Friends Only: Examining a Privacy-Enhancing Behavior in Facebook

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ABSTRACT
The seemingly paradoxical privacy practices of social network site users raise important questions for HCI researchers. As the sites grow in popularity, users are challenged to manage disclosures in multiple contexts, while mitigating potential disclosure-related harms. In this study we theorize privacy in social network sites as a contextual interaction; Web-based interaction.

INTRODUCTION
Studies of social network sites often reveal disparities between observed privacy behaviors and reported privacy attitudes [3,16,32]. This disparity, termed the "privacy paradox," [5] is often attributed to lack of comprehension, awareness, or concern for privacy within the context of the site [see 31]. As social network sites are adopted by a large, heterogeneous audience [22], individuals may adapt privacy behaviors to the contextual complexities of a site where multiple networks are represented. Recent studies have observed these changes. In a longitudinal, cross-sectional study of undergraduate Facebook users at Michigan State University, reported incidences of privacy utilization (changing default settings) increased significantly from 2006 to 2008 [19], as the service expanded considerably.

In a social network site, individuals have access to a variety of privacy controls. These controls vary by site; Common controls include profile access limitation, item-level access control, and remedies such as blocking and hiding other site users. In socio-technical systems, the meanings attributed to privacy controls vary contextually and culturally [14]. Conceptualization of privacy controls and privacy-enhancing behaviors may vary within and between social network sites. As such, this research focuses on a specific privacy-enhancing practice of a defined audience. We are interested in the increasingly normative setting of the Facebook profile by undergraduate students to friends-only status. Friends-only status refers to the practice of making a profile private, so it is only viewable by articulated Facebook connections. This paper reports on our analysis of a set of practices that inform the decision to make a profile friends-only.

Our analysis uses on a sample survey of undergraduate students at [Redacted]. Utilizing logistic regression, we model four potential predictors for setting a Facebook profile friends-only. Our hypothesized predictors draw on theories of privacy in human-computer interaction (HCI) as a cultural, contextual and discursive practice. At the baseline, we explore the relationship between demographic and Facebook use measures and the setting of a friends-only profile. We then draw upon the theoretical elaborations of Altman [4], Derlega and Chakrin [11] and Petronio [27] to explore privacy as a function of network composition, expectancy violations, and discursive privacy behaviors.

Going Friends Only
Setting a Facebook profile to friends-only status is a discrete, privacy-enhancing action with important implications. At the individual level, going friends-only...
exerts audience control over social network site disclosures. At the network level, friends-only profiles lower the amount of social information available to interested parties. For example, a second-degree contact would no longer be able to peruse friend-of-friend contacts; this information behavior has been documented as a useful form of person-and identity-perception [e.g. 12,13]. A normative orientation towards friends-only status may also reduce the potential for relational establishment, rendering the Facebook network less useful for people with these goals. Indeed, the reduced volume of accessible social information may impact overall perception of a mediated space. We see that setting a Facebook profile to friends-only establishes a boundary that regulates the individual's contributions to and perceptions by the network at whole.

In Facebook, the affordance of friendship - a reciprocal tie - creates an equivalence between ties that is not representative of their inherent variable strength [17]. As a result, the friend networks of undergraduates are generally constructed of a large number of ties of varying strength. Facebook friendship establishes a channel for networked information flow between individuals through the news feed. Facebook friends have been found to exert positive influences on measures of social capital, [15] life satisfaction and civic engagement [33]. By setting the Facebook profile to friends-only, the individual focuses and limits access to the ongoing set of informational disclosures, which may affect the individual's access to the site's supportive resources.

The transition of a Facebook profile from open to friends-only may signal a shift from a common identity orientation towards a common bond orientation [28,29]. In virtual communities, a common identity orientation specifies attachment to larger group and social identities. We might assume that new students are more likely to adopt a common identity orientation towards Facebook, as it supports and affirms the social identity of the individual as university student. Setting the profile to friends-only moves the orientation of interaction towards common bonds - the individual's attachment to smaller subgroups in the network. In setting the Facebook profile to friends-only, the individual refocuses the bond orientation; once focused on the common identity of the campus network, the individual is now oriented towards the established bonds of small group identities within the site.

Previous Work on Privacy in Social Network Sites
There is a growing body of literature exploring privacy behaviors in social network sites. Acquisti and Gross' [3] exploration of privacy behaviors in Facebook found a disconnect between stated privacy attitudes and observed behaviors. Individuals reported concern for privacy, but disclosed large amounts of information to the network. They theorize that privacy is a function of one's audience - and in the case of Facebook, an imagined audience constructed of others who view the profile. Tufekci's [32] analysis furthers the work of Acquisti and Gross by modeling the effect of imagined audience perception on disclosure behaviors, finding a significant negative relationship between unwanted profile gaze and maintaining a publicly-viewable profile (across social network sites).

Lewis et. al. [23] used a large social network site dataset to explore the relationship between setting a profile private and intensity of use. They find that privacy decisions are influenced by one's network, and that active users are more likely to use privacy features. Recent work by Lampinen et. al. [21] and Skeels and Grudin [30] highlight the challenge of privacy management in the era of ubiquitous adoption: the management of the persona for multiple contexts. As more individuals join social network sites [22], the presentation of self to multiple contexts becomes increasingly complex. Shifting the profile to friends-only becomes a feasible strategy for management of this task.

Privacy as Information and Boundary Regulation Practice
Dourish and Anderson situate privacy as an information practice [14]. Their definition of information practice refers to the "ways in which we collectively share, withhold, and manage information; how we interpret such acts of sharing, withholding and managing; and how we strategically deploy them as part and parcel of everyday social interaction" [14: 335]. In social network sites, conceptualizations of privacy will vary between sites, groups, and individual users. Therefore, privacy is not linear or necessarily rational, though it is often an optimizing process [4].

In Palen and Dourish's [26] application of boundary regulation theories to HCI, the authors identify three salient boundaries - the disclosure, identity, and temporal boundaries. Boundaries in a socio-technical system are metaphors that inform our conceptions of the range of our disclosures. In the case of the temporal boundary, for example, information disclosures may be viewed in relation to the boundary: the have variable meaning at the time of disclosure $t_1$ and at later time $t_2$.

Altman [4], Derlega and Chaikin [11] and Petronio [27] have elaborated communications privacy as a boundary regulation process. This analysis will draw primarily on Petronio's conception of Communications Privacy Management (CPM). According to Petronio, CPM involves an iterative process of rule development, boundary coordination, and boundary turbulence. Rule development describes the process of disclosure rule construction. Disclosure rules guide our decision making process around everyday disclosures, and are therefore culturally, contextually and motivationally weighted. Boundaries are coordinated by developing linkages, and applying ownership and permeability rules to the linkages. Finally, boundary turbulence describes the process of maintaining and renegotiating boundaries in response to privacy actions [27]. This process guides disclosure choices, and enables
the dynamic management of privacy in shifting contexts. We envision the process of taking a Facebook profile to friends-only status as a dynamic shifting of privacy rules based on perception of boundary turbulence.

In the context of Facebook, individuals construct rules for disclosure, based on the technological affordances and cultural norms of disclosure [21]. The setting of the profile to friends-only marks a discrete boundary through which disclosure can be regulated. In the following study, we examine the effects of three particular boundary regulation activities leading to the establishment of the friends-only boundary. Notably, the setting of the profile to friends-only does not terminate boundary-regulation; privacy boundaries continue to be managed within the existing connected networks. However, we are interested in the process that leads to the setting of a friends-only profile, which has significant information, identity, and disclosure ramifications.

In the analysis, we first explore baseline models of demographic and Facebook intensity effects on friends-only status. We then focus on network boundaries, first looking at the effect of friend network composition on the decision to take the Facebook profile friends-only. In the second analysis, we look at the impact of expectancy violations on the friends-only decision. An expectancy violation is an event where an undesired social group is expected by and individual to view his or her Facebook profile. Finally, we look at the relationship between discursive privacy behaviors and the decision to go friends-only. Upon completion of the analysis, we provide a discussion an evaluation of the models, and conclude by providing implications for design.

**METHOD**

**Sample**

Utilizing a list provided by the university registrar, 5,000 undergraduate students at [Redacted] were solicited via email to take part in a web survey of social network site use. The web survey utilized LimeSurvey, an open source web surveying platform. Participants were offered a chance to win an iTunes gift certificate for taking the survey. The majority of questions dealt with Facebook, so a skip logic routed non-Facebook users around the Facebook-centric questions. This paper focuses only on the social network site Facebook. A total of 494 individuals, 94.94% of which indicated use of Facebook, responded to the survey. 444 of the respondents completed the full instrument. The break-off rate for the survey is 10.2%, and the overall response rate for the survey is 8.8% following AAPOR's definition 1 of the response rate [1].

The survey was fielded between June 30, 2008 and August 26, 2008. The mean age of respondents was 21 years (SD = 2.86), with 50% of the respondents being either 20 or 21 years old. Females accounted for 68.4% of the respondents, with males accounting for 31.6% of the response. The majority of respondents self-identified as White, not of Hispanic origin (79.52%), followed by Asian or Pacific Islander (8.43%) and Black, not of Hispanic origin (6.75%). Based on status at the time of list generation, 16.8% were Freshmen, 36.2% were Sophomores, 27.66% were Juniors, and 19.4% were Seniors.

While response rates on email-solicited Internet surveys are often low [10], a low response rate does not necessarily produced biased estimates [18]. To identify potential sources of bias, we conducted a nonresponse analysis [e.g. 6]. Utilizing data provided by College Portrait [9], a clearinghouse of self-reported demographic information about college and universities, we conducted a series of one-sample and group means comparison tests to identify how our undergraduate sample differed from the average undergraduate at [Redacted]. We found significant overrepresentation by females ($p=0.000$), older students ($p=0.000$), and White students ($p=0.002$). We then utilized a median split to look at the effect of response time. Early responders tended to be younger than late responders (T1: 20.67, T2: 21.36, $p=0.012$) but we did not see a significant difference for gender ($p=0.838$).

**Measures**

In this analysis, we are interested in variables that inform an individual's privacy choice in Facebook. To conduct the analysis we use a mixture of demographic, network, and subjective measures. The demographic measures used in the analysis were presented in the previous section. We will now describe the remaining variables used in the analysis.

**Facebook Privacy Choice**

In a social network site, privacy regulation is a socio-technical activity that involves interactions with the technological system and the larger group context. Therefore, an individual's privacy behavior in a social network site, and in particular Facebook, involves a mixture of direct and latent strategies. A latent privacy strategy might involve an individual engaging in self-censorship to limit disclosures to certain audiences [21]. A direct strategy may involve the use of privacy settings to regulate content distribution to select audiences.

In this study, we will focus on a direct measure of privacy regulation: the setting of a profile to friends-only status. An individual with a friends-only profile only allows profile-viewing by pre-established social network site contacts. This privacy-enhancing phenomenon that has grown popular over recent years [19,32]. We collected privacy-behavior data at two levels: First, we asked participants if they used any Facebook privacy settings, and second, we assessed if the profile was friends-only. 83.2% of respondents indicated using any Facebook privacy settings, and 58.29% of respondents indicated they had made their Facebook profile friends-only. These measures are positively and significantly correlated ($r=.4526$), indicating...
a relationship between setting the profile friends-only and engaging in other discrete privacy-enhancing behaviors. The dependent measure for this study will be setting the profile to friends-only status.

**Facebook Use Measures**

Length and amount of Facebook use, as well as the size of the Facebook friend network were assessed to provide measures of Facebook activity. Length of Facebook use was assessed by asking participants how many years they used the service. Amount of Facebook use was assessed by asking participants how many minutes they spent on the service in the last week. Finally, friend network was assessed by asking how many friend connections the individual has established in Facebook.

**Friend Network, Intended and Expected Audiences**

In a networked public, individuals manage their identity and disclosure behaviors for a variety of audiences (cite boyd). Three discrete audiences include the friend network, the intended audience, and the expected audience. The friend network is constructed of individuals with which the user of the social network site has established articulated connection [8]. As friend networks among undergraduates tend to be large and heterogeneous, a smaller, focused network is intended audience - the people for whom the profile is intently managed and updated. Another network is the expected audience. The expected audience is based on the individual's perception of who is actually viewing the profile, regardless of privacy settings.

We constructed an instrument that provided a list of eight social groups to the participant. The social groups were constructed of strong ties, weak ties, and outsiders. In the strong tie group, we asked people if their family members or best friends were part of their networks. In the weak tie group, we asked if casual friends and campus acquaintances were members of their networks. We saw negligible variation between the two levels of weak ties, indicating that an undergraduate's weak tie network is strongly campus-focused. In the outsiders group, we asked if faculty or campus administrators, potential employers, marketers or corporations or law enforcement were members of their networks. To assess friend network, we asked people if their "Facebook friends include any of the following groups." Assessment of the intended audience was conducted by asking people "Who do you hope views your Facebook Profile?" The expected audience was assessed by asking "Who do you think may have looked at your Facebook profile in the last week."

**Profile Management Effort**

We hypothesize that level of effort spent maintaining a Facebook profile may mediate privacy behaviors. To assess level of effort, we asked participants if they "spend a lot of time managing [their] Facebook profile" and if they "think it is important to update [their] Facebook profile regularly." Response was provided on a 7-point Likert scale. These measures were highly correlated (r=.6637), so scale items were then averaged to produce a mean estimate of profile management effort (α=.79).

**Discursive Privacy**

In a social network site, privacy is a function of over one's disclosures, and the disclosures about one's self by others [7]. If an individual is mentioned in a Facebook Wall posting, or tagged in a picture, information may be disclosed about that individual without her knowledge or consent. In Facebook, ephemeral conversations and disclosures such as a wall posting are digitally persistent. Therefore, individuals develop discursive privacy strategies to manage their appearance in the ongoing digital conversation. When brainstorming this concept with Facebook users, a number of such behaviors were identified. A discursive privacy strategy is a privacy-enhancing action with a goal of regulating disclosure in a digitally-mediated social context.

Discursive privacy was measured with a 7-point Likert scale that prompted individuals about their level of agreement with the following statements:

- Advised someone to change their Facebook profile.
- Changed [their] Facebook profile based on advice from someone else.
- Asked someone to make private a Facebook photo containing [their] image.
- Asked someone to completely remove a Facebook photo containing [their] image.
- Untagged one's self from a Facebook photo.
- Deleted a wall post [they've] left on someone else's wall.
- Deleted a wall post someone else left on [their] wall.

We assessed these questions using a Likert scale to allow for variation in saliency and recall of the specific discursive behaviors. Overall, Cronbach's alpha for the scale was .726. A principal components analysis with varimax rotation was performed on scale items, indicating loadings on two factors (eigenvalues of 2.822 and 1.171). Using the .60/.40 criterion [25], we created two subscales to measure the identified factors.

All items, with the exception of one ("Untagged one's self from a Facebook photo"), loaded within the criterion. The first subscale, Active Privacy (α=.73), covers the items "Deleted a wall post you've left on someone else's wall" and "Deleted a wall post someone else left on your wall." The second subscale, Conversant Privacy (α=.69) covers the items "Advised someone to change their Facebook profile", "Changed your Facebook profile based on advice from someone else", "Asked someone to make private a Facebook photo containing your image" and "Asked someone to completely remove a Facebook photo containing your image."
RESULTS
In the analysis, we use a series of standard and nested logistic regression equations to model the likelihood ratio of an individual moving their Facebook profile to friends-only status. Logistic regression is an appropriate form of analysis for this research, as the prediction is a binary categorical, and is not bound by the assumption of a linear relationship between independent and dependent variables. Privacy behaviors and contextual and non-monotonic [24], so the estimation of some privacy behaviors may adhere to the assumptions of other forms of linear modeling.

Baseline Demographic and Facebook Use Measures
In the first model, we examine the effect of demographic and Facebook use measures on setting a Facebook profile friends-only. Our demographic measures are gender, race, and school year. School year highly correlates with age ($r = .62$), but due to potential in-group effects, we felt that school year may offer greater explanatory power than age. Facebook use measures, as previously discussed, are number of friends, length of membership, and minutes of use Facebook use per day. Descriptive statistics for the variables are presented in Table 1.

In this analysis, we conduct a nested logistic regression, the dependent variable being the setting a Facebook profile to friends-only. In the first step, we regress our block of demographic variables: gender, race and school year. Due to the prevalence of white, non-Hispanic students, race was recoded into a binary white/non-white variable\(^1\). The output of the regression is reported in Table 2.

In the first step, we see that gender emerges as the only significant variable, indicating that the odds of a male making his Facebook profile friends-only is 59% of the odds of a female making her Facebook profile friends-only. This finding replicates similar observed gender differences in privacy behaviors in social network sites [23].

In the second step, we introduce a block of Facebook use variables as predictors: number of Facebook friends, numbers of minutes spent on Facebook per day, and length of Facebook membership. The first two variables provide us natural intensity data, and the length variable lets us assess the effect of acculturation on privacy behaviors. In this step, we see that gender and number of Facebook friends are significant. Interpreting the exponentiated beta, we can see that the addition of a single Facebook friend produces a .1% increase in the odds of making a Facebook profile friends-only. This finding is in line with other analyses exploring the relationship between friend networks and privacy behaviors [23].

Utilizing the likelihood ratio test, we see that the second step of the model is significant, and the overall model is significant with a Bayesian Information Criterion (BIC) of 566.65 (BIC of the null model = 579.4). The model Akaike Information Criterion (AIC) is 538.7799 (AIC of the null model = 575.351). The AIC and BIC provides a goodness-of-fit estimation that we will use to compare between models.

Interpreting the first model, we see that demographic and activity measures are useful for predicting if an individual will make their Facebook profile friends-only. The effect for gender has been previously documented across socio-technical systems. The relationship between the number of friends one has in Facebook and their decision to make their Facebook profile friends-only may indicate that once a friend network

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\(^1\) Model was run with race as a full categorical predictor with no additional effect.

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<p>| Table 1. Summary statistics for the baseline demographic and Facebook use models. |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pr. Fr.-Only (n=422)</td>
<td>Yes (58.29%), No (41.71%)</td>
</tr>
<tr>
<td>School Year (n=423)</td>
<td>Fr. (16.78%), So. (36.17%), Jr. (27.66%), Sr. (19.39%)</td>
</tr>
<tr>
<td>Gender (n=421)</td>
<td>Fe. (68.41%), Ma. (31.59%)</td>
</tr>
<tr>
<td>Race (n=415)</td>
<td>Wh. (79.52%), As. (8.43%), Black (6.75%), Other (5.3%)</td>
</tr>
<tr>
<td>FB Min/Day (n=423)</td>
<td>$\mu = 51.7$, $\sigma = 103.65$, $\mu = 303.2$, $\sigma = 0</td>
</tr>
<tr>
<td>FB Mem Length (n=425)</td>
<td>&lt;1yr (4%), 1&lt;2yr (15.53%), 2&lt;3yr (44.7%), &gt;3yr (35.7%)</td>
</tr>
<tr>
<td># FB Friend (n=423)</td>
<td>$\mu = 465$, $\sigma = 303.2$, (5</td>
</tr>
</tbody>
</table>

| Variable | $e^\beta$ | z | p>|z| |
|----------|----------|---|---|
| School Year | .9969501 | -0.03 | 0.977 |
| Gender (M=1) | .5969441 | -2.35 | 0.019* |
| Race (W=1) | 1.340593 | 1.15 | 0.258 |
| School Year | 1.089634 | 0.75 | 0.456 |
| Gender (M=1) | .6205255 | -2.13 | 0.033* |
| Race (W=1) | 1.44409 | 1.40 | 0.163 |
| # FB Friends | 1.001264 | 3.19 | .001** |
| FB Mem Len | .8817067 | -0.90 | 0.371 |
| FB Min/Day | .9977202 | -0.27 | 0.789 |

Step 1: $\chi^2$:6.75, Pr > F:0.0803  
Step 2: $\chi^2$:10.18, Pr > F:0.0171*

N=396, AIC=538.7799, BIC=566.6498

| Table 2: Exponentiated betas (odds ratio), model tests and goodness-of-fit measures for baseline models. (*p<.05 **p<.01) |
achieves a degree of saturation, there may be a tipping point that allows the transformation of the network from open to friends-only.

To explore this possibility, we conducted a two-sample t-test to look at differences between number of friends between people whose profiles are friends-only and those that are not. People whose profiles are not friends-only have significantly less (p=0.003) friends (411.4 friends, \( \sigma = 276.9 \)) than people who have a friends-only profile (500 friends, \( \sigma = 314.56 \)). This may indicate that setting of the profile to friends-only is a function of salient network saturation - when one has all their friends in one place, maintaining a profile that is open to the world is either unnecessary, too risky, or offers too little marginal benefit.

**Network Composition**

To further explore the relationship between Facebook friendships and privacy behaviors, we conducted a nested logistic regression that predicts friends-only status based on gender and Facebook friends network composition.

Network composition was measured with an item that measured if an individual's Facebook friends belonged to any of three salient groups. The first group, *strong ties*, was composed of family members (11.24%) and close friends (98.59%), with an overall incidence of 98.93%. The second group, weak ties, was composed of casual friends (95.08%) and campus acquaintances (95.08%), with an overall incidence of 95.08%. The third group, *outsiders*, was composed of campus administration and faculty members (1.64%), potential employers (2.81%), marketers or corporations (28.34%) and law enforcement (1.64%), with an overall incidence of 29.74%. For clarity, we can say that 2.81% of our sample was friends with a potential employer, and that 29.74% of our sample had at least one outsider group friendship.

In this nested logistic regression model, the first step was composed of number of reported strong tie categories and gender. The first block was not significant, though the gender variable remained significant (\( e^\beta = .6341, z = -2.13, p = .0.033 \)). In the second step, we added number of reported weak tie categories, and only the gender interaction remained significant (\( e^\beta = .6291, z = -2.15, p = .0.031 \)). In the third step, we added number of reported outsider categories, and once again only gender was significant (\( e^\beta = .6258, z = -2.16, p = .0.031 \)). Overall, the model was not significant (\( p = .2593 \)).

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**Figure 1. Exploring differences in the network compositions in friend networks, intended audience, and expected audience.** Percentages correspond to amount of sample indicating membership of the particular social group in their audience. For example, 14.43% of the sample reports family members are part of the intended audience of their Facebook profile.

In this nested logistic regression model, the first step was composed of number of reported strong tie categories and gender. The first block was not significant, though the gender variable remained significant (\( e^\beta = .6341, z = -2.13, p = .0.033 \)). In the second step, we added number of reported weak tie categories, and only the gender interaction remained significant (\( e^\beta = .6291, z = -2.15, p = .0.031 \)). In the third step, we added number of reported outsider categories, and once again only gender was significant (\( e^\beta = .6258, z = -2.16, p = .0.031 \)). Overall, the model was not significant (\( p = .2593 \)).

**Table 3:** Percentage of participants indicating social group membership of intended and expected audience, with paired t-tests.
The lack of explanatory power of friend network composition is largely a function of the saturated nature of Facebook networks. In Facebook, it is normative to friend strong and weak ties, but the prevalence of friendships outside this tight circle is limited. This normative bearing leads to homogeneity in network composition.

Privacy and Expectation Violations
In Facebook, an individual's profile has a wide range of audiences. The friend network, the desired audience, and the expected audience are three particular networks informing privacy decisions. The friend network represents connections publicly articulated in the social network site. As friend networks are normatively large, individuals are forced to focus profile-viewing attention on a smaller subset of their friends list. In an explicit test, we asked participants how many Facebook profiles they had looked at in the past week. The mean answer, 6.4 ($\alpha=9.3, 0|100$) indicated that profile viewing attention is focused primarily on a small subset of the friend network. Notably, the viewing of a small number of profiles in a week does not preclude the transmission of social information; the News Feed and other targeted channels serve this purpose.

We are interested in how this focusing informs perceptions of audience and, and therefore privacy. Therefore, we utilized our network composition instrument to gauge intended audience, or the audience for which the profile was constructed. We asked participants to indicate if any of the eight enumerated social groups comprised the intended audience. These findings, reported in Table 3, provide a picture of the intended profile audience - the goal audience for profile disclosures.

One's expected network is composed of individuals who may have viewed the profile, regardless of privacy settings. These individuals may not be part of the intended audience of the profile. Therefore, we collected information about the expected audience with the network composition instrument. These findings are reported in Table 3, along with significance tests for differences between the intended and expected audience.

Expectancy Violations
We define an expectancy violation as an instance where an individual reports an expected audience, but that audience is not a desired audience. For example, if an individual reports that he expects potential employers are viewing his profile, but they are not an intended audience, there is an expectancy violation for that individual in that social group. We hypothesize that expectancy violations may exert an influence on friends-only profile behaviors, and that expectancy violations will have differing magnitude by social group. That is, an expectancy violation among family members may not be viewed with the same intensity as an expectancy violation by weak tie or outsider audiences.

We examine the effect of expectancy violations by looking at the impact of expectancy violations on friends-only profile behaviors. Among strong ties, 30.44% of participants reported an expectancy violation by family members, and 2.11% of participants reported an expectancy violation by best friends. Among weak ties, response was identical between campus acquaintances and close ties, with 9.84% of individuals reporting an expectancy violation by best friends. Among weak ties, expectancy violations were reported at the following levels: 9.6% for campus administration and faculty, 9.13% for potential employers, 7.03% for marketers or corporations, and 3.75% for law enforcement. For clarity, this measure means that 9.13% of the sample reported the undesired profile gaze by potential employers.

Expectancy Violations and Going Friends-Only
To estimate the effect and group magnitude of expectancy violations, we utilized a nested logistic regression. This allows us to explore the impact of expectancy violations by social groups: strong ties, weak ties, and outsiders. Post-estimate likelihood ratio tests revealed that only the gender predictor and weak ties block were significant ($\chi^2:7.32, p > 0.05$).

| Variable                  | $e^\beta$ | $z$ | $p>|z|$ |
|---------------------------|-----------|-----|--------|
| Gender (M=1)              | .6294311  | -2.09 | 0.036* |
| Family Members            | 1.105011  | .021 | 0.833  |
| Best Friends              | .850843   | -0.020 | 0.842 |
| Coll. Weak Tie            | 3.316345  | 2.74 | 0.006**|
| Campus Adm./Fac.          | .5204356  | -1.47 | 0.141  |
| Potential Employ.         | .8664358  | -0.33 | 0.738  |
| Marketers/Corp.           | .8950906  | -0.22 | 0.822  |
| Law Enforcement           | 1.165174  | 0.66 | 0.511  |

N=416, $p=0.0300$, AIC=566.5188, BIC=602.795

Table 4: Exponentiated betas (odds ratio), $z$ tests and goodness-of-fit measures for expectancy violations model.

$(* p<.05  \text{ **} p<.01)$
Therefore, we do not report block level estimates; the full model is reported in Table 4.

In the full model, we see that the gender was significant ($e=.6294$, $z=-2.09$, $p=.036$), upholding our previous models. We then see that having an expectancy violation by weak ties ($e=3.316345$, $z=2.74$, $p=.006$) increases the odds of having a friends-only profile by 3.31 times the odds of someone who has not had an expectancy violation by weak ties.

Considering the reported network compositions, we see that Facebook friends networks and audiences are primarily composed of strong and weak ties. This may reflect the insular nature of the software - from Facebook's origins as a college-only network, the normative orientation towards friending has been real-world, close friends [20]. Therefore, weak ties may actually represent the functional periphery of the undergraduate Facebook network, and to have an expectancy violation by weak ties may generate substantial privacy concerns motivating action. This finding warrants further inquiry into the conceptual understanding of harms originating from unexpected profile gaze.

**Discursive Privacy Control**

In our final model, we explore the relationship between discursive privacy behaviors and friends-only profiles. Here, we wish to explore the discursive nature of privacy, that privacy behaviors are communicated within groups as part of a larger acculturation process. Due to the persistent digital nature of Facebook, utterances that would normally go unrecorded are stored and replicated in the socio-technical system.

We hypothesize that individuals who engage in greater amounts of discursive privacy controls are more likely to engage in friends-only privacy behaviors. To conduct this analysis, we utilize a logistic regression. Our model contains gender, the discursive privacy subscales, and level of effort, the hypothesized mediator. The results of the analysis are reported in Table 5.

Overall, the model is significant ($p=0.0043$), the only significant predictors being the conversant privacy subscale. Conversant privacy involves management of disclosures that do not fall under the scope of Facebook's traditional privacy controls through interpersonal communication. We feel that conversant privacy practices increase salience of privacy, while reinforcing privacy as a community bond and function of in-group status.

We interpret this relation as indicative of the effect of privacy salience on privacy-enhancing outcomes. As privacy awareness enters the culture of the site through communication, this increased cultural awareness may result in more privacy enhancing behaviors. In particular, privacy-related communications between friends may result in stronger in-group feelings, which may further support the decision to set the profile to friends-only.

**DISCUSSION**

This research has explored the motivations of specific boundary regulation processes in Facebook. We explored the baseline effects of demographics and Facebook use, friend network composition, expectancy violations, and discursive privacy behaviors on the decision to set one's Facebook profile to friends-only. We based our predictors on existing research, theorizations of privacy in HCI, and theories of communicative boundary regulation, particularly CPM.

**Evaluation of Findings**

To evaluate the models, we will utilize the AIC and BIC to compare goodness-of-fit between models. Lower AIC and BIC indicate better goodness-of-fit. Summary statistics for the model goodness-of-fit measures are presented in Table 6. Overall, three of the proposed models were significant. From this research, we have identified four useful predictors of friends-only behavior in Facebook. These predictors are gender, friend network size, weak-tie expectancy violations, and conversant privacy practices.

The strongest model was our demographic model, which predicted friends-only with gender and the friend networks size variable. Gender is often significantly associated with privacy behaviors, and therefore may represent a more general trend regarding privacy in socio-technical systems. An increased friend network size pushes an individual's friend network closer to saturation; there may be a transition point at which point there is no marginal gain for maintenance of an open profile.

Discursive privacy behavior proved to be the second strongest model. Notably, in this model gender was not significant, nor was the active privacy management scale. Conversational privacy behaviors proved to be the significant predictor of friends-only status. This may indicate that engaging in conversational management of privacy increases salience towards privacy issues, as well as establishing and reinforcing group norms of privacy.

<table>
<thead>
<tr>
<th>Model</th>
<th>$p^2$</th>
<th>Pseudo $R^2$</th>
<th>AIC</th>
<th>BIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>0.758</td>
<td>n.s</td>
<td></td>
<td></td>
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<tr>
<td>FB Use</td>
<td>0.0066</td>
<td>0.0329</td>
<td>538.78</td>
<td>566.649</td>
</tr>
<tr>
<td>Friend Net.</td>
<td>0.2593</td>
<td>n.s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectancy Violation</td>
<td>0.0300</td>
<td>0.0301</td>
<td>566.519</td>
<td>602.795</td>
</tr>
<tr>
<td>Discursive Privacy</td>
<td>0.0043</td>
<td>0.0272</td>
<td>553.575</td>
<td>573.667</td>
</tr>
</tbody>
</table>

Table 6: Model goodness-of-fit statistics for the baseline, Facebook use measure, friend network, expectancy violations and discursive privacy models.
The expectation violation model was the third strongest model, with gender and weak tie expectation violations being the significant predictors. This finding may indicate that weak ties establish the functional boundary of Facebook for undergraduates, and that expectancy violations by weak ties reflect a meaningful privacy transgression. Looking at participant network composition (Figure 1), we see a high level of connection to strong tie and weak tie groups, but limited connection with outsider groups. Due to a normative lack of interaction with outsiders, Facebook users may have constructed a boundary of privacy with weak ties, their functional outside audience of a Facebook profile.

Implications for Design
Privacy in social network sites has been examined as a function of audience, network, and disclosure. Our goal in doing this research, our goal was to elaborate previous findings regarding social network site privacy behaviors, highlighting the boundary-regulating aspects of privacy management in Facebook. To accomplish this goal, we examined three boundaries - the network and its composition, expectancy violations, and discursive privacy behaviors - and modeled their effects on setting a Facebook profile friends-only.

Previous research has highlighted the effects of network size on privacy behaviors. In our baseline model, we replicated these findings, indicating a positive relationship between network size and setting the profile friends-only. To elaborate this finding, we explored the effect of network composition on friends-only behavior. While our model wasn’t significant, descriptive analysis highlighted the extremely focused nature of tie composition in our sample - that outsiders are generally not normally accepted as Facebook friends among our sample. This has meaningful implications for organizations and "social networkers" who wish to use Facebook to engage new audiences. Groups that wish to use Facebook to engage as outsider ties may not produce harmful expectancy violations, but they may have trouble connecting with users. Therefore, the creation of interfaces that facilitate conversation without the establishment of ties may be a meaningful middle ground. While communication in virtual settings is facilitated by norms of reciprocity [2], the establishment of interfaces that allow for unidirectional connection may facilitate cross-tie interaction.

Studies of social network site privacy behaviors often highlight the need for better education regarding privacy in the sites. In our analysis of discursive privacy behaviors, we identified that conversant privacy behaviors significantly predict the privacy-enhancing behavior of going friends-only. Notably, discursive privacy behaviors do not involve the transmission of technical facts regarding privacy settings, but rather the shared coordination of profile management between two individuals. This everyday practice enhances privacy and may produce greater salience for privacy issues among the user population. Perhaps rather than focusing on explaining the complexities of a privacy system to users, we should design ways to facilitate conversations about everyday privacy behaviors. This may result in the development of privacy enhancing norms such as the move to a friends-only profile.

Finally, our elaboration of expectancy violations provides insight into the culturally-shaped conceptions of privacy in a social network site. An expectancy violation is defined as an incongruity between a profile’s intended audience and its expected audience. Interestingly, expectancy violations by outsiders did not predict the adoption of a friends-only profile, but expectancy violations by weak ties did. Although this finding needs to be elaborated with further research, it may highlight the variable saliency of network-based privacy concerns in social network sites. In a network like Facebook, where strong and weak ties are heavily saturated, expectancy violations may arise at the periphery of the saturated network, and not with hypothetical outsiders. In this sense, we see that lived experience of interaction with weak ties trumps violations by theoretical outsiders - those that would be perceived to be most damaging if privacy was a linear function. This finding can be applied in examination of network-based privacy boundaries. In various systems, network saturation will inform our experience and privacy expectations. By utilizing network-based measures, we may be able to predict the point at which expectancy violations produce harms. Such analysis could be used to facilitate dynamic and granular privacy controls in socio-technical systems.

CONCLUSION
Utilizing boundary regulation theory as a motivation for elaboration, we have introduced two new potential explanations of privacy behavior in social network sites. We find that the privacy-enhancing behaviors of setting one's profile friends-only in Facebook is motivated by expectancy violations and discursive privacy practices. This highlights the fact that privacy in socio-technical systems, and particular Facebook, is a cultural and contextual information practice.

This analysis elaborates previous findings regarding the practice of setting a social network site profile to be friends-only [23,32]. Although privacy is realized in many ways in social network sites, the particular act of going friends-only provides researchers with a discrete, naturalistic phenomenon that interacts with one's network and communication practice. In future research, we plan to elaborate the concept of expectancy violations and their role in producing privacy harms. We also hope to provide a more granular elaboration of the network interaction with expectancy violations, to produce a better understanding of contextual understandings of network boundaries. This research stands to inform both the theorization and practice of privacy, allowing for the design of systems that facilitate communication while providing better privacy protections.
REFERENCES


