

This article is downloaded from



CRO CSU Research Output
Showcasing CSU Research

<http://researchoutput.csu.edu.au>

It is the paper published as:

Author(s): Al-Saggaf, Y.M. ; Nielsen, S.G.

Title: Self-disclosure on Facebook among female users and its relationship to feelings of loneliness

Journal: Computers in Human Behavior

ISSN: 1873-7692

Year: 2014

Pages: 460 - 468

Volume: 36

Issue:

Abstract: The purpose of this study is to determine if there is a relationship between loneliness and self-disclosure in social networking sites (i.e., Facebook). The study collected data from six hundred and sixteen (616) female Facebook users whose profiles were publicly available online. Out of these 616 Facebook users, half (308) were categorised as 'connected' and the remaining 308 users were categorised as 'lonely'; based on clearly stating this feeling in their latest wall posting. Data for each at ...

URLs:

FT: <http://dx.doi.org/10.1016/j.chb.2014.04.014>

PL: http://primo.unilinc.edu.au/primo_library/libweb/action/dlDisplay.do?vid=CSU2&docId=dtl_csu69534

Self-disclosure on Facebook among female users and its relationship to feelings of loneliness

Yeslam Al-Saggaf

School of Computing and Mathematics, Charles Sturt University, Locked Bag 588, Boorooma Street, Wagga Wagga, NSW 2678, Australia

Sharon Nielsen

School of Computing and Mathematics, Charles Sturt University, Locked Bag 588, Boorooma Street, Wagga Wagga, NSW 2678, Australia

1. Introduction

To say that Social Networking Sites (SNSs), such as Keek, Twitter, Instagram, and LinkedIn are a mainstream phenomena is to state the obvious. The latest global rankings of the top 500 sites by Alexa (2014) ranks Facebook as second from the top (in terms of the total number of page views), followed by YouTube in third place, LinkedIn in eighth and Twitter in eleventh place. Of the two billion (2,405,518,376) world internet citizens (Internet World Stats, 2014), more than a billion monthly active users are on Facebook alone (Facebook 2014). This makes Facebook by far the most popular site. The huge popularity that Facebook enjoys is also indicative of the popularity of social networking as an internet activity.

One of the attractive features of social networking is users' ability to share with friends and strangers up to the minute updates of the status of their feelings, thoughts and activities (Jones, Millermaier, Goya-Marthinez, & Schuler, 2008; Valenzuela, Park, & Kee, 2009). However, revealing too much personal information in SNSs due to a desire to engage in self-disclosure can be problematic for SNSs users because of the risks associated with this revelation of personal information, such as identity theft, cyber-stalking, and cyber-bullying to name a few (Gross & Acquisti, 2005; Nosko Wood, & Molema, 2010). The literature suggests that, on one hand, participants are more than ever concerned about their privacy (boyd & Ellison, 2007; Jones et al., 2008; Young, 2009; Al-Saggaf, 2011), on the other hand, self-disclosure is widespread on SNSs (Jones et al., 2008; Valenzuela et al., 2009) and users are finding it difficult to stop themselves from disclosing their personal information (Edwards & Brown, 2009).

There are several reasons for engaging in self-disclosure in SNSs. Self-disclosure could be due to lack of oral and non-verbal cues or lack of public self-awareness online or the presence of trust between online communicators (see section 2.1 below for more details on these). It could also be due to reduced interpersonal cues or self monitoring. A question, however, arises: could feelings of loneliness be another reason for self-disclosure in SNSs? With the exception of Bonetti, Campbell and Gilmore's (2010) study that suggested that the anonymity of the internet may motivate 'lonely' people to disclose intimate information online, research on the relationship between loneliness and self-disclosure online is scarce. There is also a paucity of research on loneliness in the context of SNSs. This is not to say that loneliness and self-disclosure have not been studied before; they have been studied extensively in the literature, albeit separately. This article seeks to address this imbalance in the literature by focusing on the relationship between these two in the context of SNSs.

The purpose of this study is to determine if there is a relationship between loneliness and self-disclosure in the context of SNSs. The article is organised as follows. First, relevant work to self-disclosure and loneliness in the context of SNSs is reviewed. Second, the methodological aspects of the empirical study are explained in detail, while the results are dealt with next. Third, a brief summary of the results and a discussion about the implications of self-disclosure on SNSs users' wellbeing are offered. Finally, the article discusses the limitations and future research directions.

2. Relevant work to self-disclosure and loneliness in the context of SNSs

2.1 What are the reasons for self-disclosure on SNSs?

SNSs provide enormous opportunity for users to disclose all manner of personal data. The computer-mediated nature of interaction in SNSs facilitates higher levels of sociability and willingness to self-disclose compared to non-computer-mediated social interaction (Tidwell & Walther, 2002). Studies have even revealed that, because of the unthreatening nature of computed-mediated social networking, SNSs enable self-disclosure from individuals who would not normally disclose personal information in face-to-face interactions (Forest & Wood, 2012).

According to online community researchers (see for example: Dyson, 1998; Horn, 1998; Kollock & Smith, 1999; Markham, 1998; Rheingold, 2000), the main reasons for the prevalence of self-disclosure on the internet are the lack of oral and non-verbal cues and the lack of public self-awareness. Lack of oral and non-verbal cues and the lack of public self-awareness cause abandonment of social inhibitions and detachments from social conventions. These factors, in turn, lead online communicators to disclose private information about themselves (Rafaeli & Sudweeks, 1997; Joinson, 1998; Wallace, 1999; Mar, 2000; Preece, 2000; Barnes, 2001). Self-disclosure is also associated with the level of trust between communicators (Valenzuela et al., 2009). If communicators trust each other, and perceive their friendships to be strong they will reveal more about themselves. This suggests that self-disclosure is important for personal relationships (Wallace, 1999; Preece, 2000; Rheingold, 2000; Rifkin, 2000) which is consistent with what other researchers have found in that the more familiar individuals become with each other on the internet, the more likely they will reveal private information to each other (Horn, 1998; Markham, 1998; Barnes, 2001).

2.2 Who is likely to disclose information on SNSs?

The majority of studies conducted on what kinds of users disclose information in SNSs, like Facebook, have exploited university students and young adults as their primary sample. This demographic bias is not without warrant, as young adults between the ages of 18-24 represent the largest cohort of SNSs users (Hoy & Milne, 2010), thus making this group the most effective in determining disclosure and privacy behaviour of SNSs users.

In one of the first studies of information disclosure patterns in SNSs, Gross and Acquisti (2005), found that within their sample of over 4,000 university students who used SNSs many users disclosed accurate personal information on their SNSs profiles with seemingly little concern over the negative ways their information might be accessed or how it might be used. This early study of the disconnection between students' disclosure and privacy behaviours highlighted the need for increased awareness of how information disclosure on SNSs, particularly among younger adult users, can lead to violation of one's privacy.

As SNSs, in particular Facebook, have rapidly grown in popularity, people of all age groups are being encouraged to participate in online social networking, not just teenagers and young adults. Although younger users report disclosing more information on Facebook than older adult users, a distribution that can be explained by the fact that younger users report greater time spent on Facebook, adolescents and adults share in common many factors that predict information disclosure and control (Christofides, Muise, & Desmarais, 2012a).

Having established a comprehensive checklist of all the types of information that can be disclosed on Facebook, Nosko et al. (2010) drew some general conclusions from the 400 Facebook profiles they studied, the first of which was that Facebook users demonstrated a level of discretion in regards to allowing their profile information to be viewable by other users, with, on average, approximately 25% of possible information made publically visible for other users. Users, in general, also showed a level of discretion in regards to what kinds of personal information they were willing to disclose on Facebook. The current study extends this work by utilising the scale. However the current study is unique in that it will look specifically at the relationship between loneliness and self-disclosure, examining the types of information that people who feel lonely reveal on SNSs.

2.3 What is the relationship between privacy awareness and disclosure behaviour among SNSs users?

Despite the ease in which disclosure of information can take place by users of various ages, backgrounds, and personalities in SNSs, it has been recognised that often accompanying the strong desire to self-disclose on SNSs is the competing desire for privacy, i.e. to have control over one's personal information. This conflict between the desire to disclose in SNSs and the fear of privacy violation has been receiving increasing attention in the literature (Livingstone 2008; Christofides, Muise, & Desmarais, 2009; Krasnova, Spiekermann, Koroleva, & Hildebrand, 2010; Shin, Ko, & Jang, 2011; Stutzman, Capra, & Thompson, 2011).

Some research has attempted to assess the balance that SNSs users maintain between the opposing needs for privacy control and the desire to disclose personal information and how this affects privacy enhancing behaviours (Gross & Acquisti, 2005; Joinson, Reips, Buchanan, & Paine Schofield, 2010; Shin et al., 2011). Other research concluded that greater concern over privacy issues does not always influence users' attitudes towards self-disclosure in online social networking (Joinson et al., 2010). For example, some young people value engaging in self-disclosure because disclosure plays a role in the construction and maintenance of their identities, which is a central element of participation in SNSs (boyd, 2007). Control of personal information plays a large role in self-presentation experiments, especially of young adults, conducted online (Valkenburg, Schouten, & Peter, 2005). SNSs allow younger users to go through a social process of 'self-actualisation' through the self-disclosure that takes place in SNSs, a place where they can feel relatively safe to present themselves however they choose (Livingstone, 2008).

Yet, other research suggests that concerns over privacy do influence users' motives to disclose personal information on SNSs. The benefits SNSs users derive from disclosure are often cancelled out by concerns over privacy risks which acted as a barrier to information disclosure (Krasnova et al., 2010). Privacy consumption behaviours (such as reading the privacy policy of an SNS) were also found to be a factor influencing disclosure behaviour on SNSs like Facebook (Stutzman et al., 2011). This suggests that SNSs could help alleviate some concern over disclosure of personal information by offering more transparent privacy policies and privacy controls. The amount of violations of informational privacy on SNSs can also be reduced by raising user's awareness of integrated privacy measures in SNSs, like Facebook, as a way to regulate user information revelation (Young & Quan-Hasse, 2009).

However, sometimes awareness of privacy practices does little to influence disclosure behaviour among SNSs users. Christofides et al. (2009) conducted a study of over 340 undergraduate students who were active Facebook users, and found that information disclosure and information control were not negatively correlated but that disclosure and control practices on Facebook were separate processes and depended largely on particular aspects of the individual users' personality. Privacy practices of SNSs users can often simply depend on the practices of people

the user knows. For example, Lewis, Kaufman and Christakis (2008) found that students were more likely to have a private profile if their friends and roommates had one.

2.4 What does the literature say about loneliness and use of SNSs?

The relationship between loneliness and use of SNSs is not straight forward. There has been some evidence that lonely people use the internet for emotional support more than people who are less lonely (Morahan-Martin & Schumacher, 2003); and that internet use even decreases loneliness for isolated or handicapped individuals (Fokkema & Knipscheer, 2007). These findings align with the common perception that the anonymity and non-threatening nature of online environments, such as SNSs, encourage self-disclosure among individuals who would not normally disclose personal information in face-to-face interactions (Forest & Wood, 2012). Other studies have confirmed that greater SNSs and internet usage are positively correlated with decreased loneliness and a perceived increase in social capital and social well-being (Shaw & Grant, 2002; Burke, Marlow, & Lento, 2010).

In an investigation of how personality traits, such as loneliness, influenced the use or non-use of Facebook, Ryan and Xenos (2011) discovered that Facebook users tended to be lonelier than non-users, but more extraverted and narcissistic when it came to their actual Facebook use. Similar indications about the lonely and their social networking behaviour were earlier noted by Leung (2002), whose study suggested that lonely people who use online social outlets tended to be more negative and less honest in the quality of their self-disclosure online than those less lonely. Moreover, the findings of Qiu, Lin, Leung and Toy (2012) confirmed that when it comes to emotional disclosure on Facebook, SNSs users overwhelmingly tended to present a more positive emotional 'face', by expressing more positive over negative emotions within the SNSs environment than might be true in real life.

The results of a study on increased posting and updating of profiles on Facebook, from a sample of Facebook users, revealed that an increase in frequency of status updating led to decreased loneliness and that the positive effect on loneliness derived from increased posting activity was, in fact, independent of direct social feedback from friends. This means that it was a perceived

psychological effect, rather than an actual reduction in loneliness in the form of increased responses from friends, that was at work (Deters & Mehl, 2012). Deters and Mehl explained that it was more the feeling of being more connected to others through increased SNSs use that contributed to decreased loneliness for the sample of Facebook users participating in their study.

In a similar vein to the Deters and Mehl study, a study by Grieve, Indian, Witteveen, Tolan and Marrington (2013) revealed that, while loneliness and other negative states, such as depression and anxiety, are ameliorated — that is, transformed into online ‘connectedness’ — through increased social use of Facebook, ‘offline’ social connectedness was something distinct and separate from online connectedness (Grieve et al., 2013). This again suggests that there is a separation between the perceived impact of SNSs use on loneliness and the reality of the lives of lonely SNSs users.

Based on the results of a number (albeit limited) of studies above, one might conclude that: (1) the lonely exhibit a greater predilection for SNSs use; (2) that their usage is perhaps less honest (to the user themselves and to other users, i.e. online friends), or reflective of reality, than that of less heavy SNSs users; and (3) that the benefit to social capital (increased sociability, connectedness, etc) that the lonely derive from SNSs use can sometimes be merely perceived (by the lonely SNSs user) as an apparent increase in their social well-being and connectedness, rather than actually increasing their connectedness and social capital.

2.5 What kinds of information do lonely users disclose on SNSs?

With respect to the kinds of information that lonely users disclose on SNSs, according to Burke et al. (2010), active social networking use (such as posting messages, status updating, private messaging, etc) can have a beneficial effect on loneliness, whereas passive social networking use (merely viewing photos, reading the conversations of others, etc) can have, on the contrary, a negative effect on loneliness. Thus, there is indication that the kind of SNSs use can have an impact on the lonely SNSs user.

The study by Forest and Wood (2012) on the kinds of self-disclosure made by users with low self-esteem on Facebook, revealed that disclosures were more likely to be of the emotional kind, e.g. their thoughts and feelings, and these tended to be more negative emotional disclosures rather than positive ones; something which in turn tended to elicit critical responses from other SNS users. Lee, Noh and Koo (2013) also indicate in the results of their study, that lonely people on Facebook exhibited a greater desire to disclose their feelings and mood, their status information, etc, and to have their online friends react to these disclosures.

Another study by Bonetti et al. (2010) has also found that those individuals who identified themselves as 'lonely' felt more comfortable disclosing personal information, including information about their own past, their current relationships and even intimate matters, than another group they studied (socially anxious individuals). Though perhaps not just indicative of the kinds of information that lonely people disclose in SNSs but also of many socially adept SNSs users as well, the above findings do suggest that the kind of information disclosed by lonely people in SNSs, i.e. largely emotional disclosures, is an indication of the continued lack of social skills exhibited by those who are lonely even in the context of non-face-to-face interaction, like SNSs.

This section reviewed the literature regarding the motivations for self-disclosure on SNSs, the kinds of users who disclose information in SNSs, loneliness and participation in SNSs and the kinds of information that lonely users disclose on SNSs. The next section details the methodological aspects of the empirical study.

3. Method

3.1 Sample

Prior to data collection, ethical approval for the current research study was obtained from Charles Sturt University's Human Research Ethics Committee. Using the search engine provided by the <http://youopenbook.org> site, two coders entered one keyword each ('lonely' and 'connected'), which were matched to the status description of all publicly available Facebook

profiles (youropenbook.org, 2012). The site was a specialised search engine that allowed all publicly available Facebook profiles to be accessed depending on a search criterion. Any profile status matching any of these keywords was returned to the researchers. Using this information the data in this study was collected. All records were for users who indicated in their Facebook profiles that they were females over the age of 18. However, the coders analysed only the first 308 Facebook profiles returned from the search for each status (i.e. the first 308 profiles for those who indicated in their status they were feeling ‘lonely’ and the first 308 profiles for those who indicated in their status they were feeling ‘connected’). This was done to ensure that an equal number of records for both of these groups was obtained. It is worth noting that the findings of this study are also applicable to male Facebook users and any two opposing characteristics, such as ‘bored’ and ‘excited’, could have been used to gather the data. The reason the data collection and analysis focussed only on females and the notions of connectedness and loneliness is because gender was not an important factor for distinguishing who would or would not likely disclose information (Nosko et al. 2010). Another reason is because this study was part of a larger project that aimed at examining the threats of data mining to the privacy of SNSs’ users. In total, data were collected from 616 Facebook accounts which were retrievable via youropenbook.org (youropenbook.org, 2012) at the time of data collection.

3.2 Procedure

After a blank Facebook profile was studied to decide on the pieces of information to be included in the content analysis (Nosko et al., 2010), a total of 45 items were inserted in an Excel spreadsheet (in the columns) representing the pieces of information to be gathered from the selected public profiles and recorded in the spreadsheet. Two coders then independently performed content analysis by opening the selected public profiles from within their Facebook accounts and recording the information and the outcome of their analysis in the spreadsheet. Other than the status description and the fields of age, ‘about’, gender, city, relationship status, number of friends, likes and photos and interests, all other fields only recorded the presence or absence of information. That is, only P (present), later given the value of 1, or A (absent), later given the value of 0, under the information cited was recorded. No specific information other than what is mentioned in Table 1 i.e. age and gender was recorded. While the first coder

analysed the ‘lonely’ profiles, the second coder analysed the ‘connected’ profiles. The 308 female Facebook users were categorised as ‘connected’ based on clearly indicating this feeling in their latest wall posting at the time of data collection, such as one female who said “just had to share this message from Amber. We have never met, yet in a way I feel very ‘connected’ to you”. Conversely, the remaining 308 users were categorised as ‘lonely’ based also on clearly indicating this feeling in their latest wall posting at the time of data collection. For example, one female said “Such a boring evening..I’m so ‘lonely’ ...:-(”. To limit subjectivity in the analysis, reliability was conducted on 62 profiles (31 profiles from the ‘lonely’ group and a further 31 profiles from the ‘connected’ group), representing 10% of the sample. Percent Agreement of 95.2% (N Agreements = 59) was recorded and a Cohen's Kappa score of 0.903 was returned indicating high inter-coder reliability. Disagreement between coders was resolved through discussion until a consensus was reached.

Table 1. Information collected from 616 individual Facebook profiles

Category	Attributes within category	Mean	Std. Deviation
Personal Information	Activities, people who inspire you, Favourite Quotation, music, books, Movies, TV, games, Favourite Sports, Favourite Teams, Favourite Athletes, About, Language	2.49	2.705
Relationship Information	Relationship Status, Interested In, Show my sex in my profile	1.95	0.917
Address	Hometown, lives in city, lives in country	1.77	1.305
Views	Political views, Religion	1.03	0.725
Wall	TimeLine	0.57	0.725
Photo and Update Information	Photos, Friends, Network, Likes, Family on FB	2.85	1.028
Education Information	High School, year Graduated from HS, University/ College, Year Graduated from Uni	1.68	1.430
Image/Album	Profile image, Albums	1.82	0.413

Date of Birth	Birthday Month, Birthday Month and Year	0.17	0.528
Messaging	Pokes, Email	0.05	0.208
Works At	Works At	0.05	0.498

The attributes described in Table 1 list the pieces of information that were collected from the individual Facebook profiles. The pieces of information were grouped in accordance with the classification developed by Nosko et al. (2010) of the Facebook attributes, specifically in line with their third study. Table 1 above depicts the grouping of attributes followed in this study with the minor change from Nosko et al. (2010) where the attributes were no longer available on Facebook and where additional but similar attributes were introduced.

3.3 Statistical Analysis

The purpose of this study was to determine if there is a relationship between loneliness and self-disclosure among female Facebook users. The amount of information being revealed on different aspects of a person's life (i.e the Facebook attributes) can provide a measure of self-disclosure.

The data for each Facebook profile attribute was recorded as a binomial outcome (Present (1)/Absent (0)). Attributes were grouped together according to Nosko et al. (2010) categories by totalling these values (0/1) within a particular category. Table 1 above depicts these categories. Two of the categories contained only one attribute, therefore the data can be considered to be derived from a binomial distribution. All the other categories can be considered to have data relating to the Poisson distribution, which is often related to count data.

It is appropriate to analyse both binomial and Poisson data using a generalised linear model. The analysis was conducted in SPSS (SPSS Statistics, 2014) with the only independent variable being loneliness and the categories were considered to be the various dependent variables. The model used for the analysis can be symbolically written as:

dependent variable (eg. Date of Birth) ~ loneliness

It is a requirement of this analysis that there is a constant relationship between the mean and the variance (equidispersion). In all cases this requirement was verified.

Having explained our sample, the technique we used to collect data and prepare the data for analysis and the procedures we followed to code the data and develop the categories and also the statistical tools we used to analyse the relationship between the independent and dependent variables, we now proceed to presenting the results of our study.

4. Results

A Poisson generalised linear model was used to analyse Personal Information, Relationship Information, Address and Views. In addition, a binomial generalised linear model was used to analyse Wall. All other dependent variables (i.e. Photo and Update Information, Education Information, Image/Album, Date of Birth, Messaging and Works At) showed no evidence of a relationship with loneliness ($p > 0.05$). See Table 1 above for information on these dependent variables. Table 2 below shows a summary of the results of the statistical analysis.

Table 2. A summary of the results from the statistical analysis (Residual df =614).

Dependent variable	Model used	Chi-Square	P Value
Personal Information	Poisson	53.160	< 0.001
Relationship Information	Poisson	25.276	< 0.001
Address	Poisson	2.775	0.096
Views	Poisson	5.308	0.021
Wall	Binomial	18.397	< 0.001
Photo and Update Information	Poisson	0.036	Not Significant
Education Information	Poisson	0.117	Not Significant
Image/Album	Poisson	0.258	Not Significant
Date of Birth	Poisson	2.397	Not Significant
Messaging	Binomial	2.330	Not Significant
Works At	Binomial	0.164	Not Significant

4.1 Personal Information and Loneliness

The results of this study have shown that there was evidence of a significant relationship between Personal Information and Loneliness ($p < 0.001$). While 79.54% (N = 245) of 'lonely' people disclosed Personal Information, only 64.61% (N = 199) of 'connected' people disclosed Personal Information (see Fig. 1). Moreover, only 20.45% (N = 63) of 'lonely' people did not reveal any Personal Information, compared to 35.38% (N = 109) of 'connected' people. See Table 3 for more details. This indicates that more people who felt 'lonely' disclosed Personal Information than people who felt 'connected' and fewer people who felt 'lonely' did not reveal any Personal Information compared to those who felt 'connected'. See Table 4 for the means for the 'lonely' and 'connected' groups for Personal Information.

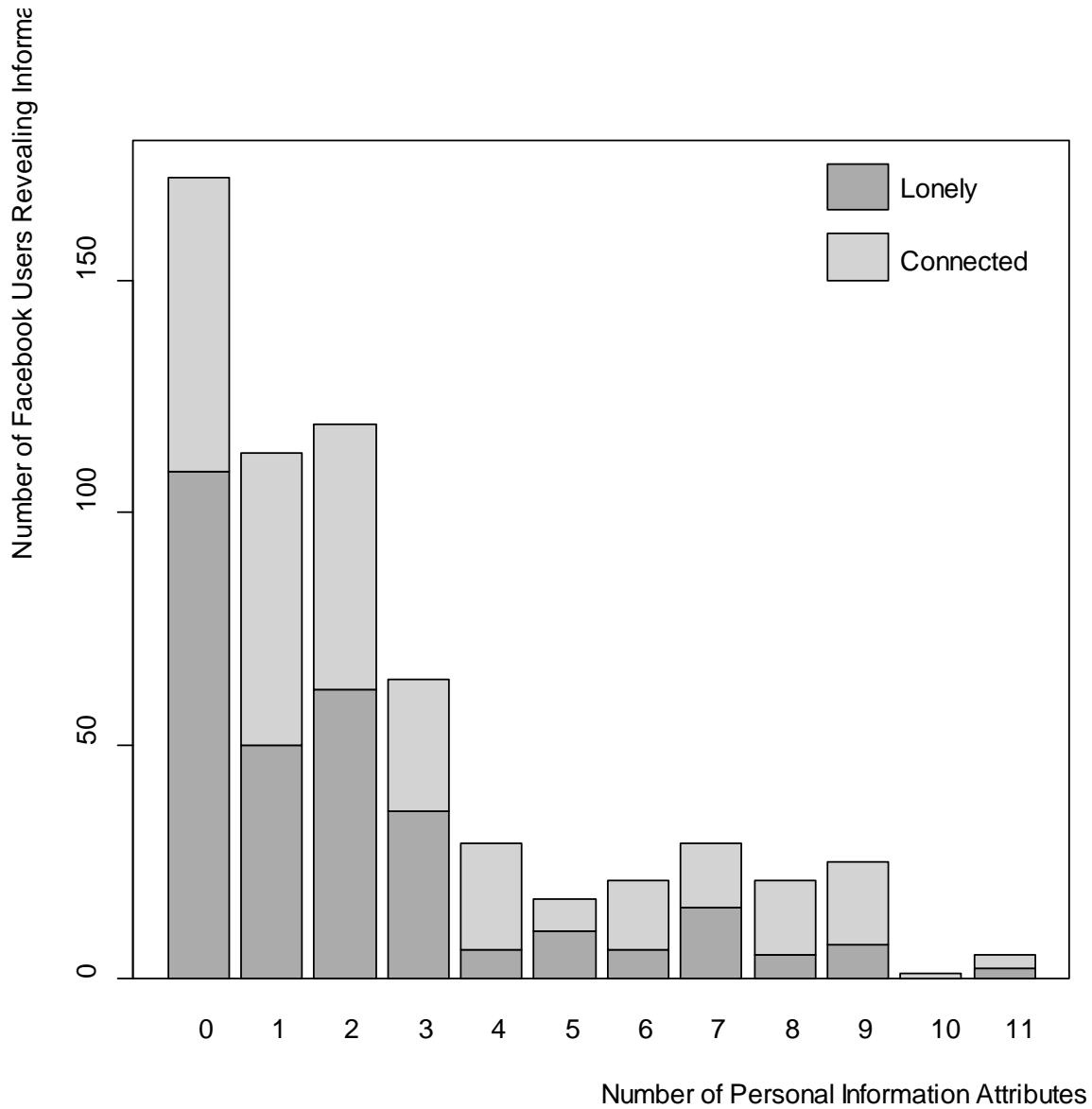


Fig. 1. The total number of Personal Information attributes revealed on Facebook.

Table 3. Personal Information (0 = no information revealed, 11 = all attributes with information)

The total number of Personal Information attributes revealed on Facebook	0	1	2	3	4	5	6	7	8	9	10	11
Total number of 'connected' people revealing information	109	50	62	36	6	10	6	15	5	7	0	2

Total number of 'lonely' people revealing information	63	63	57	28	23	7	15	14	16	18	1	3
---	----	----	----	----	----	---	----	----	----	----	---	---

Table 4. The means for 'lonely' and 'connected' for the significant dependent variables.

Dependent variables	Mean (Standard Error)	
	Connected	Lonely
Personal Information	2.02 (0.08)	2.95 (0.10)
Address	1.68 (0.07)	1.86 (0.08)
Relationship	1.67 (0.07)	2.24 (0.09)
Views	1.12 (0.06)	0.93 (0.06)
Wall	0.66 (0.05)	0.48 (0.04)

4.2 Relationship Information and Loneliness

The results of this study have also shown that there was also evidence of a significant relationship between Relationship Information and Loneliness ($p < 0.001$). While 97.72% (N = 301) of 'lonely' people disclosed Relationship Information, 93.5% (N=288) of 'connected' people disclosed Relationship Information (see Fig. 2). Moreover, only 2.27% (N = 7) of 'lonely' people did not reveal any Relationship Information, compared to 6.49% (N = 20) of the 'connected' people. See Table 5 for more details. This indicates that more people who felt 'lonely' disclosed their Relationship Information than people who felt 'connected' and fewer people who felt 'lonely' did not disclose their Relationship Information than those who felt 'connected'. See Table 4 for the means for the 'lonely' and 'connected' groups for Relationship Information.

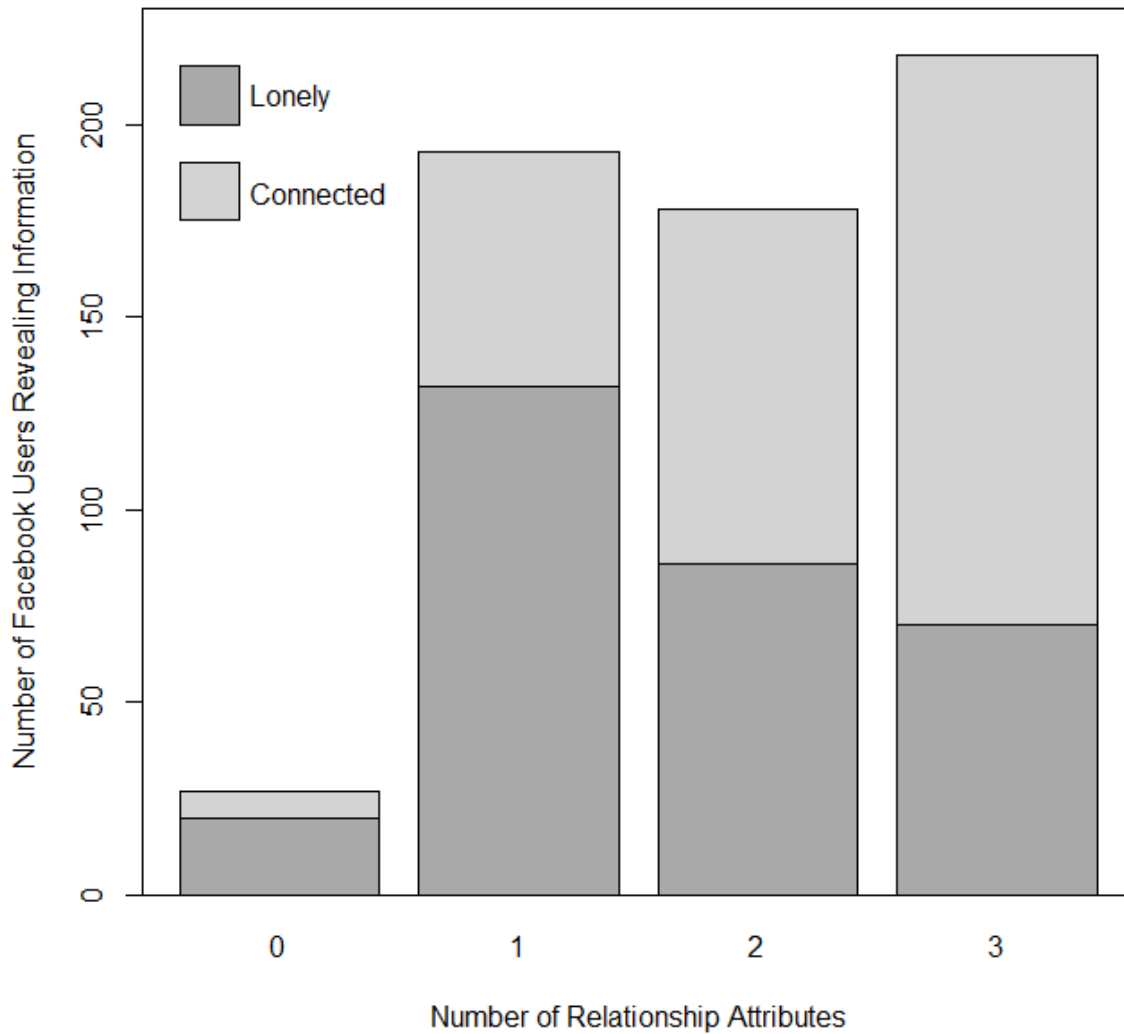


Fig. 2. The total number of Relationship Information attributes revealed on Facebook.

Table 5. Relationship Information (0 = no information revealed, 3 = all attributes with information)

The total number of Relationship Information attributes revealed on Facebook	0	1	2	3
Total number of 'connected'	20	132	86	70

people revealing information				
Total number of 'lonely'	7	61	92	148
people revealing information				

4.3 Views and Loneliness

The findings of the study have also indicated that there was evidence of a slightly weaker (but significant) relationship between Views and Loneliness ($p = 0.021$). While only 70.12% (N = 216) of 'lonely' people disclosed their Views, 79.87% (N = 246) of 'connected' people disclosed their Views (see Fig. 3). Moreover, 29.87% (N = 92) of 'lonely' people did not reveal any Views compared to only 20.12% (N = 62) of 'connected' people who did not reveal any Views. See Table 6 for more details. This indicates that more people who felt 'connected' disclosed their Views than people who felt 'lonely' and fewer people who felt 'connected' did not disclose their Views than those who felt 'lonely'. See Table 4 for the means for the 'lonely' and 'connected' groups for Views.

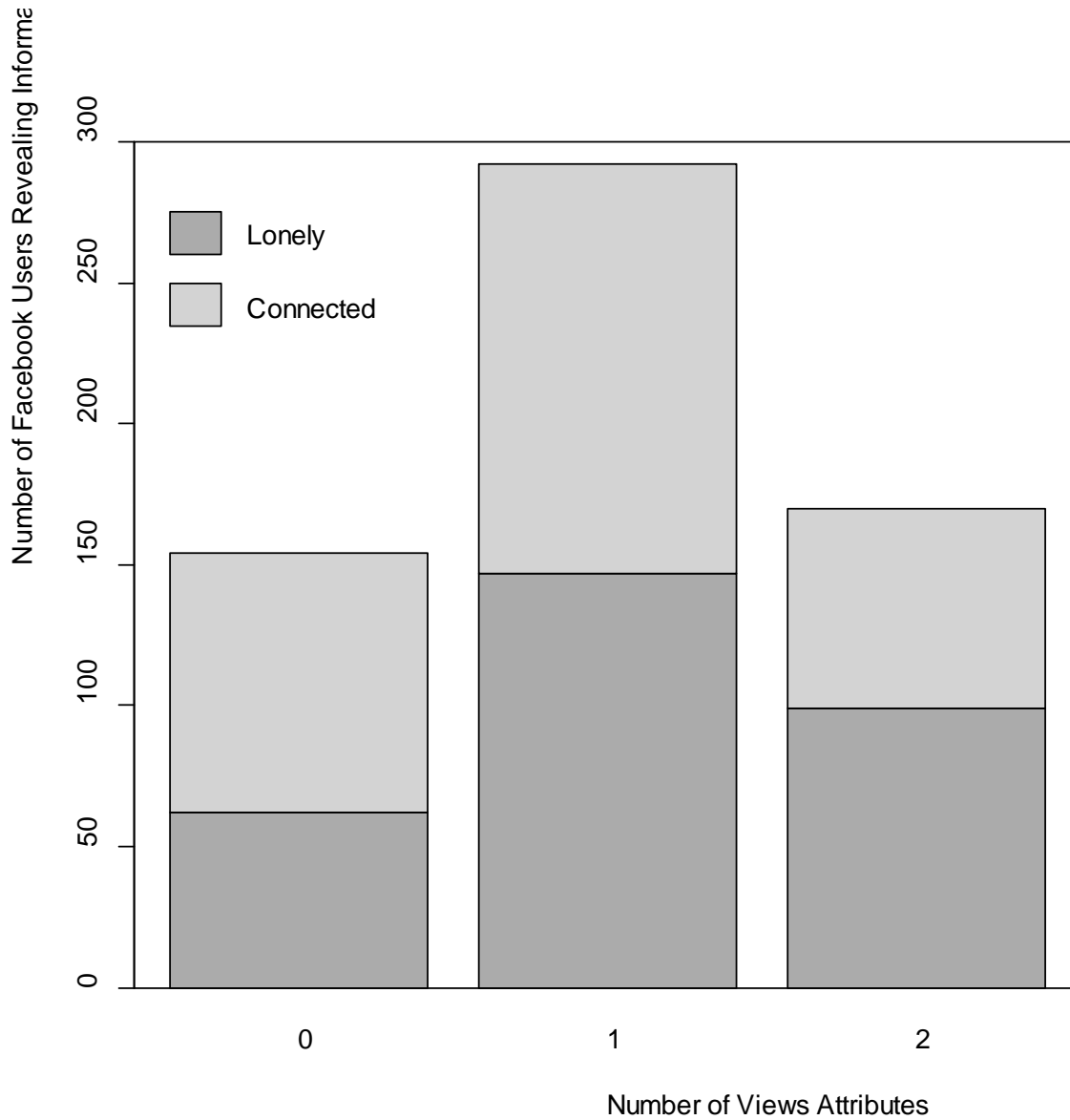


Fig. 3. The total number of Views attributes revealed on Facebook.

Table 6. Views (0 = no information revealed, 2 = all attributes with information)

The total number of Views attributes revealed on Facebook	0	1	2
Total number of 'connected' people revealing information	62	147	99
Total number of 'lonely'	92	145	71

4.4 Address and Loneliness

There was some evidence of a weak relationship, significant at the 10% level, between Address and Loneliness ($p = 0.096$). Whereas 72.72% ($N = 224$) of 'lonely' people disclosed their Address, 65.91% ($N = 203$) of 'connected' people disclosed their Address (see Fig. 4).

Moreover, 27.27% ($N = 84$) of 'lonely' people did not reveal their Address, compared to 34.09% ($N = 105$) of 'connected' people who did not reveal any Address. See Table 7 for more details.

This indicates that more people who felt 'lonely' disclosed their Address than people who felt 'connected' and more people who felt 'connected' did not disclose their Address than those who felt 'lonely'. See Table 4 for the means of the 'lonely' and 'connected' groups for Address.

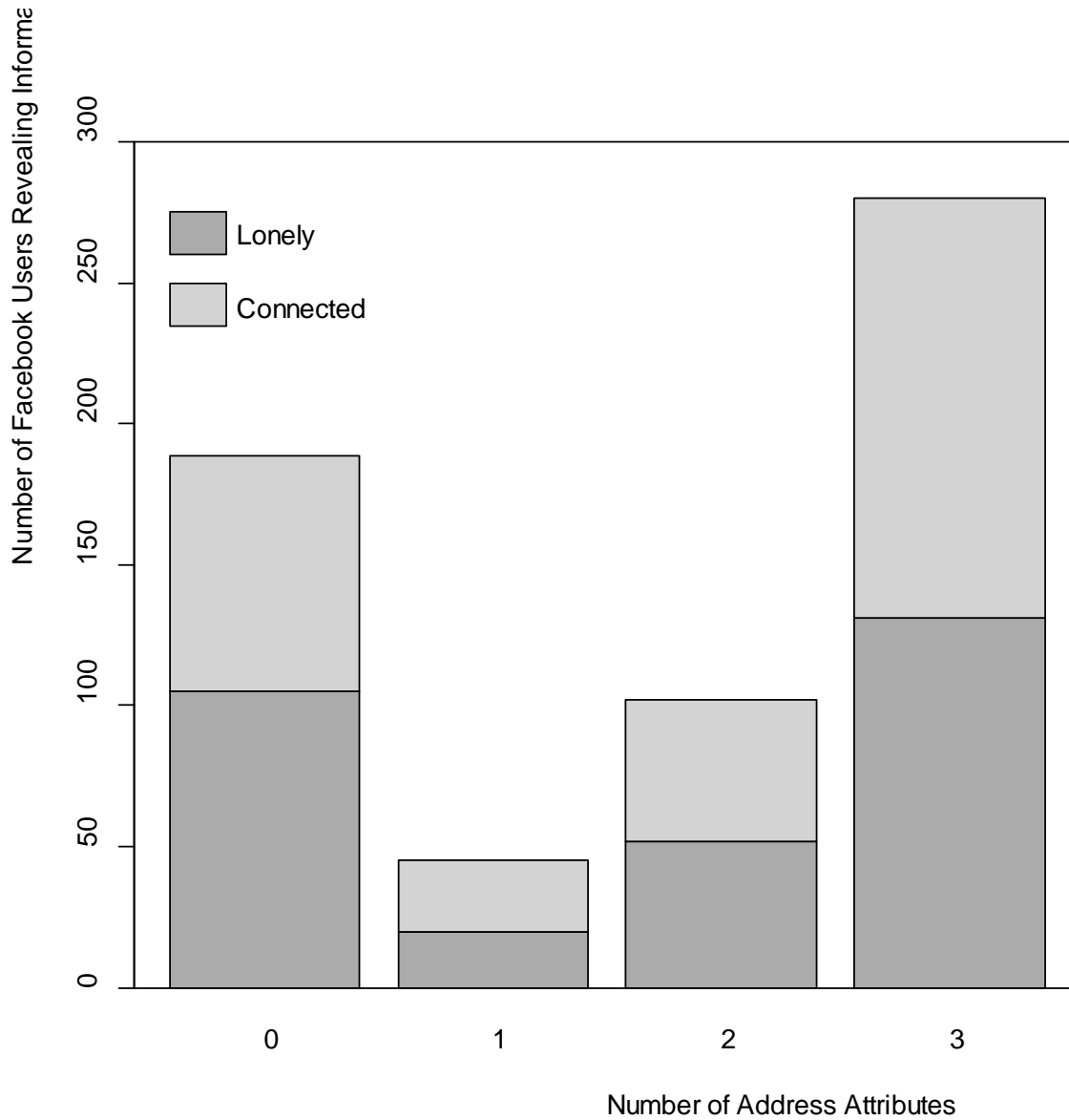


Fig. 4. The total number of Address attributes revealed on Facebook.

Table 7. Address (0 = no information revealed, 3 = all attributes with information)

The total number of Address attributes revealed on Facebook	0	1	2	3
Total number of 'connected' people revealing information	105	20	52	131
Total number of 'lonely'	84	25	50	149

4.5 Wall and Loneliness

Finally, the study results have shown that there was evidence of a significant relationship between Wall and Loneliness ($p < 0.001$). Whereas 48.38% (N = 149) of 'lonely' people disclosed their Wall, 65.58% (N = 202) of 'connected' people disclosed their Wall (see Fig. 5). Moreover, 51.62% (N = 159) of 'lonely' people did not reveal their Wall compared to only 34.41% (N = 106) of 'connected' people.. See Table 8 for more details. This indicates that more people who felt 'connected' disclosed their Wall than people who felt 'lonely' and fewer people who felt 'connected' did not disclose their Wall than those who felt 'lonely'. See Table 4 for the means of the 'lonely' and 'connected' groups for Wall.

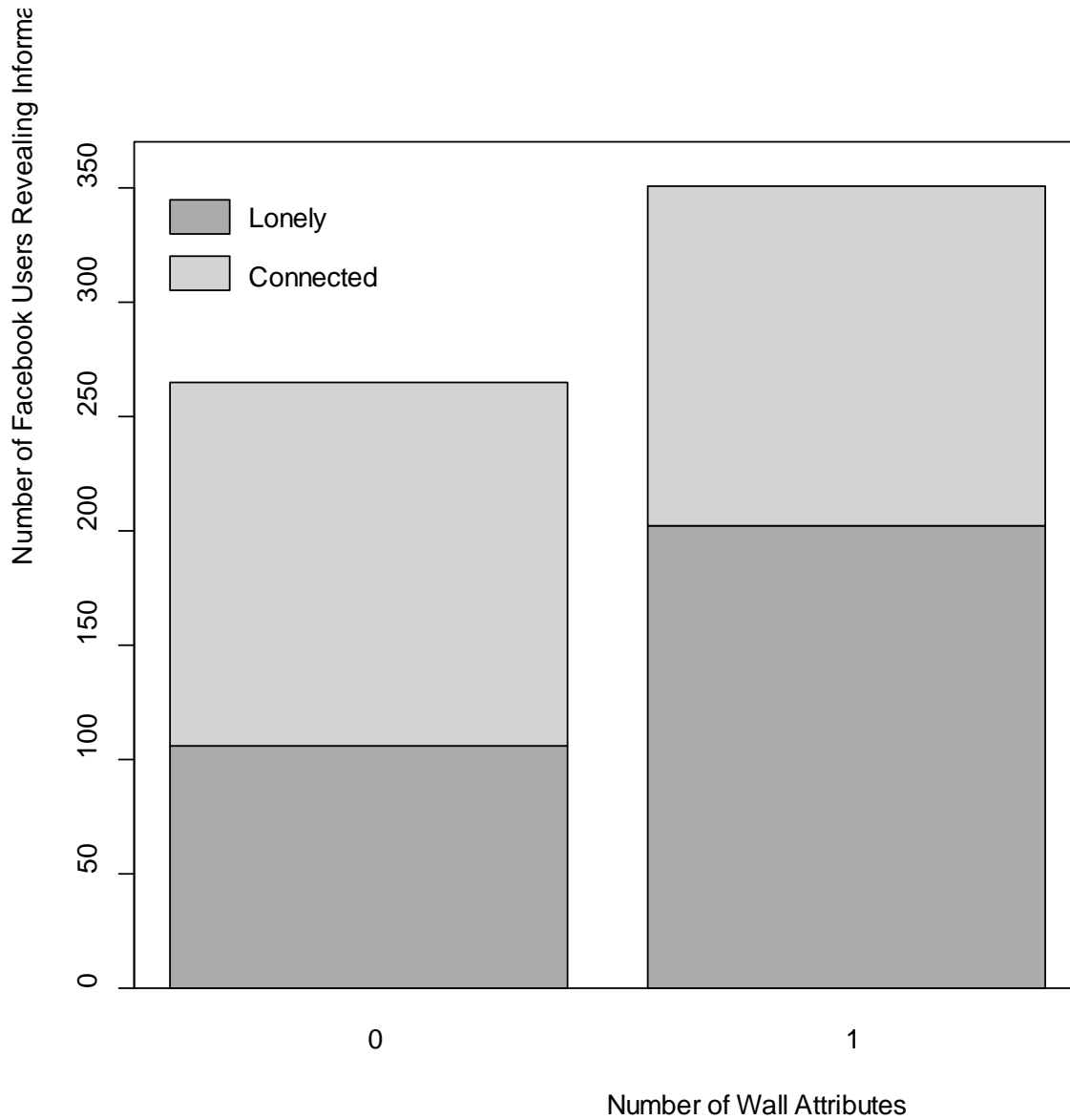


Fig. 5. The total number of Wall attributes revealed on Facebook.

Table 8. Wall (0 = no information revealed, 1 = attribute with information)

The total number of Wall attributes revealed on Facebook	0	1
Total number of 'connected' people revealing information	106	202
Total number of 'lonely'	159	149

Having presented the results of our study in this section, in the next section we provide a brief summary of these results and offer a discussion about the implications of self-disclosure on SNSs users' wellbeing.

5. Discussion

The results of this study have shown that more people who felt 'lonely' in Facebook, at the time this study was conducted, disclosed Personal Information (i.e. Favourite Quotation, Favourite Sports, Favourite Teams, and Favourite Athletes), Relationship Information (i.e. Relationship Status, Interested In, Show my sex in my profile) and Address (i.e. Hometown, lives in city, lives in country) compared to people who felt 'connected'. On the other hand, the results of this study have shown that more people who felt 'connected' disclosed their Views (i.e. Political views, Religion) and their Wall (i.e. Timeline) than people who felt 'lonely'. The study has found no other significant associations between loneliness and the other variables.

The hypothesis for this study was that more people who felt 'lonely' in Facebook would disclose all types of information on Facebook. The results of the current study supported this hypothesis in the case of Personal Information, Relationship Information and Address (for the specific types of information they disclosed under these categories see Table 1 above), but not in the case of Views and their Wall. Additionally, this trend was not observed in the case of other categories (i.e. Photo and Update Information, Education Information, Image/Album, Date of Birth, Messaging and Works At).

It makes sense that people who felt lonely would disclose Personal Information, Relationship Information and Address. They choose to disclose information about themselves that encourages others to approach them since they want to make it easy for others to initiate contact with them, which if others did, may help them overcome their feelings of loneliness. Interestingly, Nosko et al. (2010) found that individuals more likely to disclose sensitive personal information or information that could potentially expose them to threats are those seeking a relationship through

online social networking. This correlation between willingness to disclose sensitive personal information and the use of SNSs for intimate relationships aligns with the commonsense perception of one of the main uses of SNSs, i.e. online dating, and looking for an intimate relationship.

What is clear is that the revelation of Personal Information, Relationship Information and Address on public SNSs profiles can carry with it the risk of this information being accessed and used by others in ways that can enable criminal activities, ranging from identity theft, cyber stalking, cyber bullying, and activities otherwise harmful to users' personality or property (Gross & Acquisti, 2005; Nosko et al., 2010). SNSs are also an ideal environment for gathering intelligence to enable criminals to commit crimes, especially for selecting a suitable victim (Weir, Toolan, & Smeed, 2011).

Of greater concern is the disclosure of Address information as this study has found that 72.72% of people who felt 'lonely' disclosed their address. This is because coupled with other information, such as Relationship Status and Favourite Movies, which 'lonely' people also tended to disclose, the potential for harm from stalking and harassment, for example, is real and possibly serious. Cyber stalking involves threatening or harassing conduct that may not be overtly violent nor involve physical contact with the victim, such as monitoring the victim online (e.g. through SNSs profiles), gathering personal information, and repeatedly sending messages via email, text messages, or posting on a users' SNSs page. The electronic nature of the harassing behaviour, which is often conducted at great distances from the actual victim, makes the assessment of a 'credible threat' and the prosecution of cyber stalking more problematic for protection agencies compared to traditional, physical modes of stalking (Aldinger, 2008).

The disclosure of Address information coupled with the disclosure of Relationship Information and Personal Information can make cybercrimes, like identity theft and electronic fraud, easier to commit. The perpetrators of these crimes can employ malicious software and other third party applications to gather personal information from SNSs profiles. In regards to identity theft, i.e. when personal information is used in order to commit a crime without the knowledge or consent of the discloser, data such as a users' full name, date of birth, address, and phone number can all

potentially be exploited, in particular when these core personal data provide indirect access to information such as credit card information, tax file number, etc (Nosko et al., 2010).

Personal information gathered from SNSs can also lead to physical harm to a person. For example, access of information on SNSs profiles can enable some kinds of abusive behaviour from sexual predators. For example, the proliferation of images and video and other media through SNSs can incite and facilitate actual physical abuse against minors (Aldinger, 2008). The ability to post images, video, and text messages on SNSs profiles have also enabled cyber bullies to harass and threaten victims, sometimes leading to physical harm to the victim (Aldinger, 2008). There can also be a threat to personal property from information gathered on SNSs. For example, in 2010 a group of thieves in the US allegedly carried out approximately 50 burglaries of private residences after gaining intelligence regarding certain vacant properties from status updates on users' Facebook profiles (Weir et al., 2011).

Such cases of criminal activity enabled by SNSs highlight the responsibility of the discloser to regulate their personal information revelation on publically visible online profiles. Despite the fact that SNSs cultivate certain kinds of criminal behaviour, Weir et al. (2011, p. 38) have suggested that threats such as identity theft and cyber stalking are not inherent to SNSs, rather SNSs act as an "enabler" for "existing, long established and well-recognised exploits and activities".

Disclosure of basic personal information on Facebook profiles can sometimes also lead to other negative experiences, such as embarrassment, social stigma, etc, that do not necessarily involve the criminal use of disclosed information. Given that teenagers and adolescents comprise the majority of the users of Facebook, negative experiences relating to online bullying, unwanted contact, and unintentional disclosure, can corrupt the SNSs experience for a large section of its users, particularly those who exhibit low self-esteem and life satisfaction (Ellison, Steinfield, & Lampe, 2007; Christofides, Muise, & Desmarais, 2012b). However, adolescent users who had a negative experience on Facebook relating to information disclosure were more likely to be aware of the sites' privacy settings and how to use them (Christofides et al., 2012b).

The potential of personal stigmatization from a user's disclosure of their emotional states also exists. Moreno et al. (2011) conducted a study of undergraduates' disclosure of their emotional states on Facebook, focusing in particular on episodes of depression. From the Facebook profiles of over 200 students, both males and females, it was found that SNSs users were more likely to publicly disclose personal episodes of depression when they received reinforcement (in the form of encouraging comments) from other users (Moreno et al., 2011). The authors of the study suggested that the frequency of disclosure of symptoms of depression on Facebook profiles may in turn act as an innovative way of combating the stigma surrounding college students' disclosing feelings of anxiety or depression.

The aim of this study was to explore the relationship between loneliness and self-disclosure among female Facebook users. Self-disclosure was measured by the amount of information a user revealed on Facebook. The results of this study have shown that more people who felt 'lonely' in Facebook disclosed Personal Information, Relationship Information and Address compared to people who felt 'connected'. On the other hand, more people who felt 'connected' disclosed their Views and their Wall than people who felt 'lonely'. The study has found no other significant associations between loneliness and the other variables tested. The next section highlights some of the limitations of the study and avenues for further research.

6. Limitations and future research

A limitation of this study is that the feelings expressed by participants in their Facebook status field were momentarily or temporary. It is possible that soon after data were collected, a particular user may have changed their status. This issue should be kept in mind when reading the results about female Facebook users. That said, a future study may consider examining the level of self-disclosure in SNSs among users who proclaim to be 'lonely' to check whether or not loneliness really encourages the disclosure of Personal Information, Relationship Information, and Address as the results of this study have found. Another limitation of this study is that the data collection and analysis focussed only on females. One reason for this is because gender was not an important factor for distinguishing who would or would not likely disclose information (Nosko et al., 2010). Another reason for this focus was because this study was part of a larger

project whose aim was to examine the threats to the privacy of SNSs' users from the use of data mining. A future study could consider examining if loneliness among male users also encourages the disclosure of Personal Information, Relationship Information, and their Address.

Also, it is not clear why more people who felt 'connected' disclosed their Views and their Wall compared to 'lonely' people and why there is no significant relationship between loneliness and the other categories, such as Photo and Update Information, Education Information, Image/Album, Date of Birth, Messaging and Works At. Further research is needed to shed light on these findings.

References

Al-Saggaf, Y. (2011). Saudi females on Facebook: An Ethnographic Study. *International Journal of Emerging Technologies and Society*, 9(1), 1-19.

Alexa (2014, March 13). *Top Sites*. Retrieved from <http://www.alexa.com/topsites>

Aldinger, S. (2008). Social Networking Sites: How they are used to perpetrate criminal activity and how law enforcement uses them as an investigative tool, strategic assessment. *Florida Department of Law Enforcement Computer Crime Center*.

Barnes, S. B. (2001). *Online Connections: Internet Interpersonal Relationships*. New Jersey: Hampton Press.

Bonetti, L., Campbell, M. A., & Gilmore, L. (2010). The relationship of loneliness and social anxiety with children's and adolescents' online communication. *Cyberpsychology, Behavior & Social Networking*, 13(3), 279-285.

boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13(1). Retrieved from <http://jcmc.indiana.edu/vol13/issue1/boyd.ellison.html>

boyd, D.M., and Ellison, N.B. (2008). Social network sites: Definition, history, and scholarship, *Journal of Computer-Mediated Communication*, 13, 210-230.

Burke, M., Marlow, C., & Lento, T. (2010). Social network activity and social well-being, *Proceedings of the 28th International Conference on Human Factors in Computing Systems* (pp. 1901–1912). New York, NY: ACM Press.

Christofides, E., Muise, A., & Desmarais, S. (2009). Information disclosure and control on Facebook: Are they two sides of the same coin or two different processes? *Cyberpsychology & Behavior*, 12, 341-345.

Christofides, E., Muise, A., & Desmarais, S. (2012a). Hey mom, what's on your Facebook? Comparing Facebook disclosure and privacy in adolescents and adults, *Social Psychological and Personality Science*, 3, 48-54.

Christofides, E., Muise, A., & Desmarais, S. (2012b). Risky disclosures on Facebook: The effect of having a bad experience on online behaviour. *Journal of Adolescent Research*, 20, 1-18.

Deters, F., & Mehl, M.R. (2012). Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social Psychological and Personality Science*, 4(5) 579-586.

Dyson, E. (1998). *Release 2.1: A Design for Living in the Digital Age*. New York: Broadway Books.

Edwards, L., & Brown, I. (2009). Data control and social networking: irreconcilable ideas? In A. Matwyshyn (Ed.), *Harboring Data: Information Security, Law And The Corporation*. Stanford University Press.

Ellison, N.B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook “friends:” Social capital and college students’ use of online social network sites *Journal of Computer-Mediated Communication*, *12*, 1143-1168.

Facebook (2014, March 13). *Newsroom*. Retrieved from <http://newsroom.fb.com/Key-Facts>

Fokkema, T., & Knipscheer, K. (2007). Escape loneliness by going digital: A quantitative and qualitative evaluation of a Dutch experiment in using ECT to overcome loneliness among older adults. *Aging & Mental Health*, *11*, 496–504.

Forest, A. L., & Wood, J. V. (2012). When social networking is not working: individuals with low self-esteem recognize but do not reap the benefits of self-disclosure on Facebook. *Psychological Science*, *23*, 295-302.

Grieve, R., Indian, I., Witteveen, K., Tolan, G.A., & Marrington, J. 2013. Face-to-face or Facebook: Can social connectedness be derived online? *Computers in Human Behavior*, *29*, 604–609.

Gross, R., & Acquisti, A. (2005). Information revelation and privacy in online social networks, *Proceedings of the 2005 ACM workshop on Privacy in the Electronic Society* (pp.71-80).

Horn, S. (1998). *Cyberville: Clicks, culture, and the creation of an online town*. New York: Warner Books.

Hoy, H.G., & Milne, G. (2010). Gender differences in privacy-related measures for young adult Facebook users. *Journal of Interactive Advertising*, *10*, 1525-2019.

Internet World Stats (2014, March 13). *Internet Usage Statistics*. Retrieved from <http://www.internetworldstats.com/stats.html>

Joinson, A (1998). Causes and implications of disinhibited behaviour on the Internet. In J. Gackenbach (Ed.), *Psychology and the Internet* (pp. 43-60). San Diego: Academic Press.

Joinson, A.N., Reips, U., Buchanan, T., & Paine Schofield, C. B. (2010). Privacy, trust, and self-disclosure online. *Human-Computer Interaction*, 25, 1-24.

Jones, S., Millermaier, S., Goya-Marthinez, M., & Schuler, J. (2008). Whose space is MySpace? A content analysis of MySpace profiles. *First Monday*, 13(9).

Kollock, P., & Smith, M. (1999). Communities in cyberspace. In M. Smith & P. Kollock (Eds.) *Communities in Cyberspace* (pp. 3-25). London: Routledge.

Krasnova, H., Spiekermann, S., Koroleva, K., & Hildebrand, T. (2010). Online social networks: why we disclose, *Journal of Information Technology*, 25, 109-125.

Lee, K., Noh, M., & Koo, D. (2013). Lonely people are no longer lonely on social networking sites: The mediating role of self-disclosure and social support, *Cyberpsychology, Behavior, And Social Networking*, 10, 1-7.

Leung L. (2002). Loneliness, self-disclosure, and ICQ (“I seek you”) use. *Cyberpsychology and Behavior*, 5, 241–251.

Lewis, K., Kaufman, J., & Christakis, N. (2008). The taste for privacy: An analysis of college student privacy settings in an online social network. *Journal of Computer-Mediated Communication*, 14, 79-100.

Livingstone, S. (2008). Taking risky opportunities in youthful content creation: teenagers’ use of social networking sites for intimacy, privacy and self-expression. *New Media & Society*, 10, 393-411.

Mar, J. (2000). Online on time: The language of Internet Relay Chat. In D. Gibbs & K. L. Krause (Eds.), *Cyberlines: Languages and Cultures of the Internet* (pp. 151-174). Australia: James Nicholas Publishers.

Markham, A. N. (1998). *Life online: Researching real experience in virtual space*. Walnut Creek: AltaMira Publications.

Morahan-Martin, J., & Schumacher, P. (2003). Loneliness and social uses of the internet. *Computers in Human Behavior, 19*, 659–671.

Moreno, M.A., Jelenchick, L.A., Egan, K.G., Cox, E., Young, H., Gannon, K.E., & Becker, T. (2011). Feeling bad on Facebook: Depression disclosures by college students on a social network site. *Depression and Anxiety, 28*, 447-455.

Nosko, A., Wood, E., & Molema, S. (2010). All about me: Disclosure in online social networking profiles: The case of Facebook. *Computers in Human Behavior, 26*, 406–418.

Preece, J. (2000). *Online Communities: Designing Useability, Supporting Sociability*. Chichester: John Wiley and Sons.

Qiu, L., Lin, H., Leung, A.K., & Tov, W. (2012). Putting their best foot forward: Emotional disclosure on Facebook. *Cyberpsychology, Behavior, and Social Networking, 15*, 569–572.

Rafaeli, S., & Sudweeks, F. (1997). Networked interactivity. *Journal of Computer-Mediated Communication, 2*(4).

Rheingold, H. (2000). *The Virtual Community: Homesteading on the Electronic Frontier*, Revised Edition. Cambridge: MIT Press.

Rifkin, J. (2000). *The Age of Access: How the Shift from Ownership to Access is Transforming Capitalism*. London: Penguin Books.

Ryan, T., & Xenos, S. (2011). Who uses Facebook? An investigation into the relationship between the Big Five, shyness, narcissism, loneliness, and Facebook usage. *Computers in Human Behavior*, 27, 1658–1664.

Shaw, L. H., & Grant, L. M. (2002). In defense of the internet: The relationship between internet communication and depression, loneliness, self-esteem, and perceived social support. *Cyberpsychology and Behavior*, 5, 157–171.

Shin, S., Ko, Y., & Jang, J. (2011). The conflict between privacy and self-disclosure in Social Networking Services, *2011 IEEE 3rd International Conference on Communication Software and Networks (ICCSN)*, 490-493.

SPSS Statistics (2014?) version 20, Retrieved from <http://www-01.ibm.com/software/analytics/spss/products/statistics/>

Stutzman F., Capra, R., & Thompson, J. (2011). Factors mediating disclosure in social network sites. *Computers in Human Behavior*, 27, 590-598.

Tavani, H. and Moor, J. (2001). Privacy protection, control of information, and privacy-enhancing technologies, *Computers and Society*, 31, 6-11.

Tidwell , L.C., & Walther, J.B. (2002). Computer-mediated communication effects on disclosure, impressions, and interpersonal evaluations. *Human Communication Research*, 28, 317-348.

Valkenburg, P., Schouten, A., & Peter, J. (2005). Adolescents' identity experiments on the internet, *New Media & Society*, 7, 383-402.

Valenzuela, S., Park, N., & Kee, K. F. (2009) Is there social capital in a social network site?: Facebook use and college students' life satisfaction, trust, and participation. *Journal of Computer-Mediated Communication, 14*, 875-901.

Young, Y. (2009). Online social networking: An Australian perspective. *International Journal of Emerging Technologies and Society, 7*(1), 39-57.

Young, A.L., & Quan-Hasse, A. (2009). Information revelation and internet privacy concerns on social network sites: A case study of Facebook. *Proceedings of the Fourth International Conference on Communities and Technologies, 2009*, 265-274.

youopenbook.org (2012, May 14). About. Retrieved from YourOpenbook.org

Wallace, P. (1999). *The Psychology of the Internet*. Cambridge: Cambridge University Press

Weir, G. R. S., Toolan, F., & Smeed, D. (2011). The threats of social networking: Old wine in new bottles? *Information Security and Technical Report, 16*(2), 38-43.