



Privacy as information access and illusory control: The case of the Facebook News Feed privacy outcry

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ABSTRACT

Increasingly, millions of people, especially youth, post personal information in online social networks (OSNs). In September 2006, one of the most popular sites—Facebook.com—introduced the features of News Feed and Mini Feed, revealing no more information than before, but resulting in immediate criticism from users. To investigate the privacy controversy, we conducted a survey among 172 current Facebook users in a large US university to explore their usage behaviors and privacy attitudes toward the introduction of the controversial News Feed and Mini Feed features. We examined the degree to which users were upset by the changes, explored the reasons as to why, and examined the influences of the News Feed privacy outcry on user behavior changes. The results have demonstrated how an easier information access and an “illusory” loss of control prompted by the introduction of News Feed features, triggered users’ privacy concerns. In addition to enhancing our theoretical understanding of privacy issues in the online social networks, this research is also potentially useful to privacy advocates, regulatory bodies, service providers, and marketers to help shape or justify their decisions concerning the online social networks.

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1. Introduction

Recently, the booming popularity of online social networks (OSNs) has attracted significant attention: the asynchronous or semi-synchronous nature of communication in these settings, as well as the emphasis on social cues, allows users to manage their identities and contexts in desirable ways (Boyd and Ellison 2007). By providing platforms for information sharing, video sharing, photo sharing, chatting, tagging and blogging, OSNs have been experiencing massive growth over the past few years. Facebook.com, for example, attracted over 200 million unique visitors in November 2008, while MySpace.com also had an impressive 125 million in the same month (Arrington 2009). According to a recent survey published by PEW Internet and American Life Project, it is shown that 75% of US adult Internet users age 18–24 have a profile on an online social networking site (Lenhart 2009).

However, this commercial potential and rapid growth has been overshadowed by the privacy problems OSNs pose. Large amounts of the identifiable information revealed and disseminated are giving rise to growing privacy concerns among various stakeholders, including OSN providers, marketers, and other users on the social networks (Acquisti and Gross 2006, Dinev et al. 2009). These con-

cerns pertain to the confidentiality of accumulated personal data and the potential risks that users may experience through possible privacy and security breaches (Acquisti and Gross 2006, Gross et al. 2005). Users often reveal their true identities on social networking sites, thus exposing their published personal information with potential abuse by online crooks, stalkers, bullies, and, commonly, even by their own friends (Gross et al. 2005, Kelly 2008).

Facebook, a free social networking website that is especially popular among college students, upset its subscribers when it released the News Feed feature on September 5, 2006. The feature culls new information that users post about themselves on their ‘walls’ or personal profile pages and delivers it in headline-news format on the website’s initial page as seen by a user’s network of friends and acquaintances, e.g. “Ron’s status changed from ‘in a relationship’ to ‘single.’” Facebook initially promoted the News Feed feature as a convenience, with the promise that it would make new information easier than ever to find.

Within days of News Feed implementation, hundreds of thousands of users protested vehemently by forming groups (ironically, on Facebook) with names such as “Students Against Facebook News Feed” and “I Hate the New Facebook Format.” – this huge backlash was widely covered in the mainstream press and dubbed Generation Y’s “first official revolution” (Schmidt 2006). Facebook CEO – Mark Zuckerberg subsequently apologized in an open letter on Facebook entitled: “Calm down. Breathe. We hear you.” He wrote (Schmidt 2006):

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"We didn't take away any privacy options... The privacy rules haven't changed. None of your information is visible to anyone who couldn't see it before the changes... Nothing you do is being broadcast; rather, it is being shared with people who care about what you do—your friends."

In response to the widespread concerns, Facebook immediately took down the News Feed applications and worked nonstop for two days on providing a wider variety of privacy preferences to block from feeds and control what might be pushed to whom (Jesdanun et al. 2006). Then Facebook re-released the News Feed applications with new privacy control features. On September 8, 2006, Mr. Zuckerberg's apologized for this privacy outcry and said (Jesdanun et al. 2006):

"This was a big mistake on our part, and I'm sorry for it... But apologizing isn't enough. I wanted to make sure we did something about it, and quickly. So we have been coding nonstop for two days to get you better privacy controls."

Why did the introduction of News Feed bring about such a privacy outcry? The News Feed takes information that people might have placed in their profile page and automatically displays it on the homepages of people in their network of 'friends.' As the information is broadcast more widely, attention is called to changes that previously might have been seen only by people who actively hunted for it. Before the recent change, one's information—for instance, relationship status, photos, or public messages posted by friends—was visible only when users intentionally 'pulled' and read a profile. After the change, Facebook started publishing updated information in a 'push' model so that it would make new information easier than ever to find (see Figs. 1a and 1b).

It can be argued that with News Feed, no new information is revealed; people are able to see changes if they choose to visit their friends' Facebook pages. News Feed did not change restrictions on access to information. Still, the change brought about a member outcry regarding online privacy. Users who before were complacent about access to posted photos and personal details protested



Fig. 1a. Early Facebook user home page without News Feed.

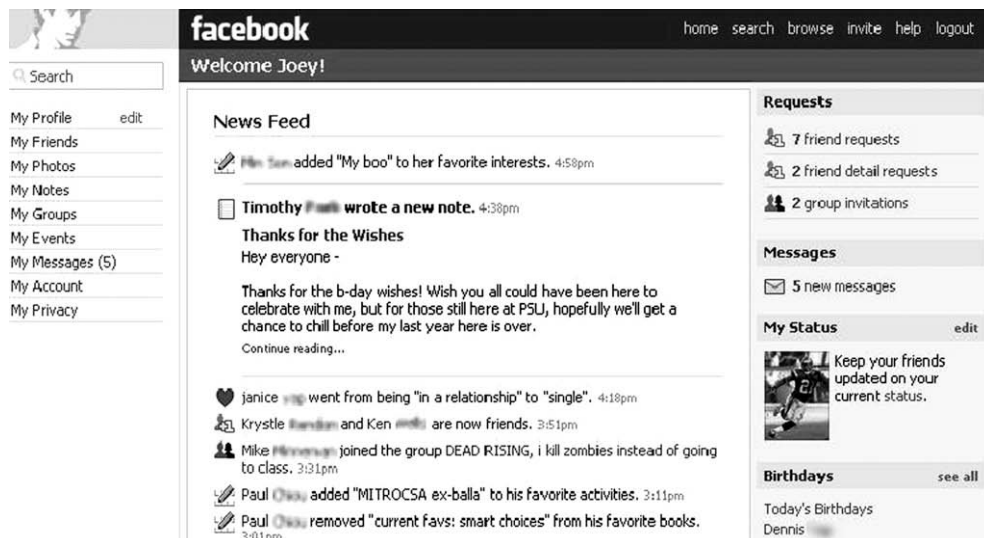


Fig. 1b. Facebook user home page including News Feed feature.

vehemently when their information appeared in the News Feed. Why did this shift occur? To explore answers to this question, we conducted a survey among 172 current Facebook users in a large US university to explore their usage behaviors and privacy attitudes toward the introduction of the controversial News Feed and Mini Feed features. The results demonstrate the importance of perceived control and ease of information access in alleviating users' privacy concerns pertaining to the release of News Feed and Mini Feed features.

In what follows, we present the survey-based study, describing the background, demographics, and patterns of Facebook usage. In our data analysis, we investigate the degree to which users were upset by the changes, explore the reasons as to why, and examine the influences of the News Feed privacy outcry on user behavior changes. The paper concludes with a discussion of theoretical and practical implications, and directions for future research.

2. A survey-based study of Facebook

Our survey was completed one month after the introduction of the News Feed feature. We sent out surveys to 1000 randomly selected members of the community of a large US university (staff, students, and faculty, including both users and nonusers of Facebook) in the wake of the News Feed controversy. In this study, we asked current Facebook users about their use of social networking systems, what types of information they provide, their reactions to the controversy, and their understanding of privacy policies past and present.

2.1. Demographics

Out of our 1000 randomly selected university community members, 290 people responded to our survey, including 172 current Facebook members (89 female and 83 male); 77 who had heard of Facebook, but had never been a member; and 41 who had never heard of Facebook. We anticipated demographic differences between Facebook users and nonusers. Our data confirmed this; 90% of Facebook users were undergraduates and 74% of nonusers were graduate students, staff, or faculty. In terms of gender, Facebook users were nearly evenly split between males and females (48% and 52%, respectively). In terms of age, respondents ranged from 18 to 65, with over 64% falling into the 18–25 category. In terms of users' technology-based activities, respondents report using email, surfing the Web, using office-related applications, and using instant messenger most frequently (77%, 55%, 40% and 34% respondents, respectively, reported using these frequently every day). Other activities, such as text messaging, blogging, and playing online games, were used much less often. Table 1 provides respondent demographics.

Table 1
Sample demographics.

	Mean or %
Gender	
Male	48%
Female	52%
Ethnicity	
White	86%
Non-white	14%
Usage of Facebook	
Less than a month	2.4%
1–6 Months	28.7%
6–12 Months	15.2%
1–2 Years	36.0%
Longer than two years	17.7%
Age	
18–25	64.8%
26–34	14.3%
35–44	10.2%
45–54	6.5%
55–64	3.8%
65 or older	0.3%
Technology-based activities*	
Surf the web	4.34
Use email	4.70
Use instant messenger	3.27
Publish or comment in blogs	1.66
Play online single-player games (arcade-style games, solitaire, etc.)	1.67
Play online multi-player games (World of Warcraft, and chess)	1.44
Use a cell phone for text messaging	2.92
Use office productivity applications (word processing, spreadsheets, etc.)	3.95

Notes: * represents 1 = never, 2 = once a week or less, 3 = more than once a week, 4 = almost every day, 5 = very frequently every day.

In the current study, because we were primarily interested in Facebook users' privacy attitudes and behaviors, we only include the responses from current Facebook members ($n = 172$). Over 53% of current members have used Facebook for more than one year.

2.2. Patterns of Facebook usage

Why do people use Facebook? Prior studies on OSNs underline the importance of self-presentation and relationship maintenance for OSN participation (Acquisti and Gross 2006, Dwyer 2007, Dwyer et al. 2007, Levin et al. 2008). OSN users commonly present "salient aspects of their identity for others to see and interpret" (Boyd 2007, p. 11) by communicating their interests in music or movies, sharing their photos, and updating their news and achievements. In addition, OSNs provide convenient functionality for relationship maintenance through wall-to-wall (public) communications, private synchronous and asynchronous messaging, joining group discussions, as

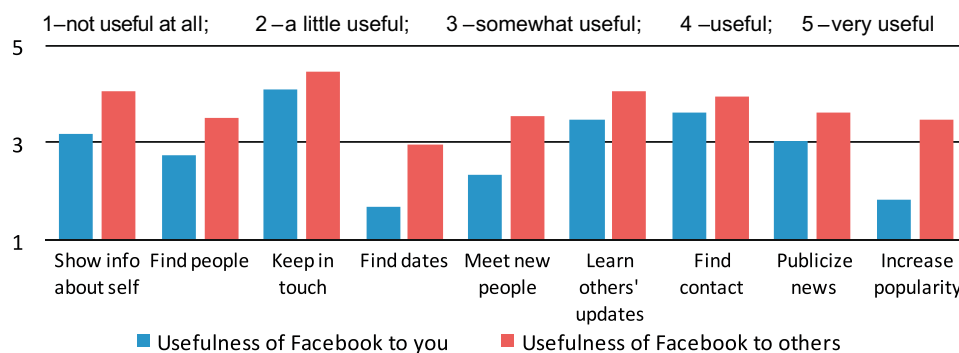


Fig. 2. Respondents report usefulness of Facebook.

well as searching contacts for communication in other media (Dwyer 2007).

Our survey results show that maintaining existing relationships is rated as the most useful feature. Fig. 2 shows the usefulness of Facebook to users for various activities. The mean scores of the usefulness (on a 5-point Likert type scale) for “keeping in touch with people,” “finding contact information,” “learning friends’ updates,” and “show information about myself” are 4.11, 3.65, 3.48, and 3.20, respectively (see Fig. 2). Furthermore, our survey results have shown that more than half (53%) of the respondents have over 100 contacts in their profiles; most (85%) report having reconnected with their old friends, colleagues or acquaintances through Facebook (see Fig. 3).

Apart from supporting close ties with existing friends, Facebook creates value by connecting unfamiliar people with each other. However, based on the responses from this study, the usefulness of new relationship development is relatively low (mean scores for “finding people with similar interests,” “finding dates,” and “meeting new people” are 2.77, 1.71, and 2.36, respectively). Similar to Acquisti and Gross (2006), we found self-presentation to be useful for Facebook users. The mean scores of the usefulness for “showing information about myself,” and “publicize my events and news” are 3.20, and 3.06, respectively (see Fig. 2). It seems that our respondents value the functions of maintaining existing relationships and self-representation (primarily within those relationships) more than developing new relationships. We also asked

participants to rate how often they think other people use Facebook for the same activities, and the results changed to some extent: functions of maintaining existing relationships and self-representation are still ranked very highly, but now the functions such as finding dates (2.99), meeting new people (3.58), and increasing popularity (3.51) suddenly are ranked as more popular (see Fig. 2).

Among various features of maintaining relationship and self-representation provided by Facebook, writing on others’ walls, writing one-to-one messages, joining groups, searching contacts and sharing photos are ranked as the most popular ones. (86%, 83%, 71%, 67% and 64% respondents, respectively, using these features; see Fig. 4).

Facebook provides users with the abilities to express their identities for others to see and interpret. We evaluated the types and amount of personal information disclosed by Facebook users. Fig. 5 presents the percentages of user profiles that disclose different categories and amount of personal information posted on Facebook. The majority of respondents are selective in terms of the type of personal information they post on Facebook. For example, most would publish their photos, sexual orientation, relationship status, birthday and major information with complete and accurate details. However, many of our respondents would conceal their political affiliations, religious views, class schedule, address, home phone and mobile phone numbers from other Facebook users. Interestingly, our results show that, if respondents would like to provide certain types of personal information, they are very likely

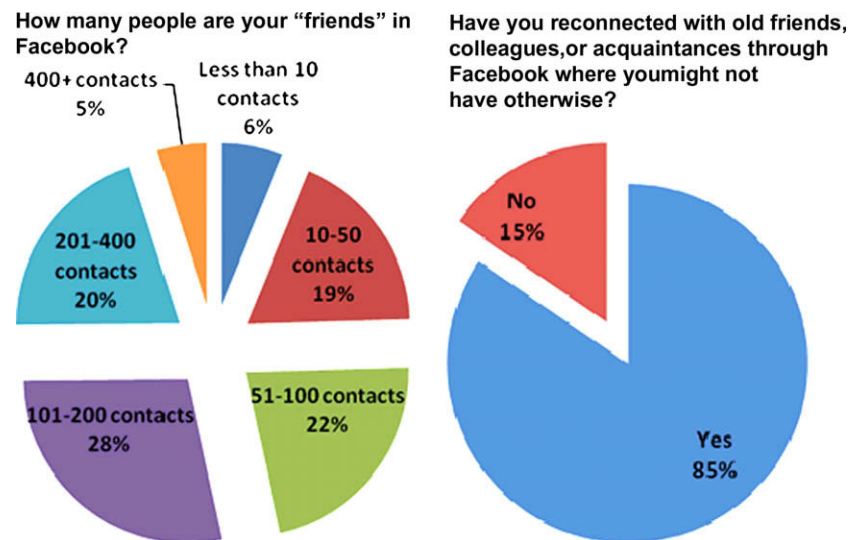


Fig. 3. Respondents' number of contacts.

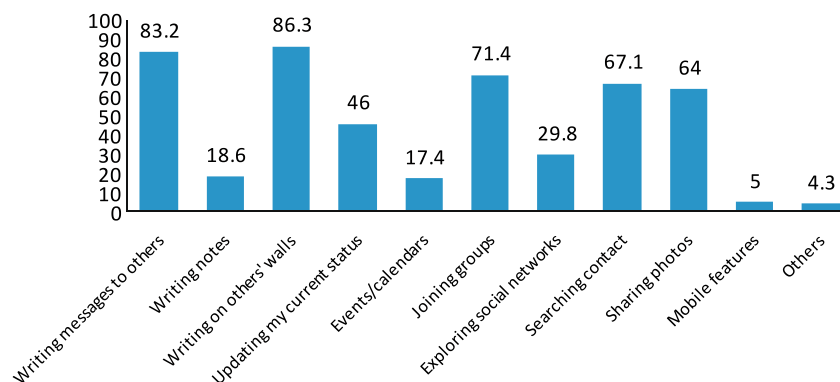


Fig. 4. Percentages of respondents using Facebook features. (What features of Facebook do you use? Select all that apply.)

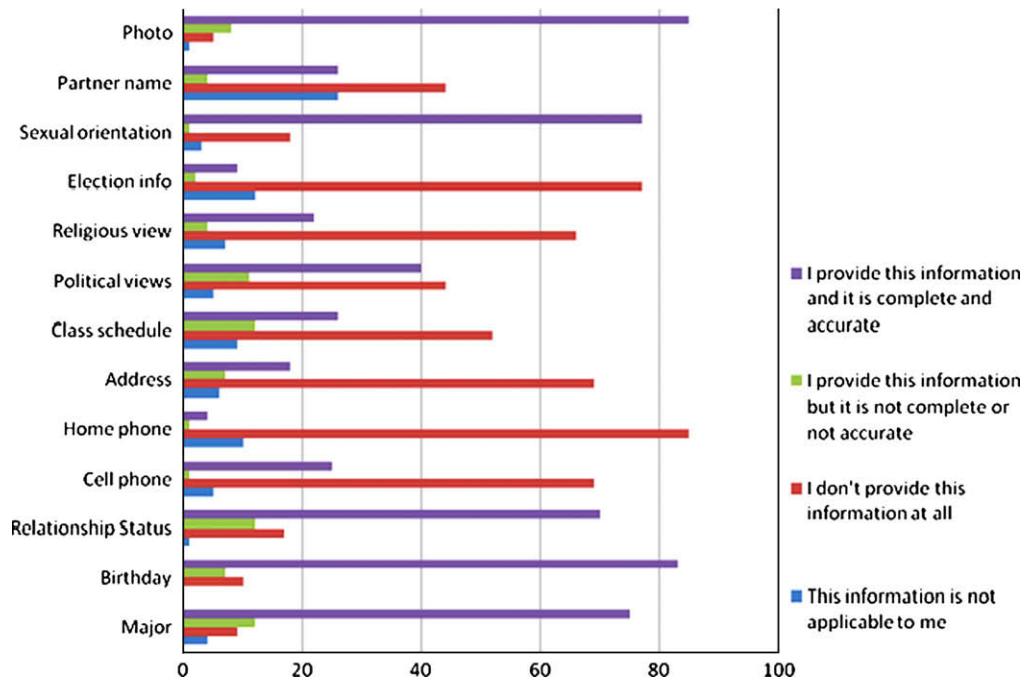


Fig. 5. Percentages of respondents' profiles revealing personal information.

to provide them in a format that is complete and accurate; very few respondents provide incomplete or untruthful (e.g., fictitious) information about themselves (see Fig. 5).

3. The News Feed controversy

With regards to the controversy surrounding the new News Feed features, we first investigated the degree to which users were upset by the changes, and then explored possible explanations for the furor. First, we examined whether the users were uncomfortable due to the hype or publicity surrounding Internet privacy at the time of the Facebook changes. Second, we examined whether the users were uncomfortable with information being more accessible. Finally, we also looked at whether their reported level of discomfort with the changes led them to behavior changes or the canceling of their account. We report our findings below, followed by a discussion of the implications.

3.1. Were people upset and to what degree?

We asked users to report their reactions upon discovering the Facebook News Feed on a 7-point Likert scale ("When you first found out about the Facebook News Feed, what was your reaction?"). The majority (68%) had at least some degree of negativity; 29% of respondents felt "very negative." The responses to this ques-

tion (mean = 3.04, sd = 1.45) were significantly lower than the neutral value of four ($t = -15.64, p < .001$), suggesting that respondents generally showed negative attitudes when they first found out about Facebook News Feed. We then asked how uncomfortable or comfortable users were with the information the new Facebook News Feed and Mini Feed provide. About half (49%) expressed that they were uncomfortable to at least some degree (see Table 2).

3.2. Were users uncomfortable due to the hype or publicity surrounding privacy at the time of the Facebook changes?

One possibility is that the hype or publicity surrounding privacy at the time of the Facebook changes, rather than their own beliefs, led users to feel uncomfortable or complain. However, our data suggest otherwise. Consistent with Smith et al. (1996), our results showed that media coverage increased the level of concern about information privacy. The respondents were asked whether they became more aware of privacy features in Facebook as a result of media coverage. The majority of our respondents (71%) reported 'yes' to this question. This is also consistent with the finding from a recent privacy study (Xu et al. 2008) which shows that users of OSNs have been more aware of privacy issues due to extensive media exposure.

Nevertheless, participants did not feel that the online petitions influenced their ideas about Facebook. The respondents were asked to rate on a 7-point Likert scale their agreement with the

Table 2
Percentages of respondents' reactions towards News Feed.

When you first found out about the Facebook News Feed, what was your reaction?		How uncomfortable/comfortable are you with the information the new Facebook News Feed and Mini Feed provide?	
Very negative	28.8%	Very uncomfortable	5.8%
Somewhat negative	20.5%	Somewhat uncomfortable	20.5%
A little negative	18.6%	A little uncomfortable	22.4%
Neutral	23.1%	Neutral	28.2%
A little positive	5.1%	A little comfortable	9.0%
Somewhat positive	3.2%	Somewhat comfortable	8.3%
Very positive	0.6%	Very comfortable	5.8%

statement “I protested the interface change in part because other people did.” Most participants (80%) did not agree with the notion that they protested the interface change because other people did. The responses to this question (mean = 3.12; sd = 1.60) were significantly lower than the neutral value of four ($t = -12.96$, $p < .001$). Likewise, most (80%) people did not feel that the online petitions influenced their ideas about Facebook. The respondents were asked to rate on the same scale their agreement with the statement “The online petition influenced my ideas about Facebook.” The responses to this question (mean = 3.52, sd = 1.45) were also significantly lower than the neutral value of four ($t = -7.85$, $p < .001$). Furthermore, the relationship between the influence of online petitions and their comfort level toward News Feed was found to be insignificant (Pearson's $r = -0.051$, $p = 0.232$), suggesting that respondents' negative attitudes toward News Feed were not associated with the influence of online petitions.

3.3. Were people uncomfortable with information being more accessible?

Did users have any sense that ease of access had changed or was an issue? Sixty-six percentages of respondents agreed with the statement “The same information was available before, but became easier to get afterwards,” while 34% were either neutral or disagreed with the statement. The responses to this question (mean = 5.10, sd = 1.35) were significantly higher than the neutral value of four ($t = 10.16$, $p < .001$). As shown in Fig. 6, a majority (78%) of respondents thought that it was easy to find out through Facebook that one of their friends had changed their profile after the introduction of News Feed; while before the introduction of News Feed, a majority (58%) of respondents thought this could be figured out with some digging. Note that this may represent misconceptions in the prior privacy restrictions in the interface; as stated before, all information that was released in News Feed was available by examining profiles over time. In terms of respondents' information disclosure, they felt less comfortable sharing information after the introduction of News Feed. Their responses to the statement “I now feel less comfortable sharing the same information than I did before” (mean = 4.33, sd = 1.55) were significantly higher than the neutral value of four ($t = 2.64$, $p = .009$).

These results indicate that even though Facebook's new interface (with News Feed and Mini Feed) is seen as providing easier

information access, the new interface is also widely perceived to provide less privacy. Given that Facebook's old and new interfaces are isomorphic in terms of who had access to what information, why were people uncomfortable with information being more accessible? A plausible explanation is that the old and new interfaces offer different levels of *perceived* control over personal information (Xu et al. 2009). In the old interface (which was a pull-based information delivery mechanism), users may perceive greater control over the interaction; the decision to look for friends' information is volitional, and one's updated information—for instance, relationship status, photos, or public messages posted by friends—is visible only when friends initiate the information seeking behavior and carefully read a profile. In contrast, after the introduction of News Feed and Mini Feed, Facebook continuously publishes users' updated information whenever they make a change (i.e., a push-based information delivery mechanism). Although the type and amount of personal information disclosed online are the same, News Feed and Mini Feed make it much easier to access information. Such perceptions of easier information access may decrease users' perceived control over personal information, which in turn could lead to a subjective higher probability of privacy intrusion. As one respondent reported, “[News Feed] seems to reveal a bit too much about other people's lives. It almost makes it too easy to ‘spy’ on people and what they are doing.”

One interpretation of these results is that users' privacy concerns are likely to be less salient for the old interface (pull-based information delivery mechanism) because users would perceive that they have greater control over hiding their information from other users. News Feed and Mini Feed appear to increase users' privacy risk perceptions, and thus users would expect more control over the disclosure of their personal information. Accordingly, privacy concerns should be lessened by offering more control functions (for not only controlling information disclosure but also controlling access to disclosed information). In fact, Facebook's solution to the privacy outcry was the addition of privacy options that allow members to opt out of the feed feature, or to shield specific information items from public broadcast (John 2006) (see Fig. 7). When interviewed for the News Feed outcry controversy (John 2006), Facebook's chief executive and co-founder Mr. Mark Zuckerberg highlighted the importance of control:

“In general the more control you can give people the better. If you give people control over everything they do, you'll never put them in a situation that's uncomfortable.”

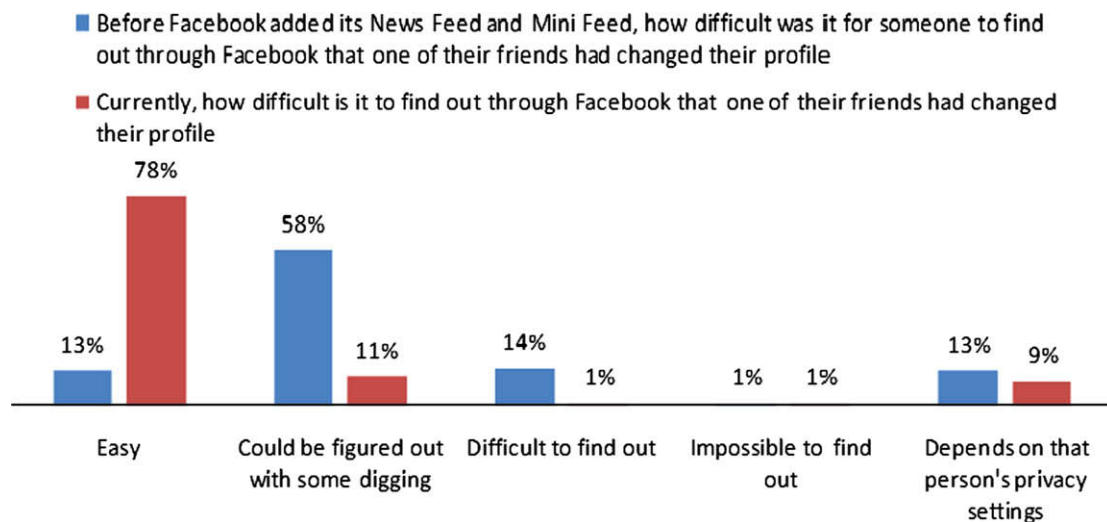


Fig. 6. Ease of information access before and after feed features.

Privacy ▸ News Feed and Wall

Actions within Facebook **Social Ads**

Actions visible to friends:
 Stories are published when you edit your profile information, join a new network, or update your Status. Also publish stories when you...

- ☐ Remove Profile Info
- ☐ Write on a Friend's Wall
- ☐ Comment on a Note
- ☐ Comment on a Photo or Album
- ☐ Comment on a Video
- ☐ Comment on a Posted Item
- ☐ Post on a Discussion Board
- ☐ Add a Friend
- ☐ Remove Relationship Status
- ☐ Leave a Network

Stories can be shown in your Chat conversations.

- ☐ Show stories in Chat

Your Wall can show the time stories were posted.
 Note: times are always shown on Wall posts and Status Updates.

- ☒ Show times in my Wall

Stories will **never be published about:**

- Pokes
- Messages
- Whose profile you view
- Whose photos you view
- Whose notes you read
- Groups and Events you decline to join
- People you reject as friends
- People you remove from your friends
- Notes and photos you delete

Stories may be published about your applications (Edit Applications):

- Marketplace

For more info, visit the help pages.

Save Changes **Cancel**

Fig. 7. Privacy control features of News Feed.

3.4. Influences of the News Feed privacy outcry on user behaviors

The introduction of News Feed created quite a big stir; but did it change users' behaviors? Our survey was completed one month after the introduction of the News Feed feature. Although no respondents reported terminating their accounts as a result of the News Feed, the results did show lower levels of respondents' willingness to disclose information about themselves. We asked respondents to compare how willing they were to disclose information about themselves at the time of the survey to how willing they were before the News Feed. More than half (55.5%) of respondents were less willing to reveal information about themselves online, while 41.3% were about equally as likely to reveal information about themselves (see Fig. 8).

Given the large public privacy outcry associated with the News Feed, were Facebook users more willing to use privacy enhancing

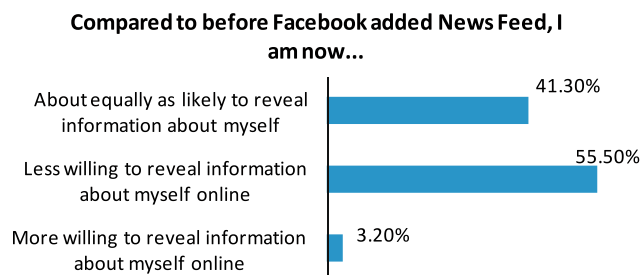


Fig. 8. Percentages of respondents' willingness of information disclosure.

features provided by Facebook? We asked the respondents whether they had changed their privacy settings in Facebook since the addition of the News Feed: 49.4% answered 'yes' while 50.6% answered 'no.' For the two groups of respondents who changed their privacy settings and who did not change privacy settings, did they differ significantly on their reactions and comfort levels of feed features? Independent *t*-tests were performed to explore the association between users' privacy attitudes and their behaviors of adjusting privacy settings. Although a majority of our respondents seemed to be uncomfortable with the News Feed features (as discussed in Section 3.1), independent *t*-tests revealed that the two groups of respondents differed on their negative reactions and uncomfortable levels of News Feed features. Specifically, results showed that respondents who changed their privacy settings showed significantly more negative attitudes toward the News Feed features than those who did not change their privacy settings ($t = -6.74, p < .001$). Similarly, respondents who changed their privacy settings showed significantly more discomfort toward the News Feed features than those who did not change their privacy settings ($t = -4.82, p < .001$). It seems that users' reactions and comfort levels of News Feed features were in fact associated with their behaviors of changing privacy settings.

In order to further understand what motivated Facebook users to change their privacy settings, we explored whether two groups of respondents (those who changed privacy setting ($n = 85$), and those who did not change ($n = 87$) differed in their usage patterns, in terms of update frequency and number of friends. An independent samples *t*-test revealed no significant difference in terms of update frequency for these two groups of respondents ($t = .45, p = .66$). Fig. 9a shows the percentage of respondents' update

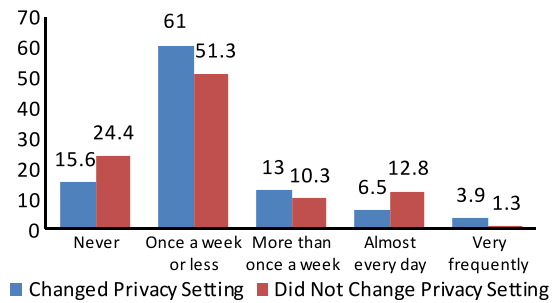


Fig. 9a. Percentages of respondents' update frequency.

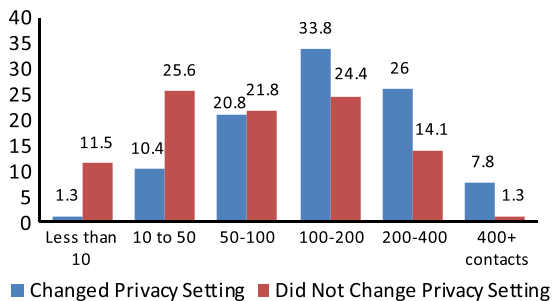


Fig. 9b. Percentages of respondents' numbers of friends.

frequency for both user groups. However, the difference in terms of number of friends for these two groups of respondents was significant: respondents who changed their privacy settings had more friends than those who did not change their privacy settings ($t = 4.47$, $p < .001$). Fig. 9b shows the percentage of respondents' numbers of friends for both user groups.

These results indicate that, the more numbers of friends users have, the more likely that users would adjust their privacy settings to control who may get access to their personal information. It seems reasonable to argue that Facebook users' privacy-related behaviors (e.g., adjusting privacy settings) are more likely to be influenced by their concerns over the amount of information *being accessed* (by their friends), instead of concerns over *being released* (by themselves). This point bears repeating: users seem to be much more concerned about what personal information is *likely* to be accessed than what personal information it is *possible* to access.

4. Discussion

This series of events is a serious wake-up call to how privacy and security experts consider privacy and information security. While computer scientists worry about who may hack into what, and designers, policymakers, and managers focus on who can use what information, our study suggests a different model of privacy that motivates users. Even though Facebook's old and new interfaces were isomorphic in who had access to what information, the new interface was widely perceived to provide less privacy. As pointed out by Boyd (2008), no privacy (from a zeros and ones perspective) was compromised due to the introduction of the feed features. Yet, privacy in the OSN context is not simply about factual state of information disclosure, access and use (i.e., zeros and ones); it is about how users "experience their relationship with others and with information" (Boyd 2008, p. 18).

In her opinion piece on the News Feed event, Boyd suggests that privacy on the OSN context is "a sense of control over information, ..., and the audience who can gain access" (Boyd 2008, p. 18). Our investigation of News Feed privacy outcry provides empir-

ical support for this argument and highlights the importance of *perceived information control* and *ease of information access* in alleviating users' privacy concerns pertaining to the feed features. As we discussed in Section 3.3, before the introduction of the feed features, those personal data were all there but were not easily and efficiently accessible. The introduction of the News Feed and Mini Feed enhances the ease of access to those personal data, hence increases the perceived probability that those data will be accessed by more audiences, which in turn leads to a lower control perception over personal information.

The control and limited access perspectives of privacy have been generally suggested by prior work (Dinev and Hart 2004, Smith 1993, Xu 2009), although it appears the notions of privacy as perceived control and easier information access have not yet been taken up by OSN promoters or designers such as the operators of Facebook. A number of privacy theorists have applied the term "control" and "limited access" widely in the privacy literature as the components or justifications for defining privacy (Margulis 2003a). Although the elements of *control* and *information access* are embedded in most privacy definitions (e.g., Culnan and Bies 2003, Smith 1993, Westin 1967) and have been used to operationalize privacy in measurement instruments (e.g., Malhotra et al. 2004, Smith et al. 1996), their meanings have been interpreted inconsistently in the context of information privacy (see Margulis (2003b) for a review). This study has demonstrated the importance of conceptualizing *control* as a psychological perception (instead of actual control) and examining *information access* as a perception of ease of access.

Although Facebook's old and new interfaces are isomorphic in terms of actual control over who had access to what information, News Feed and Mini Feed induce lower levels of *perceived* control over personal information due to *easier* information access, which in turn leads to a *subjectively* higher probability of privacy intrusion. These results suggest that the perceived loss of control may be a function of objective reality (e.g., due to easier information access), but also the individual's subjective beliefs, vicarious observations, and biases (Averill 1973). Langer (1975), in fact, asserts that the belief that one has control may be nothing more than an "illusion." Hence, "veridicality is not necessary or sufficient to bring about the perception of control, although the perception of control, however illusory, may have a profound effect on the individual" (Wallston 2001, p. 49). This study has demonstrated how an "illusory" loss of control, prompted by the introduction of News Feed features, triggered users' perceptions of increasing information accessibility and thus higher privacy concerns, and indeed led to greater control in the privacy settings eventually introduced by Facebook in response to the outcry. Future research could be directed to further explore the role of psychological control and information accessibility in alleviating privacy concerns in the OSN context.

Scholars have argued that privacy relevant beliefs and perceptions should be better related to individuals' characteristics rather than be regarded as a global consequence of information disclosure per se (Xu et al. 2008). Thus future studies could investigate additional factors on *personality differences* such as introversion vs. extroversion (Lu et al. 2004) and independent-self vs. interdependent-self (Xu 2007) which have been found to affect individual privacy concerns and information control perceptions. In addition, since some scholars have suggested that the phenomenon of information privacy may be culturally dependent (Dinev et al. 2006), future research could investigate the cross-cultural differences in terms of users' privacy perceptions in OSNs. The borderless nature of the new Web 2.0 economy complicates the issues of privacy because consumers in different countries vary widely in their opinions of what constitutes the boundary of information access, and their desired levels of information control.

5. Conclusions

In the research reported in this paper, we conducted a survey to study the privacy implications of News Feed privacy outcry. The emergent theme from the data analysis highlights the importance of *perceived control* and *ease of information access* in alleviating users' privacy concerns pertaining to the introduction of feed features. Thus, it is important for OSN providers to develop privacy enhancing features with user-friendly interfaces for specifying privacy preferences to counter privacy risk perceptions. To the extent that perceived control and ease of information access are the key factors influencing privacy concerns, application developers should pay close attention to those measures that can increase the perceptions of control and information accessibility. We would not expect to have seen so much of a public outcry related to privacy had Facebook released News Feed together with control features such as opt-out and access limit. Indeed, many users enjoy the News Feed features of Facebook now that robust privacy control features have been released. Accustomed to News Feed, some Facebook users capitalize on the feature to get friends' and others' attention, for instance, by frequently or humorously changing elements of their profile so as to "announce" them on News Feeds.

A related issue for policymakers and users alike is that because perceived control and actual control may differ significantly, we would expect situations converse to the News Feed controversy, where a significant loss of privacy is masked by perceived control over that information. One example would be how users of OSNs are surprised to see personal information suddenly used for judging them in a professional context; some football coaches have taken to examining their players' Facebook photos late on weekend nights, at a time when people may have posted compromising pictures of the team but before those students have a chance to 'untag' them (delink them from their profile). Indeed, new Facebook tools have arisen precisely to allow users to prevent certain other users from seeing tagged photos (Guernsey 2008). As legal and technical frameworks for information security and privacy are developed, they should take into account that users will typically consider the likely rather than the possible, and ensure that users are allowed to understand the implications of their information sharing behaviors online.

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Appendix Questionnaire

Where is or was your primary affiliation with Penn State? (if you have changed locations or have left the university, please use your most recent location)

- University Park campus
- Other campus location
- Noncampus location (county extension office, etc.)
- World campus or online location

What is your affiliation with Penn State? (or, if you recently left Penn State, what was your most recent affiliation?)

- Undergrad student
- Grad student
- Continuing education student
- Staff member
- Faculty
- Retired
- Other

Gender: [] Male [] Female

How old are you?

[] 18–25, [] 26–34, [] 35–44, [] 45–54, [] 55–64, [] 65 or older

How often do you do the following technology-based activities?

1 = never, 2 = once a week or less, 3 = more than once a week, 4 = almost every day, 5 = very frequently every day.

- Surf the web
- Use email
- Use instant messenger
- Publish or comment in blogs
- Play online single-player games (arcade-style games, solitaire, etc.)
- Play online multi-player games (World of Warcraft, and chess)
- Use a cell phone for text messaging
- Use office productivity applications (word processing, spreadsheets, etc.)

How useful is Facebook to you for the following?

How useful do you think other people use Facebook for the following?

1 – not useful at all; 2 – a little useful; 3 – somewhat useful; 4 – useful; 5 – very useful

- To show information about myself
- To find people with similar interests
- To keep in touch with people
- To find dates
- To meet new people
- To learn about classmates/other people
- To find contact information
- To publicize events and news
- To increase my popularity

How many people are your "friends" in Facebook?

- Less than 10 contacts
- 10–50 Contacts
- 50–100 Contacts
- 100–200 Contacts
- 200–400 Contacts
- 400+ Contacts

How often do you update your profile (including current status)? (* Answer "Very Frequently" if you do update frequently throughout the day or for a significant portion of the day on most days)

- Never
- Once a week or less
- More than once a week
- Almost every day
- Very frequently

How long have you been using Facebook?

- Less than a month
- 1–6 Months
- 6–12 Months
- 1–2 Years
- 2–3 Years
- Longer than three years

Have you reconnected with old friends, colleagues, or acquaintances through Facebook where you might not have otherwise? [] Yes [] No

What features of Facebook do you use? Select all that apply.

- Writing messages to others
- Writing notes
- Writing on others' walls
- Updating my current status
- Events/calendars
- Joining groups/forming new groups
- Exploring/searching social networks
- Searching contact information
- Sharing my photos
- Mobile (cell phone) features
- Other (please specify)

What items do you display on your user profile? Check all that apply.

This information is not applicable to me

I don't provide this information at all

I provide this information but it is not complete or not accurate

I provide this information and it is complete and accurate

- Major
- Birthday
- Relationship status
- Current status of what you're doing
- Cell phone number
- Home phone number
- Personal address
- Schedule of classes
- Instant messenger screenname
- Political views
- Religious views
- Election information
- Sexual orientation
- Partner name
- User photo

How much do you trust...

1 – Don't trust at all, 2 – somewhat distrustful, 3 – a little distrustful, 4 – neutral, 5 – trust a little, 6 – somewhat trustful, 7 – completely trustful

- Your friends in your Facebook network
- The friends of your friends on Facebook
- The university's Facebook users
- Facebook users from the general public
- Myspace users not connected to you
- Friendster users not connected to you

When you first found out about the Facebook News Feed, what was your reaction?

1 – Very negative, 2 – somewhat negative, 3 – a little negative, 4 – neutral, 5 – a little positive, 6 – somewhat positive, 7 – very positive

How uncomfortable/comfortable are you with the information the new Facebook News Feed and Mini Feed provide?

1 – Very uncomfortable, 2 – somewhat uncomfortable, 3 – a little uncomfortable, 4 – neutral, 5 – a little comfortable, 6 – somewhat comfortable, 7 – very comfortable

Since Facebook added its News Feed and Mini Feed features, have you become more aware of privacy features in Facebook?

[] Yes [] No

I protested the interface change in part because other people did.

1 – Strongly disagree, 2 – disagree, 3 – somewhat disagree, 4 – neutral, 5 – somewhat agree, 6 – agree, 7 – strongly agree

The online petition influenced my ideas about Facebook.

1 – Strongly disagree, 2 – disagree, 3 – somewhat disagree, 4 – neutral, 5 – somewhat agree, 6 – agree, 7 – strongly agree

The same information was available before, but became easier to get afterwards.

1 – Strongly disagree, 2 – disagree, 3 – somewhat disagree, 4 – neutral, 5 – somewhat agree, 6 – agree, 7 – strongly agree

Before Facebook added its News Feed and Mini Feed, how difficult was it for someone at Penn State to find out through Facebook that one of their friends had changed their profile?

1 – Easy, 2 – could be figured out with some digging, 3 – difficult to find out, 4 – impossible to find out (Facebook prevents this), 5 – depends on that person's privacy settings

Currently, how difficult is it to find out through Facebook that one of their friends changed their profile?

1 – Easy, 2 – could be figured out with some digging, 3 – difficult to find out, 4 – impossible to find out (Facebook prevents this), 5 – depends on that person's privacy settings

Have you changed your privacy settings in Facebook since the addition of the News Feed? [] Yes [] No

Compared to before Facebook added News Feed, I am now...

- More willing to reveal information about myself online
- Less willing to reveal information about myself online
- About equally as likely to reveal information about myself

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