Facebook use and its association with subjective happiness and loneliness

Accepted Manuscript

Facebook use and its association with subjective happiness and loneliness

Becky Phu, Alan J. Gow

Please cite this article as: Becky Phu, Alan J. Gow, Facebook use and its association with subjective happiness and loneliness, *Computers in Human Behavior* (2018), doi: 10.1016/j.chb. 2018.11.020

Facebook use and its association with subjective happiness and loneliness

Becky Phu[1] & Alan J. Gow[1]

[1]Department of Psychology, School of Social Sciences, Heriot-Watt University, Edinburgh, EH14 4AS

Facebook use and its association with subjective happiness and loneliness

Abstract

Social Networking Sites (SNS) allow users to create a profile and connect with others. Due to the multidimensional nature of Facebook, the most popular SNS, research has considered how usage might be associated with well-being. Three hundred and thirty-two participants (70.8% Female; M age = 21.5, SD = 2.4) completed: The Multidimensional Facebook Intensity Scale, the Subjective Happiness Scale, and the UCLA Loneliness Scale. In regression analyses, 4.2% of the variance in loneliness was accounted for by Facebook variables, with number of Facebook friends emerging as a significant predictor; participants reporting a higher number of friends were less lonely. When subscales of the Facebook Intensity Scale were considered, persistence also emerged as a significant predictor of loneliness . More persistent usage, defined as the emotional connectedness an individual has towards Facebook, was associated with higher levels of loneliness. Number of Facebook friends was also a significant predictor of subjective happiness. These results suggest that there may be positive and negative outcomes from using Facebook depending on the nature of engagement.

Keywords: well-being, social media, Facebook, loneliness, happiness

1. Introduction

Social networking sites (SNS) have rapidly grown in popularity over recent years. They typically provide individuals with the opportunity to create a personal profile page to connect with other users on the site through uploading content, commenting and messaging in a variety of ways (Boyd & Ellison, 2007; Joinson, 2008). The creators state that Facebook was made to allow individuals to "stay connected with friends and family, to discover what's going on in the world and to share and express what matters to them" (Facebook, 2016). Since its launch in 2004, several new features and updates have been developed in an attempt to keep the site relevant. For example, in 2009, a "Like" button was introduced for users to positively interact with posts, and in 2011, a video call feature was added to allow face-to-face calls with other users (Denti et al., 2012; Facebook, 2016). More recently, "reactions" (an adaptation of the "Like" button) was launched where users are able to efficiently express how they feel about certain posts through one simple touch (Facebook, 2016). Facebook is also commonly used as a platform in the workplace and in education settings to arrange professional and/or social meetings with colleagues and students (Haq & Chand, 2012). It is clear that with this recent phenomenon, people's social lives have been influenced and shaped by the use of Facebook. Therefore, due to its growing popularity, contemporary relevance and continual changes, it is necessary to examine whether using Facebook has any association with the user's psychological well-being. As studies have proposed that social media can positively influence well-being (Ellison et al., 2007; Tosun, 2012; Kim & Lee, 2010), while other studies claim it is detrimental (Brooks, 2015; Denti et al., 2012; Satici & Uysal, 2015; Wright et al., 2013), it is important to better understand the the potential consequences of usage and to explain those apparently inconsistent findings.

As established, using Facebook has influenced people's social lives, and will therefore have social consequences which could directly predict well-being. Subjective well-being is an individual's assessment of their life and maintaining positive well-being is essential for healthy psychological functioning (Diener, Sapyta & Suh, 1998). Well-being is a complex concept consisting of a variety of components that interrelate, though two often-considered components are happiness (pleasant affect) and depression (unpleasant affect) (Diener, Suh, Lucas & Smith, 1999). Loneliness is also relevant as a risk factor for depression (Cacioppo et al., 2006). Previous research has focussed on happiness and Facebook use, with some results indicating that Facebook use can negatively affect happiness (Satici & Uysal, 2015). Similarly, the relationship between depression, loneliness and Facebook use has been explored with results suggesting that those who were Facebook non-users reported being more socially lonely compared to Facebook users (Ryan & Xenos, 2011). Although both happiness and loneliness overlap to an extent, according to Bradburn and Caplovitz (1965), they make up two independent elements that need to be measured in isolation from each other.

By exploring both positive and negative aspects of well-being, it is necessary to highlight how Facebook use could potentially be beneficial or harmful to the user. This is in line with the literature that has focused on Facebook and other SNS; some research suggesting that using such sites will be beneficial to well-being (Ellison et al., 2007; Tosun, 2012; Kim & Lee, 2010) and some arguing the negative role that SNS play (Brooks, 2015; Denti et al., 2012; Satici & Uysal, 2015; Wright et al., 2013). Moreover, by considering different aspects of Facebook use from the time spent engaging with the social network to intensity of usage (including, persistence of use or overuse (Orosz et al., 2016)), it is possible to determine what factors best predict different positive or negative outcomes.

1.1. Facebook as a positive contributor

With regards to the positive outcomes of Facebook use (and other SNS), previous studies have suggested that using these sites can improve communication amongst peers and provide users with social support, therefore increasing self-esteem and well-being (Ellison et al., 2007; Kim & Lee, 2010; Tosun, 2012). A study by Valkenburg, Peter and Schouten (2006) considered a broad spectrum of "friend SNSs", such as MySpace and Friendster, to determine if these sites would predict the user's well-being. In their survey of 881 adolescent users, those who reported receiving encouraging and positive comments from other users also reported higher levels of self-esteem and wellbeing. A further study by Tosun (2012) focused specifically on Facebook and people's motivations for using the site. The findings from 143 university students demonstrated that the majority would use Facebook because it allowed them to maintain friendships that were formed offline and it also strengthened existing relationships.

Similarly, Ellison et al. (2007) examined the advantages of using Facebook in relation to social capital in a sample of 286 undergraduate students. Social capital can be interpreted in a variety of ways but it generally refers to the "resources" acquired from the formation of relationships between people (Coleman, 1988). Greater social capital can allow an individual to access more resources such as information and emotional support from the particular network which they are a part of. Use of Facebook aided students with increasing their social capital while also maintaining current social relationships. Those who reported having lower well-being and self-esteem also reported using Facebook less intensively (Ellison et al., 2007). Therefore, aspects of Facebook usage can be viewed as a positive contributor to an individual's well-being where it helps to satisfy people's social needs (Kross et al., 2013).

To further expand on the notion of social capital and Facebook use, previous studies have taken a particular interest in the relationship between the number of Facebook "friends" an individual has and how this is associated with well-being. Research by Kim and Lee (2011) supported the idea of there being positive associations between number of Facebook friends and subjective well-being. From their study of 391 undergraduate students, the average number of Facebook friends was 429. It was suggested that the number of "friends" might act as a reminder of their social support and increases feelings of self-worth. This was supported by Kalpidou, Costin and Morris (2011), suggesting that having more Facebook friends helped students to adjust better into college life through having stronger social networks, albeit based on a relatively small sample (N = 70).

Using Facebook and other SNS to reduce feelings of loneliness has been found to be a further benefit of these sites. There is a greater likelihood that lonely individuals will form online relationships that eventually become real-life relationships (McKenna & Bargh, 1999). This may result from experiencing difficulty forming social relationships offline. SNS provide these individuals with an online platform to more comfortably form relationships as they have more control over how they are presenting themselves (McKenna & Bargh, 1999; McKenna, Green & Gleason, 2002). Similar findings were also apparent when examining Facebook use. Deters and Mehl (2013) conducted an experimental study where 102 students were assigned to either a group where they were given instructions to update Facebook statuses more often, or a control group who were not given any instructions. After 7 days, it was found that the experimental group reported reduced feelings of loneliness, via a suggested greater sense of connectedness to their friends. This was also supported by Ryan and Xenon (2011) who investigated Facebook use in relation to personality traits and loneliness. It was discovered that those who used Facebook tended to be extraverted and be more narcissistic but reported lower levels of social loneliness compared to those who did not use it. Furthermore, Facebook users who reported spending more time communicating via Facebook also reported having a greater number of offline relationships with friends and relatives (Lai, Zheng, Nickekrson & McMorris, 2012), with subsequent lower levels of

loneliness. It was suggested that Facebook allowed communication with a bigger audience, compared to the typical 'one-to-one' communication witnessed in standard instant messaging.

1.2. Facebook as a negative contributor

In contrast, there is research highlighting concerns associated with Facebook usage, specifically how this may be harmful to well-being. For example, Satici and Uysal (2015) reported that overuse of Facebook was associated with lower well-being in their survey of over 300 students. Pelling and White (2009) suggested overuse, defined as a minimum of 4 times a day, could result in consequences of addiction to SNS, and in turn problems with mental health including depression (Wright et al., 2013). It was found that the addictive tendencies were a predictor of a need for belonging on SNS which placed users at risk of becoming addicted. Additionally, Bevan, Gomez and Sparks (2014) found that individuals who spent more time on SNS reported lower life satisfaction and higher stress levels. In particular, it was highlighted that greater use of such sites may result in these negative outcomes due to the demanding nature of constantly updating profiles and maintaining a desired online persona. In addition, research by Andreassen, Torsheim, Brunborg and Pallesen (2012) also found that Facebook usage differed depending on characteristics of the individual. For instance, individuals who scored higher on narcissism were more active on SNS. It has also been suggested that personality traits such as Extraversion and Conscientiousness predict an individual's interaction with SNS; for example, addictive behaviours were positively associated with Extraversion and negatively associated with Conscientiousness (Wilson, Fornasier & White, 2010). Given such trends reported on SNS such as Facebook, Andreassen et al. (2012) created a specific scale to measure Facebook addiction.

Similarly, Denti et al. (2012) found that the more time spent on Facebook was negatively associated with the user's well-being and self-esteem. Those who spent more time on Facebook tended to view themselves as less happy compared to others, supporting the finding that socially comparing oneself to others can compromise well-being. According to Chou and Edge (2012), this is based on two theories: the availability heuristic and correspondence bias. The former suggests that because Facebook users generally have more "friends" on Facebook compared to in real-life, users will generate availability heuristics when forming impressions on "friends" they do not know personally. This means that people will use information that is easily accessible to them to create a judgement (e.g. photos and statuses posted by Facebook friends) (Tversky & Kahneman, 1973). As individuals have the tendency to present themselves in a positive way online (Denti et al., 2012), the content that they post will also be of a positive nature. Therefore, more frequent Facebook users will regularly witness 'happy moments' from other people's lives and in turn perceive their own life as less happy. Correspondence bias is when individuals will make the assumption that other people's actions are as a result of dispositional, and not situational inferences (Jones, 1979). Therefore, if a Facebook user has more "friends" whom they do not know on a personal level, then they will assume that these people are always happy and that this is an aspect of their personality. They will not account for the situation that is making the individual happy (Chou & Edge, 2012).

Many of these studies (Bijari et al., 2013; Ellison et al., 2007; Kim et al., 2009; Lai et al., 2012; Ryan & Xenon, 2011; Satici & Uysal, 2015; Srivastava, 2015) only examine Facebook use in the student population, which also places restrictions on the age group that is explored; based on UK figures, the majority of undergraduate students are below the age of 20 when they begin studying for their degree (O'Prey, 2015), though this is likely to vary by country. This point is fundamental to address because Facebook use is no longer only

prevalent among students and adolescents (Lampe et al., 2008); 84% of Facebook users consists of people between the ages of 18-29 (Duggan, Ellison, Lampe, Lenhart & Madden, 2014). For this reason, the current study will focus on people who are between 18-29 years of age, and do not necessarily need to be a student. Notably, these studies also fail to acknowledge potential gender differences. This would be an appropriate aspect to explore since research has already proven that there are gender differences when examining negative affect and well-being. For example, it has been found that women tend to feel emotions more intensely compared to men (Fujita, Diener & Sandvik, 1991). Furthermore, recent research by Frison and Eggermont (2016) indicated that Facebook use differs between adolescent males and females. In their study, girls had higher levels of private Facebook use compared to boys. A speculated reason for this was based on societal norms where females typically display communal behaviours of socialising, while boys tended to follow independent behaviour.

1.3. The Multidimensional Facebook Intensity Scale

It is evident from the aforementioned studies that different types of Facebook usage may be associated with different aspects of well-being. For example, previous studies used scales tailored specifically for measuring Facebook addiction (Satici & Uysal, 2015), which might be considered an extreme end of the spectrum and would disregard those who were not addicted to Facebook but rather used the site as a distraction from boredom (Whiting & Williams, 2013). It has also been found that there are differences with an individual's motivations for using SNS, with some users who are active on the site (e.g. those who post and comment) and others who only passively use the site to view content, known as "lurkers" (Rau, Gao & Ding, 2008). Moreover, many studies exploring Facebook usage and intensity in relation to well-being used scales that were created over ten years ago (Ellison, Steinfield & Lampe, 2007), where many assumed Facebook intensity was a one-dimensional measure (Bijari, Javadinia, Erfanian, Abedini & Abassi, 2013; Kirschner & Karpinski, 2010). Therefore, it seems appropriate to consider a more updated scale that harmonises the different uses as well as the continual updates that Facebook undergoes. A new scale by Orosz, Tóth-királya and Bőthea (2016) proposed that Facebook intensity falls under four main facets of Facebook use: 1. Persistence to use Facebook, 2. Boredom, 3. Facebook overuse, and 4. Self-expression on Facebook.

Persistence to use Facebook refers to the emotional connectedness an individual has towards Facebook. Those who score highly on this element tend to view Facebook as the most important site on the Internet. There are both affective and behavioural components that are related to persistence to use Facebook. The affective aspect refers to negative feelings when Facebook becomes unavailable for use, whereas the behavioural component focuses on actions such as checking Facebook before going to sleep. Boredom relates to the user's aim of reducing boredom levels through browsing Facebook. Studies have found that a motivation for using Facebook was to alleviate feelings of boredom (Lampe, Ellison & Steinfield, 2008; Pempek et al., 2009). This facet is both affective and behavioural, where boredom is viewed as a 'negative and low arousal' emotion that is associated with Facebook intensity. The third factor, Facebook overuse, refers to using Facebook even when an individual does not have the time to do so. The user will be aware of their overuse. Unlike previous scales (Andreassen, Torsheim, Brunborg & Pallesen, 2012), this component relates to minor pathologic and non-pathologic Facebook usage, and not addiction to Facebook per se. A study by Wolniczak et al. (2013) provides an indication of prevalence rates and examined undergraduate student's dependence on Facebook and found that around 8% of their 418 participants showed levels of addiction to Facebook. As this was a relatively small percentage, the new scale by Orosz et al. (2016) might provide a better measurement for the

general population. Lastly, self-expression on Facebook focuses on aspects of 'profile-related activities', such as making a profile very detailed and in regularly updating a profile page (Orosz et al., 2016).

1.4. The Current Study

In the current study, Facebook intensity, time spent on Facebook and number of Facebook friends were examined to discover the association with psychological well-being. To date, no published research has used the Multidimensional Facebook Intensity Scale compiled by Orosz et al. (2016) to measure Facebook intensity in relation to both positive (subjective happiness) and negative (loneliness) components of well-being. Moreover, this study will explore potential gender differences in Facebook usage and intensity.

It was hypothesised that those scoring higher on Facebook intensity and usage would show lower levels of loneliness because of previous research which found that those who interact more with Facebook were less lonely (Ryan & Xenon, 2011; Valkenburg et al., 2006). The associations with subjective happiness are less predictable: SNS provide a platform for social support and convenient communication with friends and in turn increasing happiness (Tosun, 2012; Valkenburg et al., 2006), whereas it has also been discovered that more exposure to other Facebook friend's positive updates will result in the user perceiving their life as less happy (Chou & Edge, 2012; Denti et al., 2012; Jones, 1979; Tversky & Kahneman, 1973). In terms of gender, it is predicted that females would demonstrate higher Facebook usage and intensity compared to males. This is because it has been found that females generally hold stronger emotions (Fujita, Diener & Sandvik, 1991) and would display greater levels of private Facebook use (Frison & Eggermont, 2016). The research questions were formulated as follows:

RQ1. Which aspects of Facebook usage (intensity of use, time spent and number of "friends") are associated with subjective happiness and loneliness?

RQ2. Are any of the four facets of Facebook intensity (Persistence, Boredom, overuse and Self-expression) specifically associated with subjective happiness and loneliness?

RQ3. Does gender play a role in determining an individual's Facebook usage and intensity?

2. Method

2.1. Participants

A total of 374 individuals took part in the study. However, two participants were excluded from the analysis as they were out with the desired age range of 18-29, and a further 40 provided only partial data (overall dropout rate = 11.2%). Therefore, 332 participants (Female 235 [70.78%], Male 97 [29.22%], Mean age = 21.54, SD = 2.35) consisting of both students and non-students were included in the analyses.

2.2. Design

An online questionnaire created using 'Qualtrics' was distributed to participants. The questionnaire was structured to investigate the associations between Facebook intensity and well-being, namely subjective happiness and loneliness.

The Multidimensional Facebook Intensity Scale, along with two questions from the original Facebook Intensity Scale were used to explore Facebook use and intensity. The two questions from the original scale measure structural aspects of Facebook use, including time spent on Facebook and number of Facebook friends. Additionally, the Subjective Happiness

Scale and UCLA Loneliness Scale were used to measure two components of well-being. Demographic information was also collected.

Demographic Information: Data collected included age, gender, student or non-student and work status (part-time, full-time or unemployed).

The Multidimensional Facebook Intensity Scale (MFIS: Orosz, Tóth-királya & Bőthea, 2016): The MFIS consists of 13 items (e.g. Watching Facebook posts is good for overcoming boredom) and each item was presented on a five-point Likert-scale (1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree). The scale has a good model fit with the 13 items and 4 separate factors extracted from the 13 items [CFI = .98; TLI = .96; RMSEA = .05, 90% CI .03 - .06; Cfit = .52; SRMR = .02; AIC = 19,371; BIC = 19,676]. The four factors of Facebook use (with an example item in parenthesis and the Cronbach's alpha for the factor from Orosz et al. (2016)) are labelled: 1. Persistence to use Facebook ("I often search for internet connection in order to visit Facebook", α = .79); 2. Boredom ("If I'm bored, I open Facebook", α = ..85); 3. Facebook overuse ("It happens that I use Facebook instead of sleeping", α = .76); and 4. Self-expression on Facebook ("I like refining my Facebook profile", α = .74). Moreover, the four factors were found to have good reliability when testing for factor determinacy, internal consistency and temporal stability. When looking at the correlations between the four factors, scores were moderate and significant (ranged from: .27-.50) (Orosz et al., 2016). A total score from the MFIS were used to establish Facebook intensity. Factors score were also individually calculated from the relevant questions.

Number of Facebook Friends and Time spent on Facebook (Ellison, Steinfield & Lampe, 2007): The two questions were as follows: "Approximately how many TOTAL Facebook friends do you have?" and "In the past week, on average, approximately how much time PER DAY have you spent actively using Facebook?".

Subjective Happiness Scale (SHS, Lyubomirsky & Lepper, 1999): The SHS includes four items (e.g. 'In general, I consider myself', 'compared to most of my peers I consider myself') where each item was presented on a seven-point Likert-scale (e.g. '1 = not a very happy person; 7 = a very happy person', '1 = less happy; 7 = very happy'), though one item was reverse coded. The possible total scores can range from 4 to 28, with 28 being the highest level of happiness. The internal consistency reliability was found to be between 0.79 to 0.94 (M = 0.86) when tested with a variety of samples which differed in age, occupations, cultures and languages (Lyubomirsky & Lepper, 1999).

UCLA Loneliness Scale (Russell, Peplau & Ferguson, 1978): The UCLA Loneliness Scale included 20 items (e.g. Do you always feel part of a group of friends?) and participants were required to rate the items as either "I often feel this way", "I sometimes feel this way", "I rarely feel this way" or "I never feel this way". The scale has a high internal consistency scale when tested with a group of 239 students, with coefficient alpha = .96 (Russell et al., 1978).

2.3. Procedure

Ethical approval was granted by the Ethics Committee of the School of Management and Languages at Heriot-Watt University. Upon accessing the online questionnaire, the participants were presented with the objectives of the study on the consent form. Participation was voluntary with no compensation (some undergraduate students completed the study for course credits). Participants were informed that the questionnaire was anonymous and confidential, and were given the right to withdraw at any point. Upon completion of the questionnaire, a debrief sheet was presented to the participants.

A variety of convenience sampling methods were used to obtain participants. Firstly, the participants were recruited through Heriot-Watt's Student Research Participant System (StReP), an online system for undergraduate students in their 1st to 3rd year to access studies to gain credits. The questionnaire was also posted on personal Facebook pages and by requesting participants who had already completed the questionnaire to share it with other eligible individuals.

2.4. Statistical Analysis

Facebook Intensity (and the four separate facets), subjective happiness, loneliness and number of Facebook friends were normally distributed. However, time spent on Facebook showed a positively skewed distribution so a log transformation was carried out. All of the scales Cronbach's Alpha showed good internal reliability: MFIS $\propto$ = .86, Subjective Happiness Scale $\propto$ = .83 and the UCLA Loneliness Scale $\propto$ = .95.

Initial regressions were conducted using subjective happiness as the dependent variable. In the first model, the total of the MFIS was entered as a predictor, along with age, gender, number of Facebook friends and time spent on Facebook. In a second model, the four individual facets of the MFIS (persistence, boredom overuse and self-expression) were entered, alongside the other predictors (age, gender, friends and time). This process was repeated with loneliness as the dependent variable. Further regressions were conducted to determine the effects of adding in subjective happiness and loneliness as predictors.

3. Results

Table 1 presents the participants descriptive statistics for the full sample and separately for males and females. Just over 12% of the sample were employed full-time. The average number of Facebook friends was 628 (SD = 469.2), while the reported average number of minutes spent on Facebook per day was 98.7 (SD = 164.8). An independent samples t-test suggested that the reported number of minutes spent on Facebook per day was significantly higher for females (M = 99.9, SD = 108) compared to males (M = 70.4, SD = 66), t(332) = -3.213, p < .01. Females reported spending approximately 30 minutes more on Facebook per day. Furthermore, females scored significantly higher on Facebook Intensity compared to males (M = 40.6 (SD = 8.3) versus 35.9, (SD = 8), t(332) = -4.766, p < .001). Similar findings emerged when looking at the four facets individually. Females scored higher on Persistence, t(332) = -3.654, p < .001; Boredom, t(332) = -3.857, p < .001; Overuse, t(332) = -3.636, p < .001; and Self-Expression, t(332) = -3.742, p < .001. This suggests that females, in all aspects, report higher connectedness to Facebook. No significant gender differences were found for scores on subjective happiness or loneliness.

Table 2 presents the correlations among the variables. There was a positive correlation between subjective happiness and number of Facebook friends (r = .22, p < .01), while a negative correlation was found between loneliness and number of Facebook friends (r = -.21, p < .01). Additionally, there was a weak positive correlation between loneliness and persistence (r = .12, *p* < .05). As for the Facebook factors (time, friends and Facebook intensity), there was a positive correlation between Facebook intensity and number of Facebook friends (r = .22, *p* < .01), and between Facebook intensity and time spent on Facebook (r = .48, *p* < .01).

Table 1 Participant descriptive statistics

Variables	All Participants (N = 332)	Male (n = 97)	Female (n = 235)	Comparison of gender differences
Age	21.1 (2.4)	21.3 (2.5)	21.0 (2.3)	.991
Number of Facebook friends	623 (461.9)	524.4 (309.3)	647.5 (501.3)	-2.241
Time spent on Facebook per day (minutes)	91.3 (98.5)	70.4 (66)	99.9 (108)	-3.213**
Student Status				8.657**
-Student	291 (87.7%)	77 (79.4%)	214 (91.1%)	
-Non-Student	41 (12.4%)	20 (20.6%)	21 (8.9%)	
Employment Status				5.959
-Full-time	40 (12.1%)	17 (17.5%)	23 (9.8%)	
-Part-time	191 (57.5%)	47 (48.5%)	144 (61.3%)	
-Unemployed	101 (30.4%)	33 (34%)	68 (28.9%)	
Subjective Happiness	18.1 (4.7)	17.6 (5.2)	18.3 (4.5)	-1.257
Loneliness	19.8 (12.2)	20.9 (12.5)	21.6 (12.5)	-.465
Facebook Intensity	39.2 (8.5)	35.9 (8)	40.6 (8.3)	-4.766***
-Persistence	11.1 (3.5)	10.1 (3.1)	11.6 (3.5)	-3.654***
-Boredom	11.9 (2.1)	11.3 (2.5)	12.2 (1.9)	-3.857***
-Overuse	9.2 (2.7)	8.4 (2.5)	9.6 (2.6)	-3.636***
-Self-Expression	6.8 (2.5)	6.1 (2.5)	7.2 (2.5)	-3.742***

Notes: Figures shown are Mean (SD) for continuous data and for categorical data figures are presented as Total Number (%). Independent sample t-tests and chi-square tests were carried for a comparison between gender differences. (*** $p < .001$. ** $p < .01$)

Table 2 Correlations for all the variables ($N = 332$)

	1	2	3	4	5	6	7	8	9
1. Happiness	-								
2. Loneliness	-.60**	-							
3. Facebook Intensity	.04	.07	-						
4. Persistence	.00	.12*	.89**	-					
5. Boredom	.05	.02	.71**	.54**	-				
6. Overuse	.01	.05	.82**	.62**	.05**	-			
7. Self-Expression	.07	.02	.70**	.50**	.27**	.42**	-		
8. Facebook Friends	.22**	-.21**	.22**	.21**	.12*	.13*	.21**	-	
9. Time	.01	.03	.48**	.38**	.34**	.38**	.24**	.07	-

Note: Persistence, Boredom, Overuse and Self-Expression are the four facets which make up the total of Facebook Intensity. (** $p < .01$. * $p < .05$)

3.1. Subjective Happiness Multiple Regressions

The first multiple regression analysis was carried out using subjective happiness as the dependent variable and Facebook Intensity, number of Facebook friends, time spent on Facebook, age and gender as independent predictor variables (Model 1), summarised in Table 3.

A significant model emerged ($F_{(5, 332)} = 3.624$, $p < .01$), accounting for 3.9% of the variance in subjective happiness (Adjusted $R2 = .039$). Although small, number of Facebook friends emerged as a significant predictor ($\beta = .202$, $p < .001$) of subjective happiness. None of the other variables had a significant association with subjective happiness.

The second regression with subjective happiness as the dependent variable included the four facets of Facebook Intensity (Persistence, Boredom, Overuse and Self-Expression) (Model 2). This model was also significant ($F_{(8, 332)} = 2.654$, $p < .01$), accounting for 3.9% of the variance in subjective happiness (Adjusted $R2 = .039$). Again, number of Facebook friends emerged as a significant predictor ($\beta = .200$, $p < .001$).

Table 3 Summary of multiple regression analyses for predicting variables of Subjective Happiness (N = 332)

Variable	Model 1		
	B	SE	β
Age	-.137	0.11	-.069
Gender	.499	0.58	.049
Facebook Friends	.002	0.00	.202**
Time	.013	0.29	.003
Facebook Intensity	-.007	0.03	-.012
R^2	.054		
Adjusted R^2	.039		
F for change in R^2	3.62		

	Model 2		
	B	SE	β
Age	-.144	0.11	-.073
Gender	.431	0.58	.042
Facebook Friends	.002	0.00	.200**
Time	.035	0.29	.007
Persistence	-.148	0.12	-.110
Boredom	.114	0.15	0.52
Overuse	-.027	0.13	-.015
Self-Expression	.161	0.12	.087
R^2	.063		
Adjusted R^2	.039		
F for change in R^2	2.65		

3.2. Loneliness Multiple Regressions

The results from the regressions with loneliness as the dependent variable are summarised in Table 4.

A significant model was found for Model 1 (F (5, 332) = 3.870, p < .01), accounting for 4.2% of the variance in loneliness (Adjusted R2 = .042). Again, number of Facebook friends was a significant predictor (β = -.232, p < .001). The model shown in the bottom half of Table 2 (Model 2) was also significant (F (8, 332) = 3.263, p = .001), accounting for 5.3% of the variance (Adjusted R2 = .053). In this model, number of Facebook friends was a significant predictor (β = -.239, p < .001), as was persistence (β = -.237, p < .01).

Table 4 Summary of multiple regression analyses for predicting variables of loneliness (N = 332)

Variable	Model 1		
	B	SE	β
Age	.136	0.29	.468
Gender	.704	1.53	.026
Facebook Friends	-.006	0.00	.232**
Time	-.281	0.77	-.022
Facebook Intensity	.171	0.09	.117
R^2	.057		
Adjusted R^2	.042		
F for change in R^2	3.87		

	Model 2		
	B	SE	β
Age	.127	0.29	.024
Gender	.936	1.53	.034
Facebook Friends	-.007	0.00	-.239**
Time	-.284	0.77	-.022
Persistence	.853	0.28	.237**
Boredom	-.305	0.39	-.052
Overuse	-.168	0.34	-.036
Self-Expression	-.201	0.32	-.041
R^2	.076		
Adjusted R^2	.053		
F for change in R^2	3.26		

Table 5 Summary of regression for subjective happiness with loneliness added as a predictor (N = 332)

Variable	Model 1		
	B	SE	*β*
Age	-.107	0.09	-.054
Gender	.654	0.47	.064
Facebook Friends	.001	0.00	.066
Time	-.049	0.24	-.010
Facebook Intensity	.031	0.03	.056
Loneliness	-.219	0.02	-.584***
R²	.375		
Adjusted *R²*	.363		
F for change in *R²*	31.92		

	Model 2		
	B	SE	*β*
Age	-.116	0.10	.062
Gender	.637	0.47	.062
Facebook Friends	.001	0.00	.061
Time	-.027	0.24	-.006
Persistence	.038	0.09	.028
Boredom	.048	0.12	.022
Overuse	-.064	0.12	-.036
Self-Expression	.117	0.10	.063
Loneliness	-.219	0.02	-.584***
R²	.378		
Adjusted *R²*	.360		
F for change in *R²*	21.32		

3.3. Additional Regressions and Sobel Test

Table 5 displays the results from a multiple regression when loneliness was added as a potential predictor of the regression with subjective happiness as the dependent variable. A significant model emerged for Model 1 ($F_{(6, 332)}$ = 31.916, $p < .001$), accounting for 36.3% of the variance in subjective happiness (Adjusted R^2 = .363). Loneliness emerged as a significant negative predictor of subjective happiness ($β$ = -.584, $p < .001$). In the model using the MFIS facets, a significant model emerged ($F_{(9, 332)}$ = 21.322, $p < .001$), accounting for 36.0% of the variance in subjective happiness (Adjusted R^2 = .360). Loneliness was again the only significant predictor ($β$ = -.219, $p < .001$).

Given that the number of Facebook friends was significantly associated with subjective happiness before the inclusion of loneliness, tests of mediation were conducted

using a Sobel test. Since the Sobel test was designed for larger sample sizes (Preacher & Hayes, 2004), this was a suitable choice to test mediation in this study. Assumptions were checked prior to conducting the analysis. Figure 1 shows a diagram of this potential mediation. When a Sobel test was carried out with loneliness as the mediator and Facebook friends as the independent variable, and subjective happiness as the dependent variable, a significant result was found (c' = 5.47, p < .001). The indirect association (IA) was given as $IA = ab$ = .006 x .227 = .0014 = .14%. A percent mediation calculating the percent of total association accounted for by the indirect association was given as P_M = ($ab/ab+c'$)100 = (.006 x .227)/((.006 x .227)+5.47)100 = .025%. This suggests that individuals with fewer Facebook friends are likely to be lonelier, and subsequently less happy.
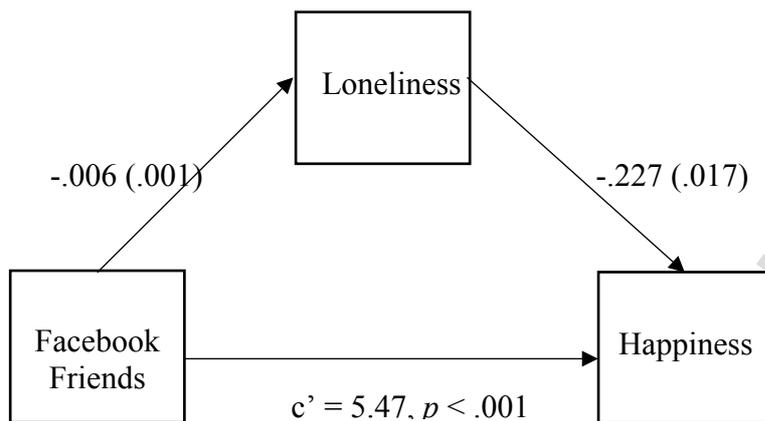

Figure 1 Diagram of the hypothesised path model for Facebook

Table 6 is a summary of the regression results with loneliness as the dependent variable when subjective happiness was incorporated into the models. A significant model emerged for the first model (F (6, 332) = 32.226, p < .001), accounting for 36.6% of the variance in loneliness (Adjusted R2 = .366). In this model, Facebook intensity (β = .161, p < .05) was a positive predictor, while Facebook friends (β = -.003, p < .05) was a negative predictor along with subjective happiness (β = -1.55, p < .001). A significant model emerged for model 2 (F (9, 332) = 22.134, p < .001), accounting for 36.9% of variance. In this model, persistence (β = .625, p < .01) was a positive predictor, Facebook friends (β = -.003, p < .01) and subjective happiness (β = -1.53, p < .001) were both negative significant predictors.

Table 6 Summary of regression for loneliness with subjective happiness added as a predictor (N = 332)

Variable	Model 1		
	B	SE	β
Age	-.075	0.24	-.316
Gender	1.48	1.25	.238
Facebook Friends	-.003	0.00	-.115*
Time	-.262	0.63	-.417
Facebook Intensity	.161	0.08	.110*
Subjective Happiness	-1.55	0.12	-.582***
R^2	.377		
Adjusted R^2	.366		
F for change in R^2	33.23		

	Model 2		
	B	SE	β
Age	-.093	0.24	-.018
Gender	1.60	1.24	.059
Facebook Friends	-.003	0.00	-.124**
Time	-.230	0.63	-.018
Persistence	.625	0.23	.174**
Boredom	-.130	0.32	-.022
Overuse	-.209	0.28	-.045
Self-Expression	0.46	0.26	.009
Subjective Happiness	-1.53	0.12	-.576***
R^2	.387		
Adjusted R^2	.369		
F for change in R^2	22.13		

4. Discussion

4.1. Discussion of Main Findings

The current study examined whether Facebook intensity (persistence of Facebook use, boredom, Facebook overuse and self-expression), number of Facebook friends and time spent on Facebook were associated with subjective happiness and loneliness. The results indicated that the more Facebook friends one has, the higher their subjective happiness. Conversely, loneliness was higher for those reporting a lower number of Facebook friends. In addition, persistence appeared to be an aspect of Facebook usage associated with higher levels of loneliness. There were no associations between aspects of Facebook intensity and subjective

happiness and time spent on Facebook did not significantly predict subjective happiness or loneliness.

Regarding the number of Facebook friends, the findings that a higher number of Facebook friends was associated with higher subjective happiness and lower levels of loneliness is consistent with previous research. For example, Kim and Lee (2010) proposed that using Facebook reminds the user of how much social support they have. Their research also discovered that this positive influence on well-being only occurs when the user communicates their need for social support. However, these findings contradict the two theories of availability heuristics and correspondence bias (Chou & Edge, 2012). As for loneliness, it seems intuitive that those who report fewer Facebook friends will also report higher levels of loneliness. Based on previous research, those who used Facebook to communicate with friends, would also report having more offline friendships and reduced feelings of loneliness (Lai et al., 2012).

Interestingly, only the persistence facet of the MFIS was found to be a significant predictor of loneliness. This may appear surprising because the Facebook overuse factor was not a predictor of loneliness. Previous research has indicated that those who are lonelier tend to use Facebook more extensively in order to compensate for a lack of social relationships (McKenna & Bargh, 1999; McKenna, Green & Gleason, 2002). Instead, this study suggested that those who scored higher on persistence, that is individuals more likely to use Facebook before going to bed, believe that it is one of the most important online websites and will seek Internet connection so they can use it (Orosz et al., 2016), reported higher levels of loneliness. Individuals displaying these types of persistent behaviours may be more emotionally connected to Facebook. Ryan and Xenos (2011), who used the Social and Emotional Loneliness Scale for Adults (Ditommaso, Brannen & Best, 2004) to define and measure loneliness, found that Facebook users tended to have higher levels of family loneliness, a subscale of emotional loneliness (Ditommaso et al., 2004). Although previous research demonstrates that Facebook helps to maintain social relationships and provides social support (Ellison et al., 2007), consequently decreasing social loneliness (Ryan & Xenos, 2011), it might be detrimental to other aspects of emotional loneliness. This seems more likely if a user is emotionally connected to the site and as a result neglects, or feels neglected by, other relationships in their offline life such as family members.

Contrary to the prior predictions made in this study, no significant associations were found between subjective happiness and Facebook intensity. However, in the mediation analysis, it was found that the pathway between number of Facebook friends and subjective happiness was mediated via loneliness. It seems appropriate to consider that other factors not accounted for in this study, such as personality traits, should be considered as potential mediators or moderators of the pathways between Facebook intensity and subjective happiness. For example, Ross et al. (2009) suggested that more Extraverted individuals were significantly more likely to be a part of a larger number of groups on Facebook. This is expected since individuals who are extroverted are more outgoing (Costa & McCrae, 1992). Such individuals may therefore access greater social capital, which has been found to be positively associated with well-being (Ellison et al., 2007). Furthermore, a study by Gerson, Plagnol and Corr (2016) found that certain personality traits moderated whether an individual would participate in negative social comparison. It was found that those who had high goal driven personalities were more likely to negatively compare themselves to others on Facebook. These individuals will compare themselves to their Facebook friends by observing their posts which usually contain information on their lives such as achievements. Those who have high goal driven personalities have greater tendency to try and improve their own selves by comparing their lives to other people's lives. Therefore, it could be speculated that there may be a negative association between Facebook intensity and subjective happiness for those

who have a high goal driven personality trait as constant social comparison of oneself to others on the site may reduce happiness (Chou & Edge, 2012). Additionally, it has been found that shy and anxious individuals used Facebook to overcome their unease with face-to-face social situations (Ebeling-Witte, Frank & Lester, 2007; Sheldon, 2008a). In this case, it could be that those who display shyer personality traits may show a positive association between subjective happiness and Facebook usage if using the site allows them to improve social communication through an online platform.

Similarly, no significant associations were found between time spent on Facebook and loneliness and subjective happiness. This could be because there are different reasons for using the site, and the actual time spent on the site is not a clear indication of the different engagements people are having. For instance, people who reported spending hours on Facebook might be using it to play games (Tosun, 2012) or they might be passively scrolling through the site and merely observing other people's posts without interacting with them (Rau et al., 2008). However, the inclusion of a multidimensional scale in this study accounted for this issue and provided a more in-depth measurement of the specific components of Facebook intensity. The current study found a positive correlation between time spent on Facebook and Facebook intensity (and for each facet separately) which suggests that time is relevant to an extent when measuring usage. For example, Pempek et al. (2009) found that one of the prominent motivations that students had for using the site was to express their identities online. This was done through a number of ways including displaying their music and film interests as well as uploading photos. This relates to the self-expression facet of the MFIS in that individuals who scored highly in this domain would regularly update their profile (Orosz et al., 2016). Furthermore, research has explored the use of Facebook as a way to tackle boredom. It was found that students would use Facebook out of boredom and as a form of entertainment (Sheldon, 2008b), which is linked to the boredom facet of the MFIS (Orosz et al., 2016). Therefore, the four facets from the MFIS summarise the core engagements that Facebook intensity is divided into, which demonstrates that usage of Facebook should not be considered a one-dimensional activity that is measured exclusively by time spent on the site.

As predicted, the current study found that females scored significantly higher on the amount of time spent on Facebook compared to males. Females also scored significantly higher on every aspect of Facebook intensity compared to males. These findings are consistent with the results from previous research examining gender differences and Facebook usage. Denti et al. (2013) conducted "Sweden's Largest Facebook Study" with 1011 participants and found that women tended to spend more time on Facebook, as well as having different motives for using the site compared to men. The majority of women believed that Facebook was more important to them and would show greater dependence on the site as a method to maintain relationships with friends. On the other hand, men generally used Facebook as a hobby and a form of entertainment. Additionally, Przepiorka, Blachnio and Díaz-Morales (2016) discovered that young, female users in particular would show decisional procrastination, which is the tendency to purposely put off making decisions (Effert & Ferrari, 1989), and as a result would intensively use Facebook. Therefore, it seems that women are more likely to be at risk for developing problematic Facebook use and addiction to Facebook, which has further consequences such as depression (Wright et al., 2013). That said, there was no gender difference in either subjective happiness or loneliness in the current study, and gender did not emerge as a significant predictor in any of the models. Further research should be conducted to determine whether these findings are true of all social media platforms, since different sites will have different methods of interaction and engagement.

4.2. Implications for Practice

There are several implications that may be drawn from this study, and some of these will be related to education since the sample was largely made up of university students. Firstly, the more Facebook friends an individual reported having, the greater their subjective happiness and lower levels of loneliness. Thus, universities could help students to appropriately use social media by informing them about the potential benefits towards well-being through correct usage in terms of being and feeling connected. To caveat that, however, as it was revealed that females spent more time on Facebook compared to males, early interventions in schools and universities could warn users of the potential consequences of overuse of SNS (including what might constitute overuse), and the impact such usage may have on the user's well-being. Another finding from this study was that persistence was a predictor of loneliness. Based on this, persistent users could be supported to better track and limit how long they spend on Facebook in order to acknowledge offline relationships. For example, there are phone applications that help individuals limit how long they spend on social media or their overall screen time. Moreover, other factors such as personality traits may play a role in determining how people engage with Facebook, and whether this positively or negatively affects their well-being. Therefore, it is important that those who have high goal-driven personalities in particular, spend more time with friends in order to discover both the positive and negative aspects of their lives.

To summarise, the key implications are:
- Universities should inform students about how to appropriately use social media sites.
- Early interventions in schools and universities to warn users of the potential damage arising from the overuse use of social media.
- Limiting the amount of time spent on Facebook through tracking how long one spends on each social media platform.
- Ensuring that people who have high goal driven personalities form unbiased views of their friend's lives by also allocating time for face-to-face interactions.

4.3. Limitations and Future Research

There are several limitations of this study which should be acknowledged. The first is the limitation of a self-report questionnaire as a means of gathering data. Although this method is largely accepted by researchers, participants may still display biases in their responses, for example social desirability (Fisher, 1993). Though given that the questionnaire was anonymous and this fact was stated to the participant before accessing the questionnaire, this would have helped to minimise this bias effect. Secondly, while the sample in this study did incorporate individuals from the non-student population, the majority were students. For a better understanding of how Facebook is associated with well-being, other researchers might conduct a study on entirely non-students or a comparison of the two populations to determine if there are similar associations.

Another limitation is the use of Facebook to recruit participants and the biases which could arise from this. As this study focused on Facebook, it may be that those participants who were recruited from Facebook spent more time on the site and will score more highly on the MFIS. The participants were largely made up of people from the UK. Therefore, other researchers may carry out the study on people from different countries to determine if the results are similar across cultures and nationalities. Lastly, only focusing on one SNS, Facebook, means that the generalisation of this study to others is limited. It is important to note that there are a variety of popular sites, including Twitter, Instagram and Snapchat, which are also of contemporary relevance. Other researchers could incorporate these SNS to find out if the results are consistent across all platforms. Finally, as a cross-sectional study the

results reported highlight associations but cannot attribute causality, ie whether more persistent usage leads to greater loneliness or vice versa. Longitudinal studies and experimental designs exploring the effects of "withdrawal" from SNS are of particular interest.

5. Conclusions

People's social lives are increasingly influenced and shaped by SNS such as Facebook. It is necessary to better understand the associations between using such sites on well-being. The literature to date has reported mixed results, which demonstrates the complexity and multidimensional nature of the usage of such sites. The current findings highlight both positive and negative associations in relation to Facebook, for example that a greater number of friends on Facebook may be positively associated with the user's well-being through reminding users of the social support one has. It is important that users understand the ways in which their engagement on SNS may benefit or harm aspects of their well-being depending on the intensity and various aspects of usage.

References

Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook Addiction Scale. *Psychological Reports, 110*(2), 501-517.

Bevan, J. L., Gomez, R., & Sparks, L. (2014). Disclousures about important life events on Facebook: Relationnships with stress and quality of life. *Computers in Human Behavior, 39*, 246-253.

Bijari, B., Javadinia, S. A., Erfanian, M., Abedini, M. R., & Abassi, A. (2013). The impact of virtual social networks on students' academic Achievement in Birjand University of Medical Sciences in East Iran. *Procedia – Social and Behavioural Sciences, 83*, 103-106.

Boyd, D. M., & Ellison, N. B. (2007). Social Network Sites: Definition, History, and Scholarship. *Journal of Computer-Mediated Communication, 13*(1), 210-230.

Brooks, S. (2015). Does personal social media usage affect efficiency and well-being?. *Computers in Human Behavior, 46*, 26–37.

Cacioppo, J. T., Hughes, M. E., Waite, L. J., Hawkley, L. C., Thisted, R. A., & Zacks, R. T. (2006). Loneliness as a specific risk factor for depressive symptoms: cross-sectional and longitudinal analyses. *Psychology and Ageing, 21*(1), 140-151.

Chou, H. G., & Edge, N. (2012). ''They Are Happier and Having Better Lives than I Am'': The Impact of Using Facebook on Perceptions of Others' Lives. *Cyberpsychology, behavior, and Social Networking, 15*(2), 117-121.

Coleman, J. S. (1988). Social Capital in the Creation of Human Capital. *The American Journal of Sociology, 94*, 95-120.

Costa, P. T., & McCrae, R. R. (1992). Normal Personality Assessment in Clinical Practice: The NEO Personality Inventory. *Psychological Assessment, 4*(1), 5-13.

Denti, L., Barbopoulos, I., Nilsson, I., Holmberg, L., Thulin, M., Wendeblad, M., Andén, L., Davidsson, E. (2012). Sweden's Largest Facebook Study. Gothenburg Research Institute School of Business, Economics and Law, University of Gothenburg.

Deters, F. G., & Mehl, M. R. (2013). Does posting Facebook status updates Increase or Decrease Loneliness? An Online Social Networking Experiment. *Social Psychological and Personality Science, 4*(5), 579-586.

Diener, E., Sapyta, J. J., & Suh, E. M. (1988). Subjective Well-being Is Essential to Well-Being. *Psychological Inquiry, 9*(1), 33-37.

Diener, E., Suh, E. M., Lucas, R. E., Smith, H. L. (1999). Subjective Well-Being: Three Decades of Progress. *Psychological Bulletin, 125*(2), 276-302.

Ditommas, E., Brannen, C., Best, L. A. (2004). Measurement and Validity Characteristics of the Short Version of the Social and Emotional Loneliness Scale for Adults. *Educational and Psychological Measurement, 64*(1), 99-119.

Duggan, S., Ellison, N. B., Lampe, C., Lenhart, A., & Madden, M. (2014). Demographics of Key Social Networking Platforms. Retrieved 9 December, 2016, from http://www.pewinternet.org/2015/01/09/demographics-of-key-social-networking-platforms-2/.

Ebeling-White, S., Frank, M. L., & Lester, D. (2007). Shyness, Internet Use, and Personality. *CyberPsychology & Behavior, 10*(5), 713-716.

Effert, B. R., & Ferrari, J. R. (1989). Decisional Procrastination: Examining Personality Corrlates. *Journal of Social Behavior and Personality, 4*(1), 151-156.

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

Facebook (2016). Company Info. Palo Alto, CA: Facebook. Retrieved from: http://newsroom.fb.com/company-info/ [Last Accessed: 08/12/16]

Fisher, R. J. (1993). Social Desirability Bias and the Validity of Indirect Questioning. *Journal of Consumer Research, 20*(2), 303-315.

Frison, E., & Eggermont, S. (2016). Gender and Facebook motives and predictors of specific types of Facebook use: A latent growth curve analysis in adolescence. *Journal of Adolescence, 52,* 182-190.

Fujita, F., Diener, E., & Sandvik, E. (1991). Gender differences in negative affect and well-being: The case for emotional intensity. *Journal of Personality and Social Psychology. 61*(3), 427-434.

Gerson, J., Plagnol, A. C., & Corr, P. J. (2016). Subjective well-being and social media: Do personality traits moderate the impact of social comparison on Facebook?. *Computers in Human Behavior, 63,* 813-822.

Haq, A. U., Chand, S. (2012). Pattern of Facebook usage and its Impact on Academic Performance of University Students: A Gender Based Comparison. *Bulletin of Education and Research, 34*(2), 19-28.

Joinson, A. (2008). Looking at, looking up or keeping up with people?: Motives and use of facebook. Proceedings of the Twenty-sixth Annual SIGCHI Conference on Human Factors in Computing Systems, 1027-1036.

Jones, E. E. (1979). The rocky road from acts to dispositions. *American Psychologist, 34*(2), 107-117.

Kalpidou, M., Costin, D., & Morris, J. (2011). The Relationship Between Facebook and the Well-Being of Undergraduate College Students. *Cyberpsychology, Behavior, and Social Networking, 14*(4), 183-189.

Kirschner, P. A., & Karpinski, A. C. (2010). Facebook and academic performance. *Computer in Human Behavior, 26*(6), 1237-1245.

Kim, J., LaRose, R., & Peng, W. (2009). Loneliness as the cause and Effect of Problematic Internet Use: The relationship between Internet Use and Psychological Well-Being. *CyberPsychology & Behavior, 12*(4), 451-455.

Kim, J., & Lee, J. R. (2011). The Facebook Paths to Happiness: Effects of the Number of Facebook Friends and Self-Presentation on Subjective Well-Being. *CyberPsychology, Behavior & Social Networking, 14*(6), 359-364.

Kross, E., Verduyn P., Demiralp, E., Park, J., Lee, D. S., Lin, N., et al. (2013). Facebook Use Predicts Declines in Subjective Well-Being in Young Adults, PLoS ONE, 8(8), e69841. http://doi.org/10.1371/journal.pone.0069841.

Lai, L. L., Zheng, Y., Nickerson, A., & McMorris, R. (2012). An Examination of the reciprocal relationship of loneliness and Facebook use among first-year college students. *Journal of Educational Computing Research, 46*(1), 105-117.

Lampe, C., Ellison, N. B., & Steinfield, C. (2008) Changes in use and perception of Facebook. The ACM 2008 conference, 721-730.

Lyubomirsky, S., & Lepper, H. S. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research, 46,* 137-155.

McKenna, K. Y. A., & Bargh, J. (1999). Causes and Consequences of Social Interaction on the Internet: A Conceptual Framework. *Media Psychology, 1*(3), 249-269.

McKenna, K. Y. A., Green, A. S., Gleason, M. E. J. (2002). Relationship Formation on the Internet: What's the Big Attraction?. *Journal of Social Issues, 58*(1), 9-31.

O'Prey, P. (2015). Patterns and Trends in UK Higher Education. Retrieved from http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2015/patterns-and-trends-2015.pdf.

Orosz, G, Tóth-királya, I., & Bőthea, B. (2016). Four facets of Facebook intensity — The development of the Multidimensional Facebook Intensity Scale. *Personality and Individual Differences, 100*, 95-104.

Pelling, E. & White, K. M. (2009). The theory of planned behaviour applied to young people's use of social networking websites. *Cyberpsychology & Behavior, 12,* 755-759.

Pempek., T. A., Yermolayeva, Y. A., & Calvert, S. L. (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology, 30*(3), 227-238.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments & Computers, 36*(4), 717-731.

Przepiorka, A., Blachnio, A., & Díaz-Morales, J. F. (2016). Problematic Facebook use and procrastination. *Computers in Human Behavior, 65*, 59-64.

Rau, P. P., Gao, Q., & Ding, Y. (2008). Relationship between the level of intimacy and lurking in online social nework services. *Computers in Human Behavior, 24*, 2757-2770.

Ross, C., Orr, E., Sisic, M., Arseneault, J. M., & Simmering, M. G. (2009). Personality and motivations associtated with Facebook use. *Computers and Human Behavior, 25,* 578-586.

Russell, D., Peplau, L.A. & Ferguson, M. L. (1978). Developing a measure of loneliness. *Journal of Personality Assessment, 42*, 290-294.

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*(5), 1658-1664.

Satici, A. S., & Uysal, R. (2015). Well-being and problematic Facebook use. *Computers in Human Behavior, 49*, 185–190.

Sheldon, P. (2008a). The Relationship between Unwillingness-to-communicate and Students' Facebook Use. *Journal of Media Psychology, 20*(2), 67-75.

Sheldon, P. (2008b). Student Favourite: Facebook and Motives for its use. *Southwestern Mass Communication Journal, 23*(2), 39-53.

Srivastava, A. (2015). The Effect of Facebook Use on Life Satisfaction and Subjective Happiness of College Students. *The International Journal of Indian Psychology, 2*(4), 204-216.

Tosun, L. P. (2012). Motives for Facebook use and expressing ''true self'' on the Internet. *Computers in Human Behavior, 28*(4), 1510-1517.

Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology, 5*(2), 207-232.

Valkenburg, P. M., Peter, J., & Schouten, A. P. (2006). Friend Networking Sites and Their Relationship to Adolescents' Well-Being and Social Self-Esteem. *Cyberpsychology & Behavior, 9*(5), 584-590.

Whiting, A., & Williams, D. (2013). Why people use social media: a uses and gratification approach. *Qualitative Market Research: An International Journal, 16*(4), 362-369.

Wilson, K., Fornasier, S., & White, K. M., (2010). Psychological predictors of young adults' use of social networking sites. *Cyberpsychology, Behavior, and Social Networking, 13*(2), 173-177.

Wolniczak, I., Cáceres-DelAguila, J. A., Palma-Ardiles, G., Arroyo, K. J., Solis-Visscher, R., Parades-Yauri, S., Mego-Aquije, K., & Bernabe-Ortiz, A. (2013). Association between Facebook Dependence and Poor Sleep Quality: A Study in a sample of

Undergraduate Students in Peru. *PLoS ONE, 8*(3): e59087. doi:10.1371/journal.pone.0059087.

Wright, K. B., Rosenberg, J., Egbert, N., Ploeger, N. A., Bernard, D. R., & King, S. (2013). Communication Comeptence, Social Support and Depression Among College Students: A Model of Facebook and Face-to-Face Support Network Influcence. *Journal of Health Communications, 18*, 41-57.

Highlights

- Studies have considered how aspects of social network usage (including Facebook) might be associated with well-being;
- In young adults, a higher number of reported Facebook friends was associated with lower loneliness;
- In terms of aspects of Facebook usage, more persistent usage was associated with higher levels of loneliness;
- The current study highlights both positive and negative outcomes from using Facebook, depending on the nature of engagement.