

Privacy: Is There An App for That?



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Research Questions

- What do Facebook users understand about Applications on Facebook Platform?
 - Do they grasp that apps aren't a part of Facebook?
 - Do they understand the profile data exchange between FB and third party developers?
 - What are their privacy expectations/attitudes w/r/t apps?
- What relationship, if any, exists between one's privacy protective behaviors, knowledge of relevant facts about how apps exchange profile info, and privacy attitudes towards apps and Facebook?
 - Is knowledge or behavior w/r/t apps predictive of one's privacy attitudes?
 - How do our "ideal" users--the most knowledgeable--behave? What are their attitudes towards privacy?

Method

- Conducted a broad survey (measuring general use of SNSs and FB, factual questions about how apps and FB work, and a few privacy-specific q's) in order to have a range of data with which to examine our research questions
- Chose to build an app in order to:
 - Desired a more diverse group of respondents than college undergrads (most FB surveys published focus on undergrads)
 - ask contextual questions specifically about FB apps, including the app adding process
 - use the API in order to calculate aspects of profile information sharing to avoid 100% self reporting

Context

- Began project in 2008 - TTBOBK no research in this specific area at the time, though several surveys and analyses of Facebook usage and information sharing
- Felt & Evans 2008 - “Privacy Protection for Social Networking APIs” - one of the first to call out the security/privacy concerns with apps on FB
- Besmer & Lipford - “Users’ (Mis)Conceptions of Social Applications (2010)
 - qual study (15 participants) & survey
 - Social aspects of application use
 - Users unaware of the extent of profile information sharing with apps and with friends’ apps

Our Survey App



- 60-question survey
- Seeded through two friends lists == non-representative convenience sample
- Used FB's Platform API to virally recruit additional participants via respondents' News Feeds, as well as Craigslist, mailing lists, and FB ads
- $N = 516$ (111, or 22%, from friends lists)
- Ran from March through May, 2010

How does Facebook define apps?

From Facebook's Help Center:

Applications on Facebook are designed to enhance your experience on the site with engaging games and useful features like Events and Photos. Some applications are built by Facebook developers, but most applications are built by outside developers who use Facebook's APIs and abide by Facebook's [Developer Principle and Policies](#).

Applications on Facebook allow you to play social games with your friends, remember friends' birthdays, share your taste in movies, send gifts to friends, and much more.

(Note: this definition wasn't available until after June 2010)

Demographics

	Total Sample	Most Knowledgable	Friends List
Female/Male	64%/36%	40%/60%	50%/50%
Mean Age	35.3	34.1	36.2
Politics	56% Demo	61% Demo	68% Demo
Race	78% White	88% White	77% White
Education	81% college +	86% college +	92% college +
Relationship	47% married	43% married	54% married
N	516	105	111

There is an overlap between the most knowledgable and the friends list of 29 respondents.

App Fundamentals

- 98% have heard of apps/familiar with term
- When offered, there was a consistent 1-2% replied “I don’t know what an application is”
- 65% claimed to have added 10 or fewer apps
- 77% understood that apps were both created by FB and other companies
- 8% falsely believed and 48% were uncertain whether Facebook reviews all apps

App Usage

- 28% admit never reading the “Allow Access” notice
 - 44% said yes/25% I’ve read it before
 - 3% don’t recall
- 74% agree that “I’ll remove an application from my profile after I’ve stopped using it.”
- 76% report removing at least one app
 - 6% wanted to but didn’t know how
 - 4% aren’t sure
- 58% disagree that they only add apps from people/companies they’ve heard of before
- 55% disagree that they only add apps their friends have added

Q: What parts of your Facebook account do you think this survey can access?

	Frequency	Percent*
Basic profile information	228	44%
Personal information	155	30%
Contact information	95	18%
Education & work info	132	26%
Your groups	136	26%
Your pages	114	22%
Your wall posts	82	16%
Your friends list	143	28%
Your photos	83	16%
Your messages	9	2%
All of the above (deselects all other choices)	278	54%
None of the above (deselects all other choices)	2	<1%

Mean = 1.56 0 Correct = 55% 7 correct = <1% (1 respondent)

*Percentages represent the number of respondents selecting each answer choice, not a cumulative total.

Note that apps cannot read the content of messages or wall posts, but they can access a count of total number sent/received/unread/posted.

Q: You decide to add an application to your profile that none of your friends have added to their profiles. Whose profile information can the application see?

	Frequency	Percent
My profile information only	89	17%
My profile info and my friends' basic profile info	240	47%
An app can access any FB user's basic profile info whether they've added it to their profile or not	42	8%
None of the above	7	1%
Not sure	138	27%

53% either picked the wrong answer or were unsure.

Q: The notice (below) tells you that this survey needs to “pull” your information in order to make it work.

Which answer best matches your understanding of what this means?

Old (survey version)

New

Allow Access?

Allowing UCB Social Network Survey access will let it pull your profile information, photos, your friends' info, and other content that it requires to work.

 **UCB Social Network Survey** No reviews
What kind of social networker are you? Take our survey and find out! This survey is part of a research project conducted at the University of California, Berkeley.

or

By using UCB Social Network Survey, you agree to the [UCB Social Network Survey Terms of Service](#).

Request for Permission

FarmVille is requesting permission to do the following:

-  **Access my basic information**
Includes name, profile picture, gender, networks, user ID, list of friends, and any other information I've shared with everyone.
-  **Send me email**
FarmVille may email me directly at jenking@ischool.berkeley.edu - [Change](#)
-  **Post to my Wall**
FarmVille may post status messages, notes, photos, and videos to my Wall
-  **Access my profile information**
Birthday and Current City


FarmVille
★★★★☆

By proceeding, you agree to the [FarmVille Terms of Service](#) and [Privacy Policy](#) - [Report App](#)

Logged in as Jennifer King (Not You?)

“Pull” Question Cont’d

	Frequency	Percent
Pulling means the survey application is allowed to see your profile data but the data stays on the FB website	151	29%
Pulling means your profile data is transferred from FB’s website to the survey application’s website	303	59%
None of the above - I think it means something else	11	2%
Not sure	51	10%

Q: How comfortable would you be with an app if it did any of the following with your profile info?

	Very or Somewhat Comfortable	Very or Somewhat Uncomfortable
Sold my profile information	5%	95%
Stored my profile information permanently (on its website)	10%	90%
Shared my profile information with other companies	6%	94%

These practices are prohibited by FB's TOS, but developers have been known to engage in them regardless.

Data Analysis

- Using these, other survey questions, and data gathered via the Platform API, we first performed bivariate comparisons to examine the relationships between concepts. We then used regression analysis (logistic nested) to explore the following dependent variables:
 - What variables are predictive of privacy attitudes w/r/t 3rd party apps?
 - ... interpersonal privacy attitudes on Facebook
 - ... institutional privacy attitudes towards Facebook
 - ... increased knowledge about apps?

Independent Variables

A: Demographics: gender, age, education, on friends list

B: SNS factors: how often visiting SNSs, membership in others besides FB, # of adverse events on SNSs (inc. FB)

C: FB specifics: amount of profile data, understands “everyone” in privacy settings, uses Facebook Connect

D: 3PA behaviors: # of apps, removed an app, only adds apps from people/companies known, clicked leave app link when adding, read the app adding notice

E: 3PA knowledge: # of correct responses to what profile info apps can see, who creates apps, who created this app, does FB review apps, accessible profile info when friend adds app, pulling info question

Model 1: A + B + C

Model 2: A + B + C + D

Model 2: A + B + C + D + E (for all the privacy regressions, additional group for most knowledgeable regression)

Adverse Events

- Had an experience on a SNS where your personal information was disclosed to someone whom you did not want to see it?
- Have you been embarrassed by information you shared or that someone posted about you on a SNS?
- Has anyone posted info about you on an SNS that you wanted removed?
- Has anyone posted a photo of you on an SNS that you wanted removed?

Privacy Attitudes Towards 3PAs

- Variable: composite of our questions asking about information disclosure by apps: storing, selling, and sharing ($\alpha = .89$)
- Distribution of responses to these questions was not normal, highly skewed towards discomfort with privacy-violating practices
- Only consistently significant variable was the influence of adverse events (higher # of events == increased odds of stronger privacy attitudes); M1: $p \leq .01$; M2-3: $p \leq .05$, but multiple testing adjustment (Bonferroni) = .002

Interpersonal Privacy Attitudes

- Composite of three specific social threats: ($\alpha = .80$); responses were normally distributed
 - *My parents or other family members viewing my profile info or photos of me that might concern or offend them*
 - *Current or future employers viewing my profile or photos of me*
 - *Embarrassing photos of me posted or tagged by others*
- Only privacy model to have a significant demographic covariate: age (M1: $p \leq .001$; M2-3: $p \leq .01$) (MTA = .002) - as age increases so does concern
- Membership in other SNS: M1-3: $p \leq .05$, M2: $p \leq .01$
- # of applications: M2: $p \leq .01$; M3: $p \leq .05$
- Adverse events: All models: $p \leq .001$

Institutional Privacy Attitudes

- Measure of concern should Facebook ever sell profile data to other companies; responses skewed towards higher concern (Scale 1-4, mean = 3.13, SD=.87)
- Was this application created by Facebook?
M3: $p \leq .01$ (MTA: .002)
- Adverse events: All models: $p \leq .001$

Those most knowledgeable folks

- Grouped based on correct answers to:
 - *Who creates applications?*
 - *“Pulling info” notice*
 - *Whose info can applications see? (you & your friends)*
 - *Are apps reviewed by FB?*
- Gender (more likely to be male): **All Models: $p \leq .01$** (MTA: .03)
- Education: All Models: $p \leq .05$
- Membership in other SNSs: M1: **$p \leq .05$** ; M3: $p \leq .05$
- Adverse: M2: $p \leq .05$
- Notably, no privacy or behavior covariates were significant.

Key Findings/ Future Direction

- Confirmed Besmer & Lipford's findings that app users often not aware of the extent of their sharing with apps (directly and by friends,) and of the information exchange process between the Platform and apps
- We didn't explore the social aspect of app usage as directly, but did find the additional dimension that users report that their use is not limited to only apps their friends use or apps made by people/companies they know
- Our respondents strongly dislike storing/sharing/selling of their data by app developers
- Whether or not you've had an adverse event on a social network is a better predictor for one's privacy attitudes than knowledge about or experience with apps
- Our most knowledgeable respondents cause us to question any relationship between knowledge, behavior, or attitudes
- Hints at the depth of complexity in understanding this model (or, apathy?)