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What's Her Face(book)? How many of their Facebook “friends” can college students actually identify?



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ABSTRACT

An online game, titled What's Her Face(book), was created and students from an Ivy League campus (as well as adults from the general population) were invited to play as many times as they wished. Each game lasted around 90 s during which individual friends were randomly selected from the participant's Facebook page and their profile photo displayed alongside up to four additional tagged photos. The participant was prompted to either type in the friend's first name, last name or both names with single names allowing a Levenshtein distance of one letter and both names allowing a distance of up to three letters for accuracy (Levenshtein, 1966). Following a game, participants were shown the photos and names for those they correctly and incorrectly identified. More than 4000 participants played the game, with an aggregate 174,615 opportunities to name their Facebook friends. Playing the game an average (median) of 4 times, participants were able to name only 72.7% of their friends, with male participants naming male friends more accurately than their female friends and female participants naming their female friends more accurately than their male friends. Although playing the game more times resulted in higher accuracy, perhaps from correcting previous mistakes, the benefit was minimal with those in the top quartile of games played garnering only an additional 2% in accuracy on average. Results were discussed in terms of social capital theory alongside issues of privacy and security on social media sites.

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1. Introduction

According to a recent national study of nearly 1600 adults, 87% of college students use Facebook regularly (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015). In addition, more than 81% of Facebook users visit the site on their smartphones (Hamburger, 2014), with Facebook being the third most popular smartphone app after the email and browser apps (Keating, 2013). According to an IDC study (Keating, 2013) the average British Facebook user checks Facebook at least 14 times a day. Another study (Rosen, Whaling, Rab, Carrier, & Cheever, 2013) reported that 35% of American members of the Net Generation—college-aged young adults born in the 1980s—checked their smartphone at least every hour, every 15 min or all the time while another 44% checked it between every few hours and once a day.

Friending another user is the core way in which people connect

on Facebook to form what is popularly referred to as “the social network.” The number of “Facebook friends” a user may have can vary drastically ranging from 318 to 587 for college students and college-age adults (Chou & Edge, 2012; Kim & Lee, 2011; Lee, Moore, Park, & Park, 2012; Manago, Taylor, & Greenfield, 2012; Marketing Charts, 2013; Smith, 2014; Thompson & Loughheed, 2012).

So how many of those “friends” do we actually know? Unsworth, Spillers, and Brewer (2012) asked college students to recall as many of their Facebook friends as they could in 8 min. They found that on average students were able to recall about 11% of their friends, the majority of which were either college friends or high school friends, perhaps indicating these relationships were the strongest in their minds. And though a 2011 study of 1865 social media users (Nielsen Wire, 2011) found that adults were primarily friending people they knew in real life, they also note that some were willing to “friend” people with whom they had never met, but rather shared mutual friends. The current study was designed to examine how many of college students' friends were known well enough to name them in a random presentation directly from their

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personal Facebook page.

When asked directly how many of their Facebook friends were strangers who they did not know in the real world, estimates ranged from 4% (Manago et al., 2012) to 15% (Chou & Edge, 2012) implying participants knew between 85% and 96% of their Facebook friends in the real world. Based on that, it is safe to assume that college students should personally know at least 85% of their friends and thus should be able to name them with high accuracy.

1.1. Psychological impact of friending

Online friendships can form an important part of users' lives. Several studies have investigated to what extent these virtual relationships affect users' emotions in the real world. First, Marder, Joinson, and Shanker (2012) reported that on average college students' Facebook friends come from seven different social spheres including those known offline, extended family, siblings, friends of friends, colleagues, ex-partners, and people met on a night out. Marder et al. propose that self-discrepancy theory—comparing oneself to the expectations that they or others feel that they should fulfill—can be used as a way to view these spheres, and that this framework may explain the social anxiety felt from amassing a large number of Facebook friends. Second, along similar lines, Steinfield, Ellison, and Lampe (2008) proposed that enhanced self-esteem comes from friends serving as “social capital,” with more benefits being derived by those initially lower in self-esteem. When social capital theory is coupled with the social compensation hypothesis—compensating for social anxiety by making friendships online rather than in the real world (Williams & Karau, 1991)—this may explain why we add friends to compensate for our lowered self-esteem, thereby increasing our feelings of well-being (Lee et al., 2012; Tazghini & Siedlecki, 2013).

To that end, recent studies have found mixed results arising from social media friending. Rosen et al., (2013) found that while having more Facebook friends predicted increased symptoms of bipolar-mania, narcissistic personality disorder, histrionic personality disorder and schizoid personality disorder, it also predicted reduced symptoms of major depression and dysthymia (mild depression). In support, some studies have found that accrual of Facebook friends is related to a sense of positive well-being and enhanced self-esteem (Kim & Lee, 2011; Manago et al., 2012). At the same time, other studies have reported negative correlations between number of friends and self-esteem (Chou & Edge, 2012; Lee et al., 2012; Tazghini & Siedlecki, 2013), particularly for those who were high in public self-consciousness—regulating one's public impression (Lee et al., 2012)—and who knew fewer of their Facebook friends (Chou & Edge, 2012). One study of Australian university students (Skues, Williams, & Wise, 2012) found that having more Facebook friends predicted *both* more loneliness and more openness, capturing both the positive and negative impacts in the same sample.

Finally, in a four-week study of university students, Wang, Tchernev, and Solloway (2012) extended the theory of uses and gratifications—whereby new media is utilized in an attempt to gratify specific needs—and demonstrated that while social media use may be driven by all four needs (emotional, cognitive, social, and habitual) it only satisfied two of those needs (emotional and cognitive) causing the remaining needs to accumulate over time and drive further social media use.

1.2. Gender differences in social media use

Research has examined gender differences in the use of social media with mixed results. While some studies indicate that women have more Facebook friends than men (McAndrew & Jeong, 2012)

and that women spend more time using social networking sites (Kimbrough, Guadagno, Muscanell, & Dill, 2012; Simoncic, 2012; Thompson & Loughheed, 2012), another found no difference in the number of Facebook friends between men and women (Thompson & Loughheed, 2012).

In one recent study, Muscanell and Guadagno (2012) examined reasons for using social media among a sample of undergraduate college students. Their results indicated that men use social media sites for forming new relationships while women reported using social media sites to maintain current relationships. This suggests women may be better at identifying their Facebook friends by photo alone, as their online friends are more likely to be part of an actively maintained relationship, compared to men who may not actively maintain relationships with many of their Facebook friends.

1.3. Hypotheses

Based on the reported literature, the following hypotheses were proposed:

H1. Female college students will have more Facebook friends than male college students based on the few studies that have compared friends based on gender.

H2. College students should be able to name 85% of their Facebook friends, based on estimates of the number of friends they “know” in the real world.

H3. Female college students will be able to name their friends more often than male college students, as they tend to use social media to maintain existing friendships whereas their male counterparts may use social media to develop new friendships.

2. Methods

2.1. Participants

Overall, 4022 participants played the “What's Her Face(book)” game, producing 174,615 guesses of the name of one of their Facebook friends. Participants were recruited via word of mouth, starting with fellow students on an Ivy League university campus. Although the intent was to primarily sample college students, several media stories appeared about the project, which included the link for playing the game (Cohen, 2011; Hill, 2011; Waugh, 2011). Thus, there is no way of knowing whether participants were college students or simply read the story and followed the link. This is discussed in the limitations section.

2.2. Procedure

Participants were invited to play the “What's Her Face(book)” game through the form of an online web-application. Upon visiting the study's site, participants were prompted to login with their Facebook credentials (a common request nearly all would have prior familiarity with). After logging in, the participants were informed they would have 90 s to name as many of their Facebook friends as they could from provided profile pictures.

After agreeing to the challenge, participants were presented with a “guessing” screen as shown in Fig. 1, displaying one or more photos of a given friend: the friend's profile picture and up to four other photos they were tagged in. When participants hovered over any image, they would be shown a larger version of that image and a box would highlight the face of the particular friend in question.

To correctly identify a given friend, participants were prompted

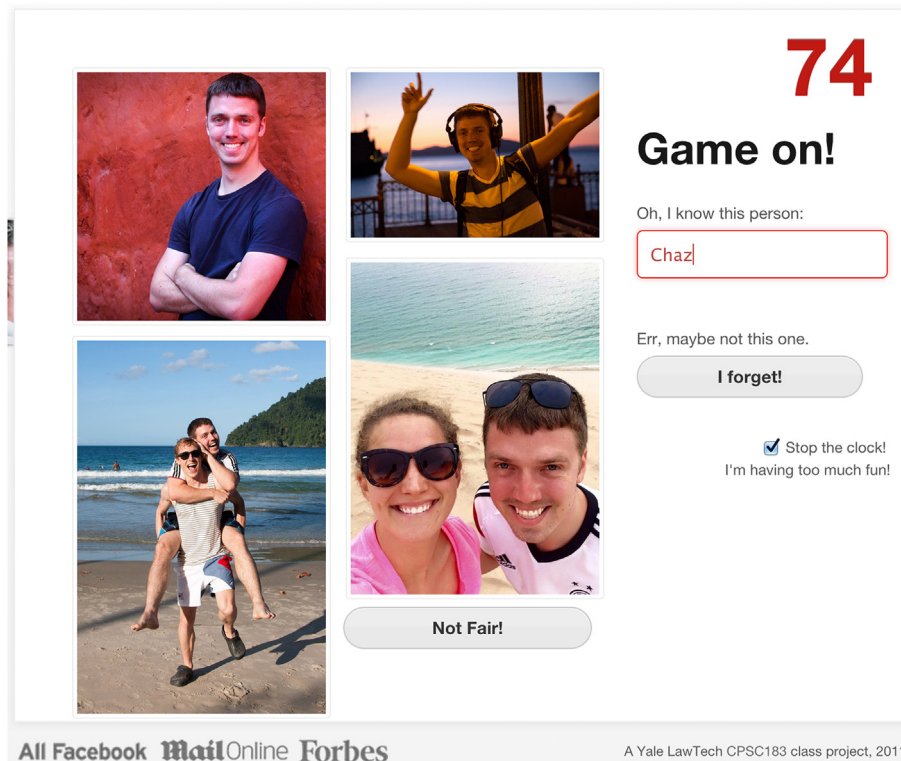


Fig. 1. The game's user interface. On the left, the user sees pictures of his/her friend. On the right, space is provided to type in the friend's name, or that they don't know the pictured person.

to enter either the friend's first, last, or full name. When using only the first or last name—but not both—the input was allowed to have a Levenshtein distance of at most one letter (Levenshtein, 1966). The Levenshtein distance compares two strings and counts the number of replacements, insertions, and deletions that are required to transform one string into another. Each unit of Levenshtein distance is roughly one single-character edit such as an insertion (Sara to Sarah), deletion (Sarah to Sara), or replacement (Eric to Erik). When providing a full name, the Levenshtein threshold was expanded to three. We found this adequately accommodated for complicated or ambiguous spellings without sacrificing the integrity of the question posed. Beyond complex spelling, we also attempted to mitigate failures caused by unidentifiable or misrepresentative profile pictures. To this end, if only three or fewer photos were available to display, an additional “Not Fair” button was exposed on the screen, allowing the participant to “skip” the current friend without logging either a success or failure.

Participants were given as many attempts as they needed to name each friend, and the game would not progress until they had either successfully guessed or given up by clicking the “I Forget!” button. The friends were randomly selected from the full list of friends available through the Facebook API.¹ To restrict participants from taking an excessive amount of time on any given prompt, we added a global countdown timer, encouraging them to rush through each friend—thereby gathering as much data as possible. At the same time, we allowed participants the option to actually “pause” the timer and cycle through as many friends as they

desired. Friends would not be repeated in the same round, but it was possible for participants to see the same friend multiple times across multiple sessions playing the game.

After each complete round, participants were presented with their score for that round as well as their overall score across all rounds. Participants were also shown all the photos and names of friends who they had previously been unable to name. Once presented with their personal results, participants were encouraged to consider tightening their privacy by removing their unnamed “friends” and thereby better controlling the publication of their content. The idea of establishing better normative behavior, and why that matters, is discussed after presentation of study results.

3. Results

Participants played the “game” a mean of 10.53 times ($SD = 16.75$; $Mdn = 4.00$, $skewness = 3.40$) ranging from playing just once to playing 116 times; half the participants played either once (19%), twice (18%), 3 times (9%) or 4 times (8%). Each name guess was counted as a single data point and included the following attributes when discernable from the Facebook API: participant gender (56.8% female; 42.6% male), participant age ($M = 24.01$; $SD = 9.30$; $Mdn = 21$, $skewness = 4.35$), participant initial friend count at the time of the guessing game ($M = 647.62$; $SD = 504.14$; $Mdn = 530$, $skewness = 2.90$), gender of friend (50.7% female; 47.9% male; 1.4% unknown), and age of friend ($M = 24.52$; $SD = 10.05$; $Mdn = 22$; available for only 51.5% of the friends).²

¹ Note that this would exclude any friends who had forbidden others from giving away their information (generally very few people do this) via 3rd party applications. We do not believe that would cause any selection bias.

² Since age of friend was only able to be determined for half the sample it was not included in any additional analyses.

Table 1
Analysis of Covariance to predict correct guesses from participant gender, friend gender, participant age (in quartiles) and participant friends (in quartiles) with participant plays (in quartiles) as covariate.

Variable	SS	df	MS	F-score	Significance	Partial Eta Squared
Plays (covariate)	51.64	1	51.64	269.47	$p < .001$	.002
Participant gender (PG)	42.06	1	42.06	219.48	$p < .001$	.001
Gender of friend (FG)	3.78	1	3.78	19.70	$p < .001$	.000
Participant age (PA)	51.42	3	17.14	89.44	$p < .001$	.002
Participant friends (PF)	479.34	3	159.78	833.78	$p < .001$	.015
PG × FG	54.80	1	54.80	285.97	$p < .001$	.002
PG × PA	23.42	3	7.81	40.75	$p < .001$	.001
PG × PF	9.82	3	3.27	17.08	$p < .001$	.000
FG × PA	5.07	3	1.69	8.82	$p < .001$	.000
FG × PF	1.35	3	.45	2.35	ns	–
PA × PF	19.85	9	2.21	11.51	$p < .001$	.001
PG × FG × PA	6.41	3	2.14	11.17	$p < .001$	.000
PG × FG × PF	6.65	3	2.22	11.57	$p < .001$	.000
PG × PA × PF	34.94	9	3.88	20.26	$p < .001$	.001
FG × PA × PF	3.77	9	.42	2.19	$p = .02$	.000
PG × FG × PA × PF	5.50	9	.61	3.19	$p = .001$	.000
Error	31808.61	165988	.192			

3.1. Hypothesis testing

Prior to examining whether men or women were better at recalling their Facebook friends' names, an initial comparison was made comparing friends by gender to test [Hypothesis 1](#) that female college students would have more Facebook friends than male college students. Across all subjects, after covarying out the number of times a subject played the game,³ males ($M = 658.82$) had significantly more Facebook friends than females ($M = 641.51$), $F(1, 169,883) = 51.14$, $p < .001$. This did not lend support to [Hypothesis 1](#).

Overall, 72.7% of the participants' guesses were correct – falling far short of the prediction made in [Hypothesis 2](#) that based on data from previous studies, college students should be able to name 85% or more of their Facebook friends. To assess what variables might best relate to the accuracy of guessing the name of Facebook friends, a 4-way Analysis of Covariance was performed with four independent variables—participant gender, friend gender, participant age and Facebook friends—one dependent variable (correct or incorrect guess) and one covariate (number of times the participant played). Due to the vast amount of data, the large variability and the skewed distributions of age, friends and play count, the independent variables were each partitioned into quartiles to reduce the variability as follows: participant age (under 20 years of age, 20–21, 22–25, 26 or older), participant friends (10–317, 318–529, 530–839, 840–5289) and participant play count (1, 2–4, 5–11, 12 or more). In all, 166,053 of the guesses—95% of the total responses—were included data on each of these independent, dependent and covariate variables.

[Table 1](#) includes the results of the 4-way ANCOVA. As can be seen in [Table 1](#), all main effects and all interactions were statistically significant except for the interaction between the gender of the friend and the participant number of Facebook friends. This is not surprising given the large number of data points and the small error ($MS_{error} = .19$). The main effect of participant gender indicated that

³ The total number of times that the game was played was used as a covariate since participants who played the game more often did have a better rate of successfully identifying their Facebook friends with the means for the number of plays partitioned into quartiles due to the large variability, ranging from 72.4% correct for the lowest quartile to 74.7% correct for the highest quartile indicating that additional plays only increased accuracy a few percentage points. In addition, each time the participant played the game he/she was shown the photos and names of those friends they failed to name, which should help them increase their ability to name the same friend in the future if random selection brought up that same friend's photos.

females guessed names correctly 74.4% of the time compared to males who guessed correctly 71.0% of the time supporting [Hypothesis 3](#). The main effect of user age found that the second youngest age group (20 and 21 years of age) was the most accurate (75.7%) followed by the youngest age group (under 20 years old) at 72.5%, the second oldest group (22–25) at 71.9% and the oldest age group (26 and older) at 70.6%. The main effect of participant Facebook friends showed a progression of correct responses from those with the fewest friends (80.1%) to those with the most friends (64.7%). Those with the second fewest friends were correct 76.4% of the time while those with the second most friends were correct 69.5% of the time.

Only three interactions were relevant to understanding who is better at naming Facebook friends. [Fig. 2](#) displays the percentage of correct guesses by male and female participants of male and female Facebook friends after correcting for the covariate. As is evident, male participants were nearly 5% more accurate at guessing male friend names (73.4%) than female friend names (68.5%) while the opposite was true for female participants who were nearly 3% more accurate in guessing female friends names (75.8%) than males friends names (72.9%).

[Fig. 3](#) displays the significant participant age by participant gender interaction. As can be seen here, female participants guessed their Facebook friends' names better than male participants with the exception of those in the 22-to-25-year-old group where they were essentially equal at naming Facebook friends.

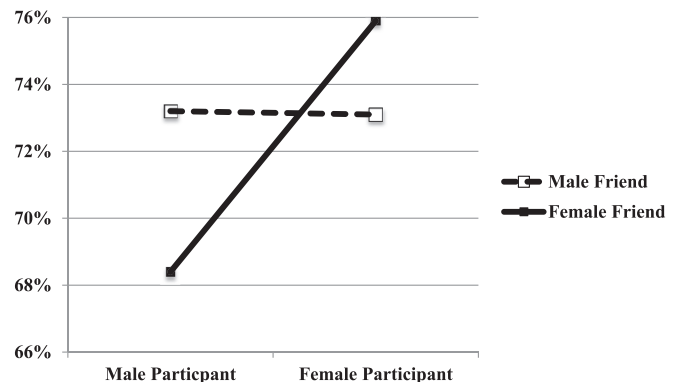


Fig. 2. Percentage of correct guesses by participant gender and by the gender of the male or female "friend" whose name they were attempting to recall.

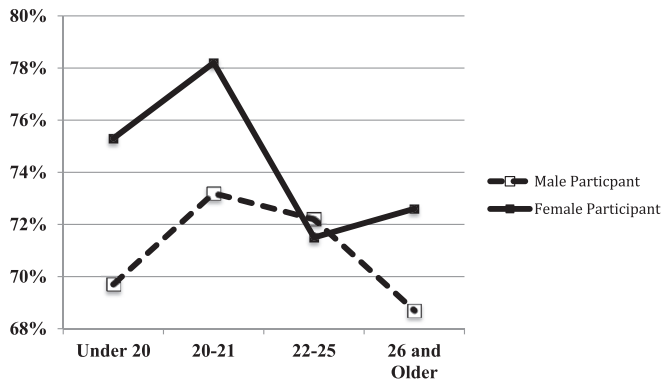


Fig. 3. Percentage of correct guesses by participant age and gender.

Finally, Fig. 4 indicates female participants were better at naming their Facebook friends than male participants except for those with the most Facebook friends where the male and female participants were roughly equal (and worst of all conditions).

To further investigate the relative impact of the main effects, a hierarchical linear multiple regression equation was performed with the covariate (times played) entered as the first hierarchy, the four main effect independent variables entered as the second hierarchy, and three pertinent interactions entered as the third hierarchy to predict correct guesses. Not surprisingly, the regression equation was statistically significant, $F(8,166,044) = 397.25$, $p < .001$. An examination of the four main effect independent variables and the interactions indicated that, other than the main effect of participant gender, each was a statistically significant predictor with the interaction between participant gender and friend gender having the highest beta weight (.204), followed by friend gender (-.145), participant friends (-.083), the interaction of participant gender and participant age (-.071), the interaction of participant gender by participant friends (-.055) and participant age (.032). As beta weights are relative based on z-scores of each variable, this indicates that the combination of participant gender and friend gender are the two most important predictors, both in their interaction as well as their main effect, of friend gender itself. Other predictors have substantially reduced impact on predicting correct guesses.

4. Discussion

This study was designed to determine whether adults, mostly university students, could name their Facebook friends chosen at

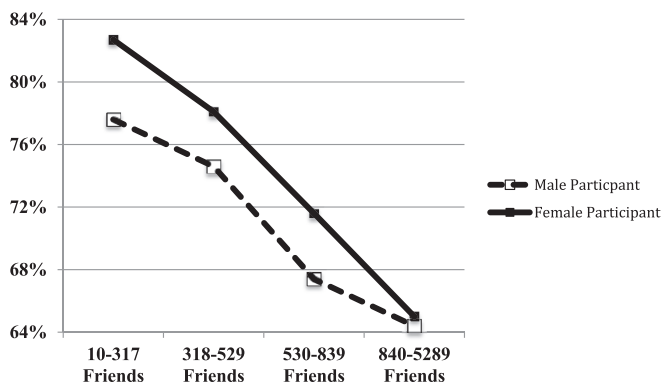


Fig. 4. Percentage of correct guesses based on participant gender and participant number of friends.

random in a game billed as, “What’s Her Face(book)” which was played by 4022 participants. The game was simple. After agreeing to participate (granting the researchers temporary access to the participant’s personal Facebook page), the guessing game began by randomly selecting a Facebook friend and presenting the friend’s profile picture as well as up to four more photos in which the friend was tagged. Given unlimited time, the participant had to type in the friend’s first, last or full name and the name was considered correct if it was spelled correctly within one character if just typing the first or last name or three characters if typing in the whole name. Participants were given feedback on their correct identification score and were encouraged to play the game as often as they wished. Overall, participants played the game an (median) average of 4 times with a mean of 10.53 times. Collected data included, when available, participant age and gender, friend age and gender, and number of Facebook friends.

This study used actual Facebook data rather than estimates supplied by the participants and found that the average Facebook user had approximately 650 friends and contrary to Hypothesis 1, males actually had a mean of 17 more friends than females, which although statistically significant, represents a difference of only between 2% and 3% and is likely due to the massive data sample of more than 174,000 guesses as each guess constituted a single data point.

Based on a small group of studies that assessed the number of real-world friends compared to virtual friends (not known in the real world) as well as one other study that asked college students to name their Facebook friends in 8 min, it was predicted that the game should produce approximately 85% correct guesses. In fact, however, participants could only accurately name 72.7% of their Facebook friends. This was in spite of the fact that at the end of the current round the participants were shown the photos of the friends that they could not identify along with that friend’s name and then, by random chance, those who played the game more than once could see the same friend’s photo displayed multiple times and have multiple chances to recall the name.

Finally, it was predicted that females would be more accurate than males in naming their friends, which was supported by a 3.3% advantage for females. Strikingly, however, when examining which names were remembered, males were better (by 5%) at remembering the names of their male friends while females were better (by 3%) at remembering the names of their female friends. Overall, through analysis of covariance and multiple regression equations, it was determined that the basic determinants of memory for Facebook friend names were the gender of the participant coupled with the gender of the friend.

Using only Facebook data and participant guesses, there is no way of knowing what underlies the impact of gender on identifying Facebook friends. In terms of social capital theory, these results imply that males gain more social capital from their male friends and females from their female friends. The lower than predicted rate of success at naming friends suggest that the definition of a “friend” must, at this time, be flexible. If you cannot name 30% of those who you claim as friends then it is likely that they do not fit any of the types of social capital—bonding, maintaining and bridging (Papacharissi & Mendelson, 2011; Steinfield et al., 2008)—seen in studies of examining online social capital. In terms of uses and gratifications theory, it is likely that knowing the names of only 72.7% of your 650 Facebook friends provides you with 473 friends from which to cull the emotional and cognitive needs that have been found garnered by social media (Wang et al., 2012).

4.1. Implications

This project itself was undertaken in order to alert Facebook

users to exercise better control over their privacy and security and to consider removing those “friends” who they could not identify. Although the result of this advice could not be verified, it would be interesting to do a follow-up study to determine if after realizing that a Facebook user cannot identify nearly a third of his or her friends, unidentified friends were unfriended and security was strengthened.

After the site was launched, the conflict between users' personal social networks and professional appearances became the center of some media attention highlighting how much poor security settings could affect users. One report (Sherman, 2013) found that up to 10% of young job applicants had been rejected from a position based on content on their social media pages. One prime example would be compromising photos a user was tagged in; the same photos the researchers were freely able to fetch through the API for users with poor settings.

Around the same time, several US states passed (or attempted to pass) bills seeking to prevent employers from requiring job applicants to divulge social network passwords (Dickerson, 2012). In Arkansas, the house drafted a bill that would have expressly permitted that behavior which was then killed in the senate (Chokshi, 2015). The fact that governments felt the need to step in and regulate should make it clear how much of a role social media can play in the workplace, both in applying for a job and continuing to hold a position.

Friending someone places a certain amount of trust in them with your photos and personal data. As time passes and people grow apart and circumstances change, these people might find themselves in a situation where exploiting that trust becomes more beneficial than honesty. Maybe they are asked by a boss to investigate a college acquaintance, perhaps they have to choose sides in a difficult breakup, or it could be that they are vetting potential dates for a friend. If users friending each other means allowing the person to take their private content into the public sphere, users should establish some basic criteria for “friends” and realize that “friends” they cannot name may provide a good place to start.

4.2. Limitations

This study was intended to survey only college students, but due to national publicity giving the game website, the final data set included an unknown number of non-college adults. With limited demographic information there was no way to specify the exact subject sample other than by gender and age and thus generalizing to all adults is not possible. Given, however, that the average participant age was 24, and the fact that the third quartile included participants up to 25 years of age, it is likely that the results would generalize to a younger population of members of the Net Generation or perhaps the iGeneration (Rosen, 2007, 2010).

Additionally, the study methodology, which provided the names and photos of those missed at the end of each game, likely provided an overestimate of the success rate in naming friends due to repeated games drawing photos from the same friends pool. To counter this potential limitation, players were divided into quartiles based on game plays and that variable was used as a covariate in the multivariate analyses. However, despite this redundancy, participants who played the game the most often—those in the top quartile of game plays—were only able to name approximately 2% more than those who were in the lowest quartile of game plays making it unlikely that the results were due to additional exposure.

4.3. Conclusions

In sum, this study used a novel methodology to assess how well a Facebook user knows that names of his or her Facebook friends.

Using data from the user's actual page, as opposed to other survey studies that rely on user responses to determine Facebook use and knowledge, it appears that Facebook users only know a little more than two-thirds of the names of their Facebook friends, even after being told the names of those they could not identify and being allowed to try the naming game multiple times. However, even after playing as many times as they wanted (a median of 4 times and a mean of 10.53 times) the best they could do was to successfully name three in four of their Facebook friends. From the multivariate analyses it appears that the major determinants in correctly naming a Facebook friend rely on a combination of the gender of the participant and the gender of the friend with male participants remembering more male names and female participants remembering more female names. This suggests that for this group of mostly young adults their social capital comes more from same-gender friends.

Author note

Charles Croom and Bay Gross performed this research while undergraduate students at Yale University under the guidance of Brad Rosen.

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