	3.80[a]		3.71[a]		3.85[c]	

Table 3: ANOVA comparisons of non-users, light users, and heavy users of Facebook. Superscript letters show groupings based on Tukey's B post hoc tests. * p<.05, ** p<.01, *** p<.001

Table 3 presents the results of three one-way ANOVAs comparing mean responses to our independent variables across our categories of use. These variables, described above in more detail, are Signals of Relational Investment (SRI), number of minutes spent per day on Facebook, and the number of "actual" friends within their Friend network. The ANOVA shows whether the means of the distinct groups are different overall; post-hoc analyses (Tukey's B) identify the specific means that are significantly different.

The three types of users are different across our three dimensions of use on many of the independent variables we included. Older people were more likely to be a non-user or a light user across all three dimensions of use, even though due to the nature of our population, the means differ by only a span of ten years. Weekly Internet Use was different in both the "Time on FB" and "Actual Friends" conditions. Light users in these two categories reported less weekly Internet use than either non- or heavy users. No differences were found across education level for different types of users.

Differences in Internet efficacy were consistent in that across all types of users, a participant with more reported efficacy was more likely to be a Facebook user, and more likely to be more engaged in different types of site use. Regarding self-esteem, the only significant difference between the types of users was for actual friends, with people who reported lower numbers of actual friends reporting lower self-esteem than either those who reported more actual friends or those who were non-users.

Reported beliefs about Facebook's usefulness were different across all groups in all dimensions of use, with heavy users reporting the highest values for this scale, and non-users reporting the lowest. For bridging social capital, both the non-users and light users in each dimension of use reported statistically similar levels of bridging social capital, whereas heavy users consistently reported more bridging social capital than the other two groups. As a reminder, both social capital scales presented here are for the social networks of the respondents overall, not just their Facebook networks.

We see a different pattern in relation to bonding social capital. For bonding social capital, across all types of users, light users reported less bonding social capital than either heavy users or non-users. In other words, those who become members of Facebook but don't use it in an active or intense fashion (as measured by time on site, engagement in SRI, and number of "actual friends" on the site) report less value from their overall social network in regards to the emotional support and other aspects of bonding social capital (which are typically associated with close ties). Even though the differences between means are not very large (for example 3.53 vs. 3.34 on a 5-point scale), the fact that these results are based on use of a scale that aggregates multiple questions regarding bonding social capital means that these are relatively robust results.

DISCUSSION

In this paper, we sought to understand the ways in which people who decided not to become members of Facebook (or who were members but stopped using the site) differ from those who were members, as well as differences between non-users, light users, and heavy users of the site.

Using binary logistic regression to calculate which individual characteristics are associated with whether a person is a Facebook member or not, we find that age, perceptions of Facebook's usefulness, and general bonding social capital are strong predictors. Internet efficacy was not significantly associated with the likelihood of being a Facebook member, indicating that participants' confidence about their ability to use Internet technology was unlikely to be an explanation for non-adoption.

When asked about why they had chosen to not use Facebook, non-adopters responses fell into five categories, with an overall theme being that these participants did not see benefits of joining or felt that the benefits of participating were not worth the costs (either in terms of time, context collapse concerns, privacy concerns, or other potential negative outcomes). These sentiments are consistent with the Technology Acceptance Model, which describes how people need to be able to identify the usefulness of the tool to be motivated to adopt it. This model also explains that identification of benefits can also include weighing risks of use as well. While previous literature has framed that as switching or learning costs, in a system like Facebook they may include concerns about privacy or context collapse. Although most of the comments evidenced concerns about other people (what they might find out), some participants who had used Facebook in the past wrote about how the affordances of the site affected them in ways they were not comfortable with (e.g., "I found I was using it to be nosy"; "I was on Facebook for about three days and did not like being that 'connected' 24/7"). Because we only asked whether participants were currently using the site, we were unable to distinguish in our analysis between those who used the site and then stopped from those who never tried the site. Future research on non-users may wish to explore differences between these two groups in terms of the kinds of benefits and risks of site use that they articulate.

One stated reason for not using the site was that participants did not see its "value." This is of particular interest given previous empirical research articulating a link between perceived social capital and site use. Given the strong link between bridging social capital, which is associated with weak ties, we speculate that as the population of Facebook users becomes more heterogeneous, these bridging social capital benefits (such as exposure to different perspectives) could become more robust as more diversity is introduced into the content shared on the site. Similarly, as use of the site becomes more normative, users may increasingly use it as a platform for sharing information and organizing events and may overlook those few acquaintances who are not on the site. Similar to concerns about the digital (access) divide, which argued that as more people come online, those who didn't would be increasingly left out, Facebook non-users may find themselves at a disadvantage. Future research should explore how experiences of non-users change over time.

Another consistent finding in Facebook studies is that motivations for use, and norms for appropriate use, are heterogeneous amongst users [23, 27]. Papacharissi and Mendelson [33] previously showed that different motivations to use Facebook had different relationships to bridging and bonding social capital. As we explore different motivations and types of uses, we're likely to find more differences like these, as the complex interplay between social systems, individual beliefs and capacities, and technical affordances continue to interact with one another.

Given extant literature on this topic, the difference in bonding social capital between non-users and light users of Facebook was surprising. Facebook non-users and heavy users reported higher bonding social capital than light users in terms of Signals of Relationship Investment and time spent on the site, and all three types of users were different in their number of "actual friends," though again people who reported fewer actual friends had less bonding social capital than not only those who reported more, but than those who weren't Facebook users at all. These data are correlational, so we cannot make causal claims about this relationship. As suggested above, it may be that there is a baseline level of use necessary for accessing the kinds of social resources associated with bonding social capital, such as meaningful emotional support. For instance, someone who discloses a support need on the site (such as a health condition), but then does not log back in for a few days may be less likely to see supportive messages when they would be most meaningful. They may also be less likely to see instances of resource exchanges between other members of their network, when seeing those exchanges could shape perceptions of their ability to access their network in the future. Other explanations may lie in third variable explanations – the existence of other important characteristics (like loneliness) which we didn't measure but which may affect the overall calculus of bonding social capital processes. Future research should focus on light users of the site to see how their perceptions and practices differ from "power" users.

It may be that participating at a very low level means increased time and effort costs on the part of the users without increases in social capital or other benefits of site use. Future work should explore this notion of a threshold effect – the level of activity at which social capital benefits are realized. The notion of a threshold effect is evidenced in some of our qualitative data. For instance, one participant (who identified as a non-user) explained, "I have started to join facebook (sic) but am not willing to put personal info out there about myself so my kids said 'why bother, mom?'"

Bonding social capital is typically associated with close friends, and thus network composition may be especially powerful when considering benefits and costs. It may be that these non-users do not have close friends on the site and thus do not see potential gains in regards to emotional support or other "big favors" associated with bonding social capital. Future research could go beyond measures of total and actual friends to include consideration of very close friends on the site. Alternatively, it could be that non-users have many strong ties, but in the absence of Facebook have used other tools to maintain relationships, in which case moving to Facebook would risk these established patterns.

For bridging social capital, analysis reveals slightly different patterns, in that light and non-use of the site was associated with lower levels of reported social capital than was heavy use. This was consistent across all three of our dimensions of use. Given previous work on this topic, we would expect to see differences between light and non-use of the site. Similarly to the bonding social capital differences, it could be that there is a threshold of use that is necessary to see benefit, or that some type of social learning occurs for heavier users that is missed by light users. It is worth noting that these light users represent the lowest quartile of use in each category, so we do not know at what level of use the bridging social capital benefits are realized.

However, why is there a difference in the patterns between bridging and bonding social capital? In both cases, heavy users reported the most social capital, but non- and light users were similar in their perception of bridging social capital, but not in terms of their bonding social capital. One explanation might be a "channel replacement" phenomenon, where for heavy users Facebook replaces other channels and allows them to access and groom a wider set of ties associated with social capital of both types. People who don't have access to Facebook may not have this "channel replacement" effect that facilitates bridging social capital, but do have access to other tools that help foster bonding social capital. All communication tool choices are made in the context of other available tools to meet a goal, and it could be that more tools facilitate bonding social capital than bridging.

Limitations

Surveys as a method of collecting data are dependent on self-reported data and respondent recall of past behaviors. However, Hampton et al. [20] found when matching survey responses to Facebook server data on the same behaviors that recall was actually very good regarding Facebook activities. Many of our variables, like Facebook usefulness and the social capital questions, are not dependent on recall. Although Hargittai's [21] work points out that looking only at aggregated SNS use statistics does not enable us to explore differences concerning specific site usage preferences, given the growing userbase and large body of scholarship that focus on Facebook, we focus only on this site in this study. Additionally, we only look at social capital as an outcome for Facebook use, when other outcomes might show different effects.

While the open-ended question in the survey provided some data expressed in the respondents' interpretation of their behavior, the use of dialogic interviews might have helped us to unpack their sense of "usefulness" to a greater extent. Future studies might include more in-depth interviews with non-users in order to more fully explore how and why they see the site as useful or not.

CONCLUSION

While use of social network sites, and Facebook in particular, has grown rapidly over the past several years, there are many people who have decided not to join these sites. Even for those who do join, they may experience benefits in different ways based on how they use it. By examining people who have decided not to adopt Facebook, and comparing their social capital scores with light and heavy users across three dimensions, we show that sometimes light use leads to the same or worse outcomes as non-use. The concept of "use" of a social computing system remains a complex interplay between individual and social factors, but our results indicate that membership alone is not sufficient to receive all benefits of use.

ACKNOWLEDGMENTS

This work was supported in part by the National Science Foundation (HCC 0916019). We would like to thank

Rebecca Gray for her help in data collection and analysis. We also thank Brandon Brooks and Yumi Jung for help in data collection.

REFERENCES

1. Ackerman, M. The Intellectual Challenge of CSCW: The Gap between Social Requirements and Technical Feasibility. in Carroll, J. ed. *Human Computer Interaction in the New Millennium*, ACM Press, New York, NY, 2001.
2. Backstrom, L., Bakshy, E., Kleinberg, J., Lento, T.M. and Rosenn, I., Center of Attention: How Facebook Users Allocate Attention Across Friends. in *Fifth International AAAI Conference on Weblogs and Social Media (ICWSM)*, (Barcelona, 2011).
3. Bagozzi, R.P. The Legacy of the Technology Acceptance Model and a Proposal for a Paradigm Shift. *Journal of the Association for Information Systems*, *8* (4). 244-254.
4. Barkhuus, L. and Tashiro, J. Student socialization in the age of facebook *Proceedings of the 28th international conference on Human factors in computing systems*, ACM, Atlanta, Georgia, USA, 2010.
5. Brandtzaeg, P.B. Social networking sites: Their users and social implications—a longitudinal study. *Journal of Computer-Mediated Communication*, *17*. 467-488.
6. Burke, M., Kraut, R. and Marlow, C. Social capital on facebook: differentiating uses and users *Proceedings of the 2011 annual conference on Human factors in computing systems*, ACM, Vancouver, BC, Canada, 2011, 571-580.
7. Burke, M., Marlow, C. and Lento, T., Feed me: Motivating newcomer contribution in social network sites. in *ACM Conference on Human Factors in Technical Systems*, (Boston, MA, 2009), ACM Press.
8. Burke, M., Marlow, C. and Lento, T. Social network activity and social well-being *Proceedings of the 28th international conference on Human factors in computing systems*, ACM, Atlanta, Georgia, USA, 2010.
9. Cheunga, C.M.K., Chiua, P.-Y. and Leeb, M.K.O. Online social networks: Why do students use facebook? *Computers in Human Behavior*, *27* (4). 1337-1343.
10. Davis, F.D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13* (3). 319-340.
11. DeSanctis, G. and Poole, M.S. Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organization Science*, *5* (2).
12. Donath, J.S. Signals in social supernets. *Journal of Computer Mediated Communication*, *13* (1). 12.
13. Ellison, N., Steinfield, C. and Lampe, C. The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer Mediated Communication*, *12* (4). article 1.
14. Ellison, N., Vitak, J., Gray, R., Lampe, C. and Brooks, B. Cultivating Social Resources on Facebook: Signals of Relational Investment and their Role in Social Capital Processes *iCS-OII 2011 "A Decade in Internet Time" Symposium.* , Oxford, UK, 2011.
15. Ellison, N.B., Steinfield, C. and Lampe, C. Connection Strategies: Social Capital Implications of Facebook-enabled Communication Practices. *New Media & Society*, *13*. 873-892.
16. Gilbert, E. and Karahalios, K. Predicting tie strength with social media *Proceedings of the 27th international conference on Human factors in computing systems*, ACM, Boston, MA, USA, 2009.
17. Golder, S., Wilkinson, D. and Huberman, B.A., Rhythms of Social Interaction: Messaging within a Massive Online Network. in *3rd International Conference on Communities and Technologies (CT2007).* (East Lansing, MI, 2007), Springer.
18. Grudin, J. Groupware and social dynamics: Eight challenges for developers. *Communications of the ACM*, *37* (1). 93-104.
19. Grudin, J., Why CSCW applications fail: problems in the design and evaluationof organizational interfaces. in *ACM conference on Computer-supported cooperative work*, (Portland, OR, 1988), ACM Press, 85-93.
20. Hampton, K., Sessions-Goulet, L., Marlow, C. and Rainie, L. Why most Facebook users get more than they give, Pew Research Center's Internet & American Life Project, Washington DC, 2012.
21. Hargittai, E. Whose Space? Differences Among Users and Non-Users of Social Network Sites *Journal of Computer Mediated Communication*, *13* (1).
22. Johnson, T. and Perlmutter, D. The Facebook Election: New Media and the 2008 Election Campaign. *Mass Communication and Society*, *12* (3).
23. Joinson, A.N., Looking at, looking up or keeping up with people?: motives and use of facebook. in *Conference on Human Factors in Computing Systems (CHI)*, (Florence, Italy, 2008), ACM Press, 1027-1036.
24. Lampe, C., Ellison, N. and Steinfield, C., Changes in Use and Perception of Facebook. in *ACM Conference on Computer-Supported Cooperative Work (CSCW)*, (San Diego, CA, 2008), ACM Press.
25. Lampe, C., Vitak, J., Gray, R. and Ellison, N., Perceptions of Facebook's Value as an Information Source in *30th International Conference on Human*

Factors in Computing Systems (CHI), (Austin, TX, 2012), ACM Press.

26. Lampe, C., Vitak, J., Gray, R. and Ellison, N., Perceptions of Facebook's Value as an Information Source. in *CHI - Conference on Human Factors in Computing*, (Austin, TX, 2012), ACM Press.

27. Lampe, C., Wohn, D.Y., Vitak, J., Ellison, N.B. and Wash, R. Student use of Facebook for organizing collaborative classroom activities. *International Journal of Computer-Supported Cooperative Learning*, *6* (3). 329-347.

28. LaRose, R. The Problem of Media Habits. *Communication Theory*, *20* (2). 194-222.

29. Larose, R., Mastro, D. and Eastin, M.S. Understanding Internet Usage. *Social Science Computer Review*, *19* (4). 395-413.

30. Madden, M. and Zickuhr, K. 65% of Online Adults Use Social Networking Sites, Pew Internet & American Life Project, Washington, DC, 2011.

31. Morris, M.R., Teevan, J. and Panovich, K. What do people ask their social networks, and why?: a survey study of status message q&a behavior *Proceedings of the 28th international conference on Human factors in computing systems*, ACM, Atlanta, Georgia, USA, 2010.

32. Panovich, K., Miller, R. and Karger, D. Tie strength in question & answer on social network sites *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work*, ACM, Seattle, Washington, USA, 2012, 1057-1066.

33. Papacharissi, Z. and Mendelson, A. Toward a new(er) sociability: Uses, gratifications and social capital on Facebook. in Papathanassopoulos, S. ed. *Media perspectives for the 21st century*, Routledge, New Tork, 2011, 212-230.

34. Putnam, R.D. *Bowling Alone*. Simon & Schuster, New York, 2000.

35. Rogers, E.M. *Diffusion of Innovations*. The Free Press, New York, 1995.

36. Rosenberg, M. *Society and the Adolescent Self-image*. Wesleyan University Press, Middletown, CT, 1989.

37. Selwyn, N. Faceworking: exploring students' education-related use of Facebook *Learning, Media and Technology*, *34* (2). 157-174.

38. Skeels, M.M. and Grudin, J. When social networks cross boundaries: a case study of workplace use of facebook and linkedin *Proceedings of the ACM 2009 international conference on Supporting group work*, ACM, Sanibel Island, Florida, USA, 2009.

39. Smith, A. Why Americans use social media, Pew Research Center's Internet & American Life Project, Washington, DC, 2011.

40. Smith, A. and Brenner, J. Twitter Use 2012, Pew Research Internet & American Life Project, Washington, D.C., 2012.

41. Smock, A.D., Ellison, N.B., Lampe, C. and Wohn, D.Y. Facebook as a toolkit: A uses and gratification approach to unbundling feature use. *Computers in Human Behavior*, *27* (6). 2322-2329.

42. Teevan, J., Morris, M.R. and Panovich, K., Factors Affecting Response Quantity, Quality, and Speed for Questions Asked via Social Network Status Messages. in *ICWSM - International Conference on Weblogs and Social Media*, (Barcelona, Spain, 2011).

43. Tufekci, Z. and Wilson, C. Social Media and the Decision to Participate in Political Protest: Observations From Tahrir Square. *Journal of Communication*, *62* (2). 363-379.

44. Valenzuela, S., Park, N. and Kee, K.F. Is there social capital in a social network site?: Facebook use and college students' life satisfaction, trust and participation. *Journal of Computer-Mediated Communication*, *14*. 875-901.

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

46. Venkatash, V., Morris, M.G., Davis, G.B. and Davis, F.D. User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, *27* (3). 425-478.

47. Vitak, J. and Ellison, N. There's a network out there you might as well tap': Exploring the benefits of and barriers to exchanging informational and support-based resources on Facebook. . *New Media & Society*.

48. Vitak, J., Zube, P., Smock, A., Carr, C.T., Ellison, N. and Lampe, C. It's Complicated: Facebook Users' Political Participation in the 2008 Election. *Cyberpsychology, Behavior, and Social Networking*, *14* (3). 107-114.

49. Williams, D. On and Off the 'Net: Scales for Social Capital in an Online Era *Journal of Computer Mediated Communication*, *11* (2).

50. Wilson, R.E., Gosling, S.D. and Graham, L.T. A Review of Facebook Research in the Social Sciences *Perspectives on Psychological Science*, *in Press*.