Motivators of Online Vulnerability: The Impact of Social Network Site Use and FOMO.

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Abstract

Continued and frequent use of social network sites (SNS) has been linked to a fear of missing out (FOMO) and online self-promotion in the form of friending and information disclosure. The present paper reports findings from 506 UK based Facebook users (53% male) who responded to an extensive online survey about their SNS behaviours and online vulnerability. Structural equation modelling (SEM) suggests that FOMO mediates the relationship between increased SNS use and decreased self-esteem. Self-promoting SNS behaviours provide more complex mediated associations. Longitudinal support ($N = 175$) is provided for the notion that decreased self-esteem might motivate a potentially detrimental cycle of FOMO-inspired online SNS use. The research considers the implications of social networking on an individual's online vulnerability.

Keywords: Online social networks; FOMO; self-esteem; structural equation modelling; online vulnerability

1. Introduction

Social networking sites (SNS) are a pervasive force in today's digitally driven society offering users the ability to develop and maintain their social spheres in interactive, multimedia rich online environments (boyd & Ellison, 2007). Constant connectivity to SNS such as Facebook is becoming increasingly common through the widespread availability of internet connectivity and a plethora of socially enabled digital devices. Increased connectivity to SNS has been linked to a fear of missing out (FOMO), a psychological state in which people become anxious that others within their social spheres are leading much more interesting and socially desirable lives (Przybylski et al., 2013). An under-researched but rising area of academic interest, previous studies have focussed on the potential impact of FOMO on users' digital behaviour in terms of use and device checking (Przybylski et al., 2013). To date FOMO has not been discussed in the realms of online vulnerability. In the following research, a set of analyses that link SNS use, FOMO and psychological vulnerability are outlined.

Online vulnerability can be defined as an individual's capacity to experience detriments to their psychological, reputational, or physical wellbeing (Davidson & Martellozzo, 2012) as a result of the experiences that they may encounter whilst engaging in online activities. Direct associations between SNS use and online vulnerability present a complex research landscape. SNS use has been found to provide an abundance of benefits for an individual's psychosocial wellbeing, including increases in social support, connectivity, and self-esteem (Burke & Kraut, 2014; Ellison, Steinfield & Lampe, 2007). A recent cross-sectional structural equation modelling based analysis by Wang et al. (2014) of 337 college students (M = 19.6 years, 765% female) in China found that frequent social use of SNS was positively linked to increases in wellbeing.

Use of SNS, however, has also been found to harbour a 'dark side' in terms of an individual's potential exposure to online vulnerability. A myriad of sensationalised anecdotes in the popular press have included instances of identity theft (BBC, 2015), cyber-harassment (Mail Online, 2015) and stranger danger (New York Times, 2016). While these purported experiences can be largely attributed to the few and not the masses, away from the media panic academic studies have nevertheless demonstrated consistent associations between increased SNS use and a variety of online vulnerabilities, including incidents of data misuse, online harassment, and exposure to inappropriate content (boyd & Ellison, 2008; Brandtzaeg, Luders & Skjetne, 2010; Staksrud, Ólafsson & Livingstone, 2013).

Exposure to online vulnerability does not automatically necessitate psychological vulnerability (Livingstone & Smith, 2014). However, there is compelling evidence to suggest that exposure to online vulnerability may result in adverse consequences for a SNS user's psychological wellbeing (Patchin & Hinduja, 2010; Keipi, Oksanen, Hawdon, Näsi & Räsänen, 2015). For this reason this study argues that the purportedly positive benefits of engaging with SNS are likely to be offset if an individual reports experiencing increased exposure to online vulnerability.

Testing associations between SNS use and online vulnerability provide an indication of the potential benefits and consequences of frequent social media use. However, such tests are unlikely to provide an adequate explanation of the factors that make some users more susceptible to online vulnerability than others. In the following, these factors are explored.

1.1 Vulnerability factors

Staksrud et al. (2013) suggest that merely being an online social network user does not in itself make a person susceptible to online vulnerability; vulnerability is instead dependent on the way in which an individual interacts with the site. Online practices including self-

disclosure and the accumulation of large unmanageable online networks (Buglass et al., 2016; Staksrud et al., 2013) have been cited as being contributory factors to online vulnerability.

It has been suggested that such online self-promoting behaviours might be driven by a user's attempt to regulate psychological needs deficits relating to social control, social connectivity, and belonging derived from perceived feelings of social ostracism (Carpenter 2012; Vorderer, Krömer & Schneider, 2016). On Facebook, these perceptions are borne from an individual's ability to view a constantly updating stream of multimedia content (e.g., status updates) and friending behaviours exhibited by members of their online network. This information is intended to provide the individual with a means of keeping informed about the social lives and interests of their connections. However, social monitoring on this scale can be problematic. For example, viewing the status updates and photographs of a 'friend' at a party to which the individual user has not been invited has the potential to fuel perceptions and fears of being socially ostracised.

The perception and fear of online social ostracism has been most recently linked to FOMO. FOMO is a psychological trait described as a *"pervasive apprehension that others might be having rewarding experiences from which one is absent"* (Przybylski et al., 2013, p.1841). In the context of SNS, FOMO promotes a state of continuous psychological flux in which a user's tendency for FOMO drives SNS use which in turn drives further feelings of FOMO (Przybylski et al., 2013). Associations between FOMO and SNS have to date focused on FOMO as a psychological driver of user engagement and device checking. Little attention has been paid to the effect of increased SNS use on FOMO itself, in spite of claims that the phenomenon is likely to become increasingly embedded in an SNS user's psyche as SNS use intensifies (Przybylski et al., 2013).

Feeling excluded from ones' social connections has been seen to lead to decreases in psychological wellbeing (Bevan, et al., 2012). In terms of FOMO itself, Przybylski et al.

(2013) reported that increased levels of FOMO were indicative of decreased levels of life satisfaction and general mood. On this basis therefore it might be assumed that suffering from FOMO has the potential to negatively impact on any psychological benefits from using SNS.

The impact of FOMO on a user's potential to experience online vulnerability is a somewhat more complex affair. At present no empirical evidence exists to suggest a direct link between FOMO and incidents of vulnerability. However, previous research has alluded to links between online self-promotion behaviours and online vulnerability (Dredge, Gleeson, & de la Piedad Garcia, 2014). It has been suggested that individuals fearing ostracism are likely to compensate for a lack of perceived control in their online lives by self-promoting themselves via editing and updating content on their profiles (Trepte & Reinecke, 2013). Furthermore, while empirical research into the consequences of FOMO, or indeed the fear of social ostracism, have thus far been lacking in terms of links with social connectivity and belonging, researchers have made connections between SNS use and a user's ability to self-promote through increasing their social capital in order to boost their self-worth (Ellison et al., 2007). On this basis, it is therefore plausible that individuals experiencing deficits in social needs as a result of FOMO might be more likely to seek out increased social capital through the accumulation of larger online networks.

Concerns have been raised regarding increased self-disclosure and friending on social network sites due to their apparent role in increasing opportunities for users to experience incidents of online vulnerability (Debatin et al., 2009; Davidson & Martellozzo, 2012). It is therefore expected that one or indeed a combination of these behaviours, whilst potentially offering psychological benefits for SNS users coping with needs deficits, will ultimately lead to an increased capacity for users to experience online vulnerability and therefore result in an overall increase in user vulnerability.

Furthermore, it has been suggested that individuals experiencing FOMO may find themselves in a state of "self-regulatory limbo" (Przybylski et al., 2013, p.1842), with individuals entering a cycle of behaviour in which they seek to reaffirm their identity and self-esteem by spending an increasing amount of time online, which in turn may lead to further fears of missing out, an increased capacity for self-disclosing and friending behaviours, and ultimately further decreases in social and psychological wellbeing.

1.2 Hypotheses

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

H1: Increased SNS use will be positively associated with psychological wellbeing.

H2: Increased SNS use will be positively associated with reported exposure to online vulnerability.

H3: Increased reported exposure to online vulnerability will mediate the relationship between SNS use and psychological wellbeing.

H4: Increased SNS use will be positively associated with increased FOMO.

H5: FOMO will mediate the relationship between SNS use and psychological wellbeing.

H6: FOMO will be positively associated with an increase in online self-promotion.

H7: Online self-promoting behaviours will mediate the relationship between FOMO and online vulnerability.

H8: Detriments in psychological wellbeing will lead to increases in SNS use, FOMO and further decreases in psychological wellbeing over time.

The overall theoretical model (see Figure 1) that incorporates our hypotheses and that is tested within this study therefore aims to integrate the literature supporting the cross-sectional role of SNS use and FOMO as a predictor of online vulnerability, with the notion that the hypothesised detrimental effects of SNS user on user wellbeing might be cyclic in nature.

Insert Figure 1 here

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2. Method

Data from online surveys were used to explore the relationship between SNS use, FOMO, self-promoting behaviours, online vulnerability, and psychological wellbeing.

2.1 Sample

Five-hundred and six UK based Facebook users, aged between 13 and 77 years old (Mean Age = 20 years 7 months; SD = 9 years 10 months; 53% male), responded to an extensive online survey about social networking behaviours, psychological wellbeing, and their experience of online vulnerability. Participants were recruited from three populations stratified by age: (1) School aged adolescents (N=291) between 13 and 17 years from five socio-economically diverse UK schools; (2) Undergraduate students (N=90) from a large UK university; and (3) Online adult users (N=125) recruited via online advertisements. Seventeen participants were removed from the analysis due to missing data, producing a sample size of 489 (247 male, 242 female). In return for their time, all participants were eligible for entry into a prize draw to win online vouchers. Appropriate ethical procedures were observed for all three sub samples. For school based participants, school and parental consent were obtained prior to the study.

2.2 Measures

The online survey contained a battery of pre-established scales, sample demographics and study-specific measures.

Sample Demographics. Six items addressing age, gender (*0 for male; 1 for female*) and Facebook demographics**:** duration of the participant's Facebook membership (*in years*), digital device preference (*smart phone, PC, or tablet*), Facebook logout preferences (*ranging*

from 1"never" to 5 "always"), and Facebook privacy settings *("anyone", "only friends", "different settings for different people" or "don't know").*

SNS use. A one item measure was used to assess an individual's daily use of Facebook. Responses were given on a 5-point scale ranging from *1 (0-15 minutes)* to *5 (Over an hour).*

Fear of Missing Out (FOMO). The 10-item Fear of Missing Out scale (Przybylski et al., 2013). Responses to items (e.g., "I fear others have more rewarding experiences than me") were positively anchored on a 5-point scale ranging from 1 (*Not at all true of me*) to 5 (*Extremely true of me*). The scale produced an average score ranging from 1 to 5, with higher scores indicating increased levels of FOMO. The FOMO scale demonstrated good internal consistency (Cronbach's α = .88) complimenting previous studies (Przybylski et al., 2013).

Online self-promoting behaviours. Operationalised by three variables (network size, profile data, and self-disclosure). These are described as follows:

Network Size. One item assessed Facebook user network size: Reponses were given as a self-reported numerical estimate.

Profile Data. A list of 15-items (e.g., "status updates", "email address") typically displayed on Facebook profile pages used to determine the magnitude of the participants' online data disclosure. Participants selected "*yes*" or "*no*" to indicate use on their page. Positive responses were summed to provide an estimation of the total number (from 0 to 15).

Self-Disclosure. A 12-item scale (Cronbach's α = .88), adapted from the 10-item Self-Disclosure Index (SDI; Miller et al., 1983) indicating willingness to make emotional self-disclosures on Facebook assessed self-disclosure. Two additional items were added to the scale to represent liking and anger ("What I like and dislike about others" and "Things that anger me"); both forms of emotional disclosure commonly witnessed on SNS platforms (Forest & Wood, 2014). Responses were positively anchored on a 5-point scale ranging from 1 (*Not at all willing*) to 5 (*Very willing*), with higher scores indicating increased willingness

to participate in online emotional disclosures. The SDI and previously adapted versions of the scale have been shown to have good internal consistency (Trepte & Reinecke, 2013) for samples involved in technology based research.

Online Vulnerability. Prior exposure to online vulnerability on Facebook was measured by six items combining questions and theory presented by Binder et al. (2012) and Debatin et al. (2009). Participants were asked to indicate how frequently they had personally experienced or see others encounter a range of online vulnerabilities (e.g., "critical or hurtful comments", "stalking and/or harassment"). Responses to each item ranged from 1 (*Very rarely*) to 5 (*Very often*). The scale items (Cronbach's α = .91) produced an average score ranging from 1 to 5, with higher scores indicating increased exposure to online vulnerability whilst on Facebook.

Self-Esteem. Psychological wellbeing was operationalised as self-esteem and measured using the 10-item Rosenberg Self-Esteem (RSE; 1965) scale (Cronbach's α = .88). The RSE contains an equal number of positively (e.g., "On the whole, I am satisfied with myself") and negatively (e.g., "At times I think I am no good at all") worded items. Responses were given on a 4-point scale ranging from 1 (*Strongly disagree*) to 4 (*Strongly agree*). Negative items were recoded so that high scores indicated higher self-esteem. The RSE was originally developed for use with adult samples for which it has demonstrated good internal consistency and construct validity (Robins, & Trzesniewski, 2001). Precedent for use of this scale with an adolescent sample had previously been set in research by Bagley & Mallick (2001).

2.3 Procedure

Participants completed a secure online survey, optimised for use on desktop computers, tablets, and mobile devices. Data was collected in two phases over a period of 6 months (Time 1 = 0 months and Time 2 = 6 months).

2.4 Data analysis

Analysis of the data combined standard statistical methods and structural equation modelling (SEM). Confirmatory factor analysis (CFA), structural modelling, and mediation effects were tested using AMOS v.21 (Arbuckle, 2014).

Model fit for CFA and SEM based analyses were determined by checking for consistency across a range of alternative fit indices (Hooper et al., 2008). Five fit indices were reported for all models: the Chi-Square ($\chi 2$) test, the Tucker Lewis Index (TLI; Tucker & Lewis, 1973), the Comparative Fit Index (CFI; Bentler, 1990); the Root-Mean-Square Error of Approximation (RMSEA; Steiger, 1990); and the Standardised Root Mean Square Residual (SRMR; Joreskog & Sorbom, 1982). Good model fit is indicated by a non-significant $\chi 2$ test (Byrne, 2010). The $\chi 2$ test has a tendency to underestimate model fit in larger sample sizes (> 400) (Byrne, 2010). As such for this study the TLI, CFI, RMSEA and SRMR were considered as more reliable indicators of model fit. The alternative fit indices ranged in value from 0 to 1. Recommended cut-off values of >.95 for TLI and CFI and <.05 for RMSEA and RMR (with upper limit of 90% CI <.08) were used to indicate good fit (Hu & Bentler, 1999).

3. Results

The findings of the present study are outlined first as a large-scale cross-sectional analysis seeking to demonstrate potential associations between SNS use, FOMO, and online vulnerability. Secondly, a two-phase longitudinal dataset is used to demonstrate whether these associations are evident over time.

3.1 Cross-sectional Analysis (N = 489)

The sample reported a mean duration of Facebook membership of 4 years 8 months (SD = 2 years 0 months). Facebook was the primary social network site used by 322 (66%) of the sample. Almost two thirds (60%) of the sample reported having their Facebook profiles set to

friends only, with a further 18% reporting having additional filters in place to increase the security of their information.

Descriptive statistics and bivariate correlations for all study variables were calculated (Table 1). In light of the directional hypotheses one tailed significance values are reported for all correlations. Significant p-values of $<.01$ are reported.

Correlational support was not found for H1, no significant association was found between SNS use and self-esteem. However, in line with H2 a modest positive association was evident between SNS use and online vulnerability. Increased use of Facebook was indicative of an increase in reported exposure to online vulnerability. A modest but significant correlation between online vulnerability and self-esteem with individuals reporting increases in exposure to online vulnerability reported lower self-esteem. This therefore had the potential to impact negatively on their psychological wellbeing.

In terms of FOMO and in support of H4, SNS use was significantly associated with FOMO. Increasing use of Facebook was indicative of increasing levels of FOMO. Variables related to social networking behaviours (network size, profile data, and disclosure) were also positively associated with FOMO. Although, the correlations were rather small, they nevertheless indicated that increased feelings of FOMO might lead to Facebook users reporting higher friend connectivity and data disclosure; H6 was therefore supported. Furthermore, increases in all social networking behaviours were significantly associated with increases in online vulnerability. No significant association was evident between these behaviours and levels of self-esteem.

Insert Table1 here

3.1.1 SEM Modelling

SEM analysis was used to test for causal paths and potential mediating effects. SNS use, network size, and profile information were single item observed variables in the model. The factor structures of all scales (i.e., FOMO, Disclosure, Online Vulnerability and Self-esteem) were tested using CFA prior to the main SEM analysis. Scales with more than 5 items remaining after CFA (i.e., FOMO and Disclosure) were parcelled in order to optimise the parameter to sample ratio (Bentler & Chou, 1987).

Parcelling is a procedure in which individual scale items are combined and used as the observed variables for a latent factor. Items were ranked according to their factor loading and then distributed sequentially across a minimum of 2 parcels per factor (Kenny, 2014). The sum of items for each parcel was then calculated. Two parcels were created for each of the Disclosure factors and three parcels for the FOMO scale. The parcelled structural model was a good fit to the data (χ^2 (254) = 442.04, $p < .001$; CFI = .97, RMR = .05, TLI = .97, RMSEA = .04) with an acceptable item to sample ratio of 1:7 (Bentler & Chou, 1987). All items loading onto latent variables were strong (>.06) and significant ($p < .001$).

Direct path estimates (Figure 2) demonstrated mixed results in terms of associations between SNS use, online vulnerability, and psychological wellbeing. In support of H2 a small but significant direct effect was found between SNS use and online vulnerability ($p = .02$) indicating that increases in SNS use was associated with increases in exposure to online vulnerability. Support for H1 was not evident, as the association between SNS use and self-esteem was non-significant ($p = .31$).

A significant direct effect between online vulnerability and self-esteem was found indicating that increases in exposure to online vulnerability were associated with decreases in self-esteem (p < .01). This result suggests that exposure to online vulnerability on a social network site has the capacity to directly impinge on an individual's psychological wellbeing. This provided good grounds for testing H3.

In terms of FOMO, a significant positive effect was found between SNS use and FOMO. This was in line with hypothesis H4 and indicated that increases in SNS use were associated with increases in FOMO ($p < .001$). Significant direct associations between FOMO and both online vulnerability and wellbeing were also evident. Increases in FOMO were associated with increases in online vulnerability ($p < .01$) and decreases in self-esteem ($p < .001$). This provided good grounds for testing potential mediating effects hypothesised in H5.

FOMO also appeared to be a significant driver of specific online self-promoting behaviours, lending support to H6 with positive direct paths to network size, profile data and emotional disclosure ($p < .01$). The association between online self-promoting behaviours and vulnerability and wellbeing was mixed. Increases in network size and profile data were significantly associated with increases in online vulnerability ($p < .01$), however, only profile data was significantly linked to self-esteem ($p < .01$). There was no direct link between emotional self-disclosures and vulnerability or self-esteem ($p > .05$).

3.1.2 Mediation Analysis

Indirect effects were used to test the mediation effects hypothesised in H3, H5 and H7. As hypothesised in H5, FOMO mediated the relationship between SNS use and psychological wellbeing, with increases in SNS use, leading to increases in FOMO which in turn resulted in decreases in self-esteem ($\beta = -.03$ [-.04, -.02], $p < .001$). Likewise, FOMO was found to mediate the relationship between SNS use and online vulnerability ($\beta = .05$ [.02, .08], $p < .001$). Increased use of SNS, increased an individual's feelings of FOMO which in turn increased their reported exposure to online vulnerability. In support of H3, online vulnerability mediated the relationship between SNS Use and self-esteem ($\beta = -.02$ [-.04, -.01], $p < .001$), with increases in SNS use and online vulnerability leading to reduced self-esteem. Support for H7 was gained with both network size ($\beta = .08$ [.04, .15], $p < .001$) and

profile data (β = .14 [.08, .22], p < .001) mediating the relationship between FOMO and online vulnerability. Increases in FOMO resulted in increases in both network size and profile data, which in turn both lead to increases in potential exposure to online vulnerability. No significant indirect effect via disclosure was evident (p > .05).

Insert Figure 2 here

3.2 Longitudinal Analysis (N = 175)

One hundred and seventy-five of the time 1 (T1) sample (Mean Age = 20 years 6 months; SD = 10 years 0 months; 48% male), responded to the both phases of the online survey. This represented approximately 35% of the overall sample. Attrition analysis with *t*-tests was used to compare the main study variables between the Time 2 (T2) sample and participants who completed T1 only. No significant systematic attrition was found.

Mean totals and bivariate correlations (Table 2) were calculated. Significant *p*-values of <.01 are reported. Temporal support for H2 was evident in the correlational analysis. SNS use at T1 was significantly correlated with online vulnerability at T2, indicating that increased SNS use resulted in increased reported exposure to online vulnerability over time. No significant association was found between SNS use and self-esteem. In contrast to the findings from the cross-sectional analysis, a direct association between online vulnerability at T1 and self-esteem at T2 was not significant. However, a significant association was found between self-esteem at T1 and vulnerability at T2, indicating that decreased self-esteem at T1 lead to increases in online vulnerability at T2. In terms of FOMO, temporal support for H4 was evident with a significant association between SNS use at T1 and FOMO at T2. Increased SNS use lead to increased perceptions of FOMO over time.

3.2.1 SEM Analysis

Due to sample size a simpler path estimated SEM model was implemented. This approach tested H8 exploring the mutually influencing role of SNS use, FOMO, online vulnerability, and self-esteem over time (Figure 3). To control for changes in Facebook use a self-reported indicator of Facebook use change (*coded 0 for No and 1 for Yes*) was included as a potential mediator in the T1 to T2 relationships. Age and gender were controlled for. The model was a good fit to the data (χ^2 (14) = 9.76, *p* = .78; CFI = 1.00; TLI = 1.00; RMSEA = .00; RMR = .06).

Direct support for a link between SNS use and online vulnerability was not evident over time with SNS use at T1 bearing no significant association with vulnerability or self-esteem at T2 (*p* > .05). However, SNS use at T1 was significantly associated with FOMO at T2, with increases in engagement leading to a small but positive increase in FOMO (β = .16, *p* <. 05). A significant indirect effect was also found between SNS use at T1, FOMO at T2 and self-esteem at T2. This provided temporal support for H5. Decreased self-esteem at T1 was also indicative of increases in SNS use (β = .13) and FOMO (β = .14) at T2 (*p* < .05), indicating the start of a potential cycle of behaviour and thus providing support for H8.

Insert Figure 3 here

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4. Discussion

The present study explored the potential associations between SNS use, FOMO, and online vulnerability. Using SEM based analyses of cross-sectional and longitudinal self-reported datasets, the results provide an insight into the behavioural predictors of online vulnerability. The main findings can be summarised as follows. First, direct support for a positive relationship between SNS use and psychological wellbeing (H1) was not evident. Second, the online vulnerability hypothesis (H2) was supported; SNS use was found to be a significant

predictor of reported increases in exposure to incidents of online vulnerability. Furthermore, a significant indirect effect (H3) was evident in in the relationship between SNS use and wellbeing via online vulnerability. Such that increases in SNS use lead to increases in online vulnerability which in turn lead to decreases in self-esteem. Third, support was also garnered for the FOMO hypotheses (H4 & H5). Increased SNS use lead to increased levels of FOMO, with significant indirect effects evident between SNS use, FOMO and psychological wellbeing in both cross-sectional and longitudinal analyses. Cross-sectional support was also found for associations between SNS use, FOMO and online vulnerability. Fourth, in terms of online self-promoting behaviours correlational support was found for H6, with increases in FOMO being indicative of increases in network size, profile data and emotional disclosure. Fifth, the mediation hypothesis H7 was supported. Indirect effects were evident with network size and profile data mediating the relationship between FOMO and online vulnerability and profile data mediating the relationship between FOMO and self-esteem. Finally, longitudinal support for a potential cyclic relationship between the main study variables (H8) was evident with low self-esteem at T1 seemingly driving increases in SNS use and FOMO at T2.

The direct influence of SNS use on psychological wellbeing was non-significant in all analyses. While at odds with previous research into the purported psychosocial benefits of engaging in SNS (Burke & Kraut, 2014; Ellison et al., 2007), this result was not entirely unexpected. Social network site use and its subsequent consequences are rather subjective. Individual motivations for use and experiences encountered online have the capacity to determine the extent to which a user gains an enriching experience. As such, and akin to findings from other areas of digital technology research, a consistent and simple direct psychological effect of SNS use may be non-existent (McKenna & Bargh, 2000).

Despite the lack of a significant direct effect, the study supported the role of the tested mediators. Findings indicated that individuals engaging in increased levels of SNS use tended

to be more prone to experiencing online vulnerability through their FOMO driven capacity to experience online vulnerability and consequent decreases in psychological wellbeing. The findings supported the notion that the SNS users have the capacity to experience detriments in their psychological wellbeing due to their use with SNS.

The association between SNS use and FOMO was consistently significant across all analyses. Individuals engaging in increased levels of SNS use were found to exhibit raised levels of FOMO. A possible reason for this is that the use of SNS promotes social surveillance. In the past an individual may not have realised that their best friend had gone to the cinema or a party without them. The advent of SNS, however, means that such an event is unlikely to go unnoticed. Frequent exposure to such Facebook posts has the capacity to illicit the belief in users that their connections are leading happier and more desirable lives than their own due to an increased capacity for upward social comparisons (Chou & Edge, 2012). As such, the more an individual engages with such content, the more likely it is that they might feel that they are missing out.

The hypothesised impact of FOMO on online vulnerability was slightly more mixed. While FOMO mediated the relationship between SNS use and vulnerability, it was also found to drive online friending and disclosure which provided further opportunities for individuals to experience online vulnerability. These findings suggest that individuals experiencing feelings of FOMO might turn to self-promoting behaviours in order to compensate for their feelings of social inadequacy. However, in doing so they might inadvertently be leaving themselves open to increased vulnerability.

The impact of FOMO on psychological vulnerability was found to be significant in the cross-sectional data. FOMO mediated the relationship between SNS use and self-esteem, demonstrating that increases in FOMO lead to direct and significant decreases in wellbeing. This finding is in line with the previously reported associations in the FOMO literature

(Przybylski et al., 2013). Furthermore, it is also in line with the negative psychosocial consequences that have been identified in studies exploring the impact of individuals making frequent online social comparisons (Fox & Moreland, 2015; Lee, 2014). The longitudinal results complemented these findings with a significant association between SNS use at T1 and FOMO at T2; adding further support to the notion that prolonged use of SNS can result in an increased capacity for potentially damaging social comparisons and feelings of social exclusion. Furthermore, an indirect effect between use at T1 and wellbeing at T2 via FOMO at T2, served to maintain the potentially detrimental psychological effects of such perceptions of social ineptitude.

The cyclic nature of detrimental SNS use found some support in the longitudinal analysis. Decreased self-esteem at T1 was found to be a driver of both SNS use and FOMO at T2. FOMO theory (Przybylski et al., 2013) suggest that SNS users can unwittingly find themselves engaging in a cycle of use in which users engaging with the site experience FOMO and associated detriments in wellbeing (directly or via behavioural vulnerability) and then seek to boost their sense of wellbeing by further increasing their use and as a result their sense of FOMO. Such a cycle, the beginning of which appears to be evidenced by this data, is likely to plunge the user into a spiral of behaviour which is unlikely to offer them the sense of control or social belonging they increasingly crave and without positive intervention or complete abstinence from the site they are unlikely to break. Further research of this cyclic effect with larger and more stable groups across at least three time points is recommended to determine the true extent to which such potentially debilitating online behaviour exists.

The present study has several limitations. Firstly, the sample size for both datasets while large enough to facilitate the models presented lacked the power to perform non-parcelled complex SEM models. While parcelling may reduce sample size estimation bias (Little, Mijke, Gibson & Schoemann, 2013) concerns about potential information loss abound

(Bandalos, 2008). We therefore acknowledge that future research should look to source larger representative samples in order to limit the need for such procedures to be implemented. Secondly, the two phase longitudinal analysis of FOMO does not provide adequate data points to fully investigate cyclic effects. Future research should consider the use of three time-points to fully exploit the cyclic potential.

To conclude, the results presented in this study provide a good indication of the potentially negative effects that SNS use can have on an individual's psyche and the resultant behaviours and vulnerabilities that might ensue. These findings carry practical implications for SNS users as they suggest the need for both offline and online interventions, in the form of information campaigns to make users aware of the potential warning signs of problematic FOMO inspired SNS use and the ways in which engaging in online behaviours can render an individual vulnerable.

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Table 1:

Descriptive statistics and bivariate correlations for the full sample (N = 489)

	Mean (SD)	2	3	4	5	6	7
1. SNS Use	2.54 (1.48)	.25**	.25**	-.08	.14**	.33**	.30**
2. FOMO	2.00 (.78)		.28**	-.29**	.18**	.29**	.28**
3. Online Vulnerability	2.52 (1.09)			-.22**	.28**	.16**	.33**
4. Self-Esteem	2.95 (.56)				-.09	-.04	-.03
5. Network Size	424.28 (419.46)					-.01	.29**
6. Disclosure	2.00 (.79)						.28**
7. Profile Data	8.48 (3.46)						

df = 487; ***p* <.001; **p* < .01 (one-tailed)

Table 2

Descriptive statistics and bivariate correlations (N = 175)

| | | SNS Use | | FOMO | | Online Vulnerability | | Self-esteem | |
	Mean	T1	T2	T1	T2	T1	T2	T1	T2
1. SNS Use	T1 2.58		.56**	.43**	.37**	.33**	.28**	-.05	-.08
	T2 2.53			.32**	.37**	.18*	.23*	-.16	-.11
2. FOMO	T1 1.96				.55**	.38**	.31**	-.30**	-.20*
	T2 1.92					.24*	.27**	-.27**	-.34**
3. Online	T1 2.47						.58**	-.19*	-.17
Vulnerability	T2 2.40							-.26**	-.21*
4. Self-	T1 2.94								.59**
Esteem	T2 2.98								

df = 173; **p <.001; *p < .01 (one-tailed)

Figure 1. Theoretical model of the main hypothesised cross-sectional and longitudinal effects associated with SNS use, FOMO, online vulnerability and psychological wellbeing.
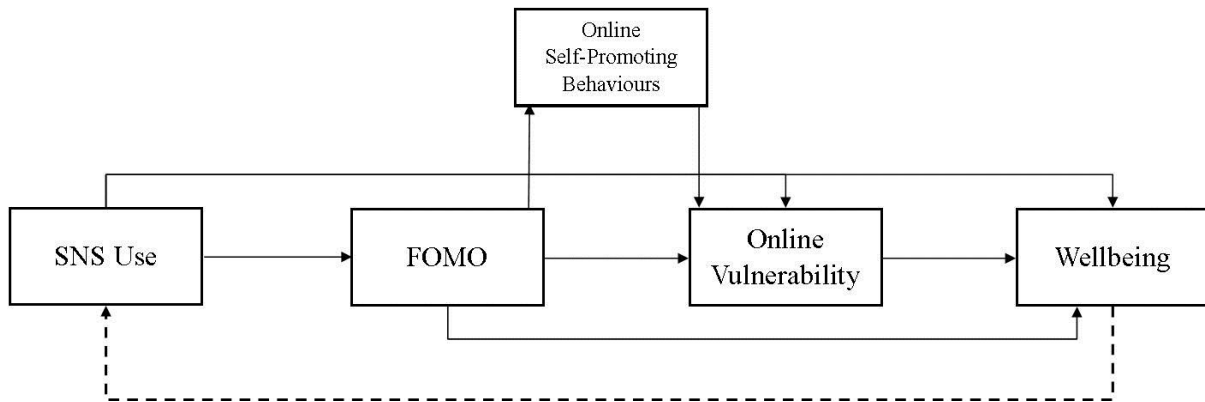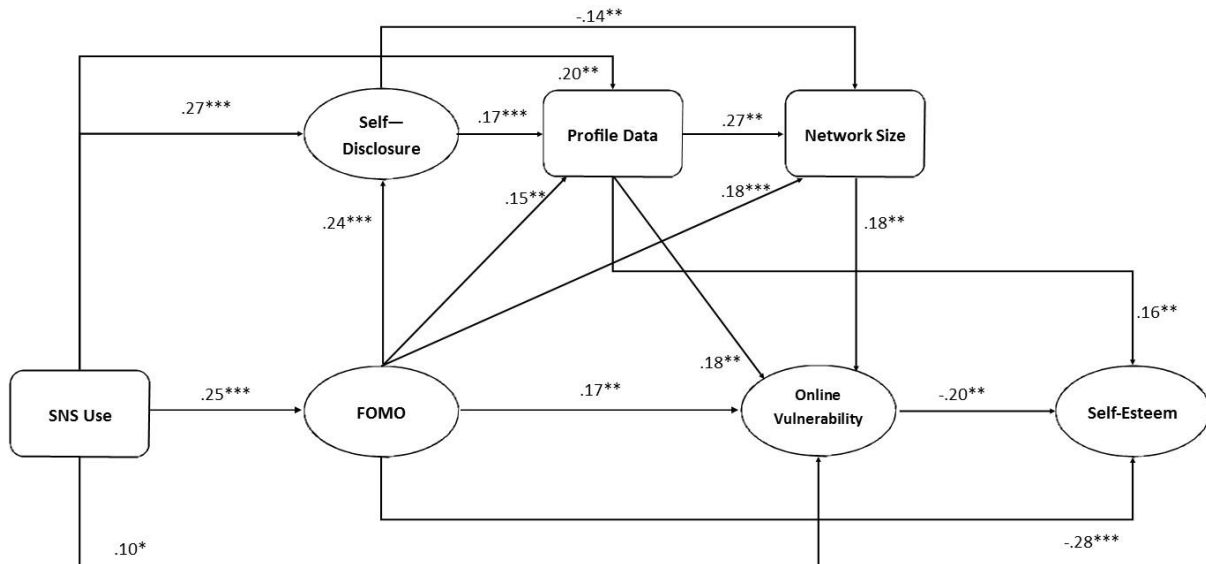
Figure 2. Illustration of direct paths and standardised coefficients (N = 489) for the structural SEM model. SNS use, network size and profile data represented by observed variables. All other variables represent latent variables. Only significant main effects are shown to aid interpretation of the model.

Key: *p < .05; **p < .01; ***p < .001; ^p=.05

Figure 3. Temporal associations between the main study variables (N= 175). All variables represent mean totals. Only significant main effects are shown to simplify model interpretation.