

**Social network engagement and subjective well-being: a life-course
perspective**

Daniel L. Wheatley¹ and Sarah L. Buglass²

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Corresponding Author: Daniel L. Wheatley, Department of Management, Birmingham Business School,

University of Birmingham, UK. Email: d.wheatley@bham.ac.uk

¹ Department of Management, Birmingham Business School, University of Birmingham, UK.

² Department of Psychology, School of Social Sciences, Nottingham Trent University, UK.

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Abstract

Social networking is a digital phenomenon embraced by billions worldwide. Use of online social platforms has the potential to generate a number of benefits including to well-being from enhanced social connectedness and social capital accumulation, but is also associated with several negative behaviours and impacts. Employing a life-course perspective, this paper explores social networking use and its relationship with measures of subjective well-being. Large-scale UK panel data from wave 3 (2011-12) and 6 (2014-15) of *Understanding Society* reveals that social network users are on average younger, aged under 25, but that rising use is reported across the life-course including into old age. Probit, multinomial logistic, and ANCOVA and change-score estimations reveal that membership, and greater use, of social networks is associated with higher levels of overall life satisfaction. However, heavy use of social networking sites has negative impacts, reflected in reductions in subjective well-being. Socio-economic disadvantage may drive these impacts among young (in education), unemployed and economically inactive heavy SNS users.

Keywords: social networking sites; subjective well-being; life-course; social connectedness; panel regression analysis

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Introduction

Online social networking sites (SNS; boyd and Ellison, 2008) are a ubiquitous method of socialising in the digital era. SNS afford users multimedia rich, interactive platforms to develop and manage their online social spheres, and facilitate the sharing of extensive amounts of personal and social information. These platforms are used for a range of purposes from developing and managing personal social networks, to promoting business enterprise and organizing mass social movements (Brym et al., 2014; Vitak, 2012). As global users have grown to number in their billions (Ofcom, 2016; Statista, 2017), use of SNS has been most often associated with young adults (Ofcom, 2016; Pew Research, 2015) although use is reported throughout the life-course including among the over 50s (Khalaila and Vitman-Schorr, 2018; Yu et al., 2016a). Frequent engagement with SNS may offer a range of social and psychological benefits including increases in social support and connectedness, social capital accumulation and subjective well-being (Chesley and Johnson, 2014; Ellison et al., 2007, 2014; Magsamen-Conrad and Greene, 2014; Oh, Ozkaya and LaRose, 2014; Verduyn et al., 2017). However, the existing evidence base is conflicting, also linking the use of SNS to a range of negative psycho-social vulnerabilities (Buglass et al., 2016; Wilcox and Stephen, 2013). Given the significant growth and potentially diverse demography of SNS use, we employ a life-course perspective to examine patterns of SNS use and related impacts with respect to subjective well-being.³

³ Well-being is linked to an individual's capacity to manage their daily lives in a productive and meaningful manner, encapsulating subjective well-being, psychological functioning and interpersonal relationships (Tennant et al., 2007). It is an important predictor of health, economic and social outcomes in adult populations (Diener and Tay, 2015). Subjective well-being is a self-reported well-being indicator consisting of emotional responses

In the past decade, SNS usage has become a global phenomenon with over two billion worldwide users (Statista, 2017) engaging regularly with a plethora of sites including Facebook, YouTube, Twitter and LinkedIn. Active Facebook memberships, for example, have increased from around 100 million in 2008 to around 1.94 billion in 2017 (Statista, 2017). Social networking sites, commonly referred to by the umbrella term ‘social media’ (which also includes blogs, video streaming sites and massively multiplayer online role-playing games (MMORPGs)), are web-based services that provide users with the opportunity to create a digital personal profile, curate and share content, and connect to fellow users (boyd and Ellison, 2008) by forging mutual online connections (e.g., Facebook and LinkedIn) or by non-reciprocal following (e.g. Twitter).

In the UK, it is estimated that over 73% of internet users regularly maintain at least one such SNS profile, with young adults (aged 16-24 years) identified as the most prominent users (Ofcom, 2016). Similar demographic patterns are also evident in the USA and other digitally developed countries (Pew Research, 2015; We Are Social, 2015). Existing research has, therefore, tended to focus on older adolescent and college-aged users (e.g. Davidson and Martellozzo, 2013). Recently evidence of increasing popularity amongst middle-aged and older generations (Hutto et al., 2015; Ofcom, 2015, 2016; Pew Research, 2014; Yu et al., 2016a) has indicated a need for researchers to encompass a wider age range of users in their efforts to identify key behaviours and potential impacts associated with SNS use (Wilson et al., 2012).

and experienced feelings which can be both positive and negative. It can act as a global assessment of well-being reflected in measures of satisfaction with life, and can offer insight into specific domains e.g. satisfaction with leisure, health, income (Pavot and Diener, 2013).

A life-course approach to research involves consideration of both chronological age and the range of events and milestones, referred to as transitions, which influence decisions and experiences throughout the life-course, for example, time in education, employment/unemployment or retirement (Worth and Hardill, 2015: 2-5). To date research into SNS use across the life-course is limited, with findings often focusing on making age related distinctions in network accumulation and content sharing. For example, a study by McAndrew and Jeong (2012) of 1026 worldwide SNS users (18 – 79 years) found that young female users spent more time online, had larger networks of contacts, and were more likely to post photographs than male users or their older counterparts. Similarly, a study by Ozimek and Bierhoff (2016) of 335 European SNS users aged between 16 and 56 years demonstrated that increased activity (e.g., social interactions, posting pictures, and engaging in social comparison) on SNS such as Facebook are more apparent amongst younger users. In addition to gaps in understanding with regard to SNS use across the life-course, there is also a lack of research, especially that drawing on large-scale data-sets, which directly addresses potential psycho-social impacts of SNS use in this context.

Social Networking Sites, Psycho-Social Impacts and Well-being

In the offline world, social networks provide a range of positive psycho-social opportunities, including access to social, professional and emotional support, sources of information and the ability to forge and maintain relationships (Berkman and Glass, 2000). Use of online social networking platforms such as Facebook, Twitter and LinkedIn, offer individuals the potential to access these perceived offline benefits online (Joinson, 2008). For instance, SNS can be used to manage an individual's social spheres, share information (in the form of text, photographs and video), seek information (from individuals, groups and pages) and

communicate with others (via wall posts or direct messaging with individuals or groups). Mobile technologies have facilitated access and use of SNS on the move (Fortunati et al., 2014), removing geographic and temporal restrictions to social networks. As such, the use of SNS offers individuals the ability to seek and fulfil a range of social needs, e.g. social connectedness and support, with greater ease and frequency, with potentially important impacts to well-being (Joinson, 2008; Papacharissi and Mendelson, 2011).

One of the primary psycho-social impacts of greater connectedness through SNS is that it offers individuals the potential to become more closely linked with others. Social connectedness refers to the quantity and quality of social relationships (Topoel, 2012, 357), and has a close causal relationship with leisure activities such as engagement in SNS (Park et al., 2009). The presence of social connections provides opportunities for leisure participation and its recorded positive outcomes, including for well-being, while at the same time involvement in leisure activities itself generates social connections. The concept of 'linked lives' (Elder, 1995) is useful in understanding this phenomenon in a life-course context. This concept recognizes that individual attitudes, expectations, and behaviours are heavily influenced by social networks, especially intimate connections. SNS have the potential to increase both the number and intensity of these connections, including the influence of family, friends, and others (Chesley and Johnson, 2014: 590). SNS could also act as a substitute for face-to-face interaction among those who are socially isolated or lonely, characteristics closely linked with socio-economic status and health, potentially enhancing their well-being (Arampatzi et al., 2018).

SNS, further, supports the accumulation of social capital (Ellison et al., 2014; Magsamen-Conrad and Greene, 2014; Steinfield et al., 2008; Verduyn et al., 2017). The accumulation of

social capital, social resources that are available through social interactions (Bourdieu, 1986) such as access to information, opportunities and support that might be otherwise unavailable (Putnam, 2001), is a common motivator of SNS use (Yoo and Jeong, 2017). This is important as individual social capital has been shown to have a positive association with a range of subjective well-being measures (Arampatzi et al., 2018: 100; Portela et al., 2013). SNS platforms not only provide users with greater opportunity for gaining social support from their existing connections but also aid them in increasing their social spheres and the subsequent social capital that they can access (Ellison et al., 2014; Joinson, 2008, Valenzuela, Park and Kee, 2009). Individuals who belong to large and diverse online social circles are thought to have more social capital than those with fewer online connections (Valenzuela et al., 2009), leading to increased levels of perceived social connectedness and belonging, social trust, and subjective well-being (Steinfeld et al., 2008; Valenzuela et al., 2009).

The life-course is closely intertwined with patterns and benefits of SNS use including social connectedness and social capital accumulation. It is debated whether individuals accumulate social capital as they age. Occupational networks grow throughout the career, however, there is commonly acknowledged to be a decline in social capital in older age (McDonald and Mair, 2010). Continuity theory (Atchley, 1989, cited in Yu et al, 2016b, 1449) would suggest SNS could be used to off-set the loss of social status and connections associated with life-course transitions e.g. retirement. Evidence suggests that the nature of SNS use and networks may change with age and key transitions e.g. socio-economic status. Young people often report narrower peer-focused networks, while more diverse networks encompassing children, family and friends, are reported by older users (Pfeil et al., 2009). Meanwhile, research using the 2012 US Health and Retirement Study which found SNS use to be greater among younger, female, widowed, and homemaking individuals (Yu et al., 2016b), suggested patterns

reflected individuals using SNS to complement, or in the case of the latter two groups compensate for, existing social status. SNS use further, may contribute to feelings of social connectedness to a greater extent as people age (Yu et al., 2016a). Khalaila and Vitman-Schorr (2018: 9), exploring a sample of 502 internet users aged 50 and over in Israel, found positive effects on quality of life and lower levels of loneliness from internet use including SNS. SNS users gain social currency from the public articulation of their networks (Couldry et al., 2016: 123; Gerlitz and Helmond, 2015).

The potential benefits of SNS engagement are not, however, attributable to all with some previous studies reporting associations between heavy SNS use and reductions and/or deficits in well-being and life satisfaction (Howley and Boyce, 2015: 13; Kalpidou et al., 2011; Kross et al., 2013). Research has suggested that the effects, however, may be nuanced relative to personality traits (Howley and Boyce, 2015), off-line psychological characteristics (e.g. users with low self-esteem; Forest and Wood, 2012), and the nature of SNS use. Using a sample aged 15-44 in the Netherlands, Arampatzi et al. (2018) found that socially isolated individuals may encounter more negative impacts, as they are more likely to become involved in negative activities and/or may find it difficult to express their true self online. Rae and Lonborg (2015) found that maintenance of existing social networks was associated with well-being benefits, whereas creation of new networks had negative effects. Passive use of SNS i.e. following or monitoring others, may have negative effects on subjective well-being due to users suffering from feelings of envy and making social comparisons, while active use may have positive effects associated with users gaining social capital and feelings of social connectedness (Verduyn et al., 2017).

Over-use of SNS is a common theme in explaining deficits in SNS user well-being. A survey study by Satici and Uysal (2015) exploring the relationship between problematic SNS use and the well-being of 311 undergraduate students found significant associations between heavy SNS use and decreased levels of participant life satisfaction, subjective happiness, and vitality. Similarly, Kross et al. (2013), exploring the impacts of high levels of SNS use among 82 US Facebook users, recorded reductions in reported well-being associated with ‘a lot’ of use compared with not using Facebook. Finally, Arampatzi et al. (2018) reported a negative relationship between hours of SNS use and happiness among SNS users who self-reported feelings of social disconnectedness and loneliness. Such findings complement previous research that has postulated that heavy SNS use is associated with maladaptive constructs which might reduce an individual’s subjective well-being, including reductions in self-esteem (Kuss and Griffiths, 2011), family loneliness (Ryan and Xenos, 2011), and lower levels of academic performance (Kalpidou et al., 2011).

Heavy use of SNS has been associated with social network diversity (Buglass et al., 2016). With SNS platforms being increasingly used for a range of different social purposes, a blurring of the boundaries between social, family and professional life is becoming increasingly common (Bulger et al., 2007; Hislop and Axtell, 2009; Lowry and Moskos, 2008; Vitak, 2012). SNS such as LinkedIn, have quite narrowly defined purpose (e.g. to publicise business, business activity, and to create and maintain a professional network for job seeking), however, others present a considerably less well-defined social landscape. Aside from the well-documented problems of constant digital connectivity and issues regarding work-life balance (Chesley and Johnson, 2015), research has demonstrated that individuals who are frequently using sites such as Facebook and Twitter may be prone to deficits in well-being

due to the complexities of managing large, contextually collapsed networks of social, family and professional contacts (Buglass et al., 2016; Vitak, 2012).

The existing literature suggests a range of potential impacts from SNS use. It is also evident that demographics and life-course stage are likely to influence the extent to which users might experience positive or negative effects, including those attributed to social connectedness and social capital. The extant literature, though, remains limited as it is primarily based upon small-scale primary data collection exercises and experiments and/or is limited in focus to certain demographic groups e.g. young SNS users. This paper extends the existing body of SNS and well-being research by exploring the impact of SNS use on subjective well-being across the life-course using large-scale panel data and a range of well-being measures derived from the UK Understanding Society longitudinal survey (Understanding Society, 2016). In doing so the paper contributes to understanding, answering the following research questions: (1) what is the relationship between levels of engagement in SNS and measures of subjective well-being? (2) How is the level of reported subjective well-being related to the life-course characteristics of the sample studied? (3) Is subjective well-being negatively impacted by SNS use?

Method

Sample

Data for this study are drawn from Understanding Society, alternatively titled the UK Household Longitudinal Survey (UKHLS). Understanding Society is a nationally representative longitudinal study, which began in 2009 with an aim of recruiting over 100,000 individuals in 40,000 households. The main survey used in this study comprises data collected from all adult members aged 16 and over in each household each year. The survey

had a total sample of 70,751 in wave 3, and 64,916 in wave 6, with a relatively even gender split (48.3% male in both wave 3 and 6). Respondents of Understanding Society reported a mean age of 37.9 years in wave 3 (minimum 16 years, maximum of 104 years) and 38.3 years (minimum 16 years, maximum of 102 years) in wave 6. Further information on the sample and data collection procedures in Understanding Society is available in Burton, Laurie and Lynn (2011). Understanding Society includes a range of variables relevant to the analysis of SNS use and well-being, including measures of digital technology use, subjective well-being, employment, health, and a range of other economic and social descriptors. The analysis in this paper uses data from wave 3 (2011-12) and 6 (2014-15) of Understanding Society, the only waves at this time which included relevant questions on SNS membership and use.

Measures

Within waves 3 and 6 of Understanding Society all respondents were asked questions regarding their engagement with SNS. Respondents were asked an initial question focusing on membership, *‘Do you belong to any social networking web-sites?’* with responses comprising yes or no. Those who responded yes were subsequently asked *‘How many hours do you spend chatting or interacting with friends through social web-sites on a normal week day, that is Monday to Friday?’* The latter single-item measure of time spent using SNS collected and reported in Understanding Society, which focuses on more active use (Verduyn et al., 2017), is used in our analysis. Although containing an inherent scale, it is grouped as follows: (i) no time spent on social networking websites, (ii) infrequent users (report SNS membership but do not use every day), (iii) less than one hour, (iv) 1-3 hours, and (v) 4 or more hours (comprised of responses ‘4-6 hours’ and ‘7 or more hours’).⁴ The category ‘no

⁴ The Understanding Society question on daily SNS use offers respondents the following options: (i) none, (ii) less than one hour, (iii) 1-3 hours, (iv) 4-6 hours, and (v) 7 or more hours.

time spent on social networking websites' is derived from those who report not having a SNS membership. While some smaller-scale studies have employed multi-item measures of SNS engagement e.g. Ellison et al. (2007), the use of single-item SNS use measures is consistent with many existing contributions in SNS research. These include, for example, Davidson and Martellozzo (2013), who utilise a series of single-item measures of SNS and digital media use, drawing on samples collected in the UK and Bahrain, in their exploration of use in the context of internet safety. Brym et al. (2014) use two single-item measures of social media engagement from the Gallup World Poll in their analysis of the role of new communications media in the 2011 Egyptian Uprising. Yu et al. (2016a, 2016b) draw on a single-item question on SNS use in their research on older SNS users. Yoo and Jeong (2017) conducted a primary longitudinal survey in South Korea, which captured engagement using a single-item measure of daily hours of SNS use. Finally, Arampatzi et al. (2018) analysed panel data from the Dutch Longitudinal Internet Studies for the Social Sciences (LISS) survey, which provides single-item survey responses on both SNS engagement and time spent on SNS.

The analysis considers a number of subjective well-being measures comprising both domain satisfaction (satisfaction with amount of leisure time, health, income) and a measure of satisfaction with life overall. Both overall and domain satisfaction measures are explored for two reasons. Firstly, the extant literature is indicative of drivers and patterns of SNS use differing throughout the life-course and among different demographics, alongside patterns of leisure, income and health, reflecting movements into and out of paid work, ageing and a range of other factors (McAndrew and Jeong, 2012; Pfeil et al., 2009; Yu et al., 2016a, 2016b). Understanding the relationship between SNS use and different domains of individual well-being (leisure time, income and health) is therefore of particular relevance to understanding the psycho-social impacts of SNS use. Secondly, existing research into aspects

of subjective well-being has shown differentiated effects across well-being domains, including for example Powdthavee and Van Den Berg (2011) and Wheatley (2017a), providing a further rationale for our analysis of both overall and domain satisfaction measures. A range of demographic, e.g. age, gender; socio-economic e.g. current economic activity, and; time-use variables, e.g. working hours, hours spent caring for the ill/elderly, are also included to provide insight into the characteristics of individuals reporting different levels of engagement in SNS.

Data analysis

The analysis is conducted in three stages, initially utilising panel ordinal probit models to provide insight into the relationship between different forms of well-being and SNS use. This is followed by multinomial logistic regression models which provide greater understanding of the life-course characteristics of individuals relative to levels of SNS use. Multinomial logistic regression is chosen for the second stage of the analysis given the structure of the dependent variable. While the variable has an inherent scale, it is presented in categorical non-linear form in Understanding Society rendering this method of analysis appropriate. In these stages of analysis separate models consider the relationship between use of SNS and chronological age, and key transitions in the life-course measured by reported economic status. The final stage of the analysis employs ANCOVA and change-score analysis to provide greater evidence of the impacts of changing levels of subjective well-being relative to reported levels of engagement in SNS. This approach is consistent with that used in Lim and Putnam (2010) who explored impacts of religion on subjective well-being using the US Faith Study, and Wheatley (2017a) which used Understanding Society to measure subjective well-being impacts of autonomy in paid work. ANCOVA models incorporate a measure of satisfaction for the previous period (wave 3) into the probit analyses to adjust for initial

differences in satisfaction. The change-score models consider differences in satisfaction levels between survey waves, comparing responses at wave 6 against wave 3 i.e. changes in reported satisfaction relative to levels of SNS use.

Empirical Findings

Consistent with reported overall growth trends in SNS use (Statista, 2017), the data from Understanding Society reveals a significant increase in membership between waves 3 and 6. In 2011-12 just over 45% of respondents reported SNS membership, while this had increased to 55% by 2014-15. The observed growth is approximately the same among both men and women, equal to around 22 percent growth between the two waves of Understanding Society. Women are marginally more likely to report a SNS membership (57% compared with 53% of men in 2014-15), consistent with existing evidence (Yu et al., 2016b). While it has been noted that there has been increased popularity among older users (Hutto et al., 2015; Ofcom, 2015; Pew Research, 2014; Yu et al., 2016a), both SNS membership and use remain dominated by those under 30, accounting for around 90% of the under 30s in 2014-15. Particular growth in SNS membership has been recorded among the middle aged groups, however, as summarized in Figure 1. Around two-thirds of 40-49 year olds and just under half of those aged 50-59 reported SNS membership by 2014-15. Turning to transitions in the life-course, over 90% of those in education (including apprenticeships) report SNS membership, while almost 70% of the employed and around 60% of the self-employed and unemployed report SNS membership. In contrast, less than 20% of retirees are members of social networking sites.

Among SNS members light use of up to three hours per day is most common, with 53% of respondents report using SNS for up to one hour per day in 2014-15, and a further 25.9%

reporting spending 1-3 hours on SNS. Around one-in-seven SNS members report, on average, spending little or no time on SNS each day. While overall proportions reporting 4-6 hours (4.7%) and 7 or more hours (2.3%) of daily use are relatively small, combined they account for a more substantial proportion of younger SNS users, 18.2% of 16-24 year olds and 8% of 25-29 year olds. The highest proportions of heavy SNS use is also found among those in education (14.1% report 4-6 hours and 5.2% report 7 or more hours), and among the unemployed (8.6% report 4-6 hours and 7.2% report 7 or more hours).

Panel ordinal probit regression

The panel ordinal probit regression analysis is summarized in Table 1. We generate findings that are consistent with existing evidence on the relationship between a range of controls and subjective well-being. Age is found to follow the u-shape with satisfaction (Blanchflower and Oswald, 2008). Being in employment, education or retirement is associated with greater well-being, and unemployment has a generally negative effect (Krueger and Mueller, 2012). Women report greater well-being, but this is not present for satisfaction with leisure, reflecting their greater household contribution (Wheatley, 2017b). Higher education levels generally equate to greater satisfaction, while those who are divorced or widowed report lower satisfaction (Dolan et al., 2008). Lengthier hours of paid work have a negative association with leisure satisfaction, while higher income levels are associated with greater well-being but not for leisure satisfaction. These findings reflect the impacts of paid work in squeezing leisure time (Kahneman et al., 2006). Meanwhile, the provision of care for the ill/elderly has an overall negative association with well-being consistent with past evidence (e.g. Martin and Westerhof, 2003).

Turning to SNS use, life satisfaction is greater among those using SNS for up to one hour per day, but lower among those using SNS for four or more hours daily (Ellison et al., 2007; Howley and Boyce, 2015; Kalpidou et al., 2011; Kross et al., 2013; Magsamen-Conrad and Greene, 2014; Satici and Ursal, 2015). This initial finding indicates potentially lower levels of life satisfaction among heavy SNS users, who we know to be on average younger – a demographic generally considered to report higher levels of satisfaction with life, at least when compared with those in middle-age (Blanchflower and Oswald, 2008). Income satisfaction is lower among those reporting greater use of SNS. This finding is consistent with the greater use of SNS among the young including those in education — existing research suggests a growth in income satisfaction during the life-course (Plagnol, 2011) — and the unemployed/economically inactive who we would expect to report lower satisfaction with income (Krueger and Mueller, 2012). Satisfaction with health is generally greater among SNS users, in line with age-related patterns of use, but the results for the age models do suggest that satisfaction with health may be lower among heavy SNS users. Leisure satisfaction results are inconsistent and the age model results statistically insignificant. Other social activity variables suggest that greater television use is associated with higher levels of satisfaction with leisure, but lesser satisfaction in other areas of life (Frey et al., 2007; Knabe et al., 2010, 875). Those reporting more social interaction (meals with family, number close of friends) also report greater well-being, reflecting the benefits of these offline social activities.

Multinomial logistic regression

The second stage of the analysis, the multinomial models summarized in Table 2, provides deeper insight into the relationship between subjective well-being and SNS use, comparing individuals grouped by SNS use against those who report no SNS membership. The models

suggest that the 16-24 age group are those most likely to use social networking sites and be heavier users, consistent with the descriptive analysis and previous estimates (e.g. Ofcom, 2016; Pew Research, 2015). Older adults are significantly less likely to engage in, and particularly be heavier users of, SNS and the retired are the least likely to use SNS (evident in the large magnitude of effects found for this group). Consistent with the age profile of SNS users, those in education are most likely to use SNS. Alongside those in education, the unemployed are particularly likely to be heavy users. Aligned with these findings greater use of SNS is present among those on lower incomes.

The models suggest men are more likely to be heavy SNS users than women. SNS users are less likely to be married or widowed, again in line with the general age patterns observed. Results for those who are divorced or separated in model 1 (age) suggest these individuals may be heavier users, although results in model 2 (economic status) are conflicting casting some doubt over this observation. Those with intermediate and further education are the most likely groups to use SNS, and be heavier users, in line with other characteristics present. SNS users are less likely to have caring (ill/elderly care) responsibilities. However, those reporting particularly high levels of care (50 or more hours per week) may be heavier users of SNS. Alongside the patterns by economic activity (unemployed, inactive) this is likely to reflect some socially disadvantaged individuals who are not engaged in paid work due to caring responsibilities, using SNS in the absence of social (including work-related) connectedness (Yu et al., 2016b). Time spent watching television is also greater among heavier SNS users, consistent with these individuals engaging in these leisure activities in the absence of face-to-face interaction (Arampatzi et al., 2018). Those reporting infrequent SNS use are likely to watch less television than those who report no SNS membership. This could simply reflect age profiles, in that older adults including retirees, who form a considerable portion of those

without SNS membership, may watch more television as they have more time available (Frey et al., 2007). The number of meals with friends/family and number of close friends are both positively associated with higher levels of SNS engagement. This may again be driven by the overall younger age profile of heavier SNS users and, in turn, propensity for them to live with their family. For number of close friends it could also reflect use of SNS in creating and maintaining more extensive friendship networks (Ellison et al., 2007, 2014; Joinson, 2008, Valenzuela et al., 2009).

Results pertaining to subjective well-being suggest that greater use of SNS is associated with lower levels of satisfaction with leisure time, but that heavy users report higher levels of leisure satisfaction. It is likely that this relationship reflects the younger age and economic status (education or unemployed/economically inactive) of heavy users. Existing research is consistent with these groups reporting higher satisfaction with leisure relative to levels leisure satisfaction among those in paid work (Kahneman et al., 2006). Health satisfaction is higher among SNS users than non-users, in this case driven by non-users being older on average and reporting worse states of health. Greater use of SNS is associated with lower satisfaction with income. Among heavier users this is in line with lower incomes and socio-economic status reported. Differences with light users are not statistically significant in model 1, though, suggesting little observed difference in this case. Extending the probit analysis the multinomial models show that satisfaction with life overall is higher among SNS users, but lower among heavy users. The latter is important given the profile of heavy users who are predominantly either young and in education or unemployed/inactive, and report lower incomes.

ANCOVA and change-score analysis

The final stage of analysis provides evidence of the impacts of SNS use on well-being. The results of the ANCOVA and change-score analysis, summarized in Table 3, suggest negative impacts on satisfaction with leisure, particularly among those reporting heavier SNS use (evident in magnitude and statistical significance). This finding could be indicative of heavy users engaging in high levels of SNS use in the absence of other sources of social connectedness (both leisure activities and paid work), and/or these individuals engaging in more negative online behaviours (Arampatzi et al., 2018; Buglass et al., 2016). The results are not indicative of causal effects on health satisfaction associated with reported SNS use. This finding is as we would expect as it is likely a driver associated with other, demographic, variations including age and disability, etc. The negative relationships observed in the probit and multinomial analysis among heavier users likely reflect SNS use among those who have existing ill health. Impacts on satisfaction with income are negative among those reporting greater use of SNS. This finding provides further strength to the assertion that some heavy SNS users are individuals that are unemployed or economically inactive, and whose incomes and satisfaction levels are likely to be negatively affected by this economic status (Krueger and Mueller, 2012). Finally, for life satisfaction we find statistically significant negative impacts among heavier users. This strengthens and extends the earlier findings, as it suggests that heavy SNS use, and in turn the drivers of heavy use including social disconnectedness, low self-esteem and others (Arampatzi et al., 2018; Kuss and Griffiths, 2011; Vitak, 2012), could act to reduce overall life satisfaction.

Discussion and Conclusion

This paper has contributed to understanding of the relationship between use of social networking websites and subjective well-being, using large-scale panel data from wave 3 (2011-12) and 6 (2014-15) of Understanding Society. The almost exponential growth of

social networking in the last decade, as well as a number of highly publicised cases of negative behaviours on these platforms, renders this study of the relationship between SNS use and subjective well-being particularly timely. Existing evidence suggests that use of SNS has the potential to deliver a range of psycho-social benefits, including to social connectedness, social capital accumulation and subjective well-being (Chesley and Johnson, 2014; Ellison, et al., 2007; Oh, et al., 2014), but can be associated with negative behaviours and well-being impacts (Buglass, et al., 2016; Wilcox and Stephen, 2013). Employing a life-course perspective, taking account of both chronological age and transitions throughout the life-course including education, employment/unemployment and retirement, we explored patterns of SNS use. We find, consistent with recent evidence (Hutto et al., 2015; Ofcom, 2015; Pew Research, 2014; Yu et al., 2016a), that use is greatest among younger individuals aged under 25. SNS use is reported across the life-course including into old age, and particular growth has been recorded in membership and use among the middle-aged.

Our analysis provided a number of important findings with respect to the relationship between SNS use and subjective well-being. The probit models provided important insight into the relationship between frequency of engagement in SNS and satisfaction with amount of leisure time, health, income and life overall. The findings suggest that membership, and greater use, of social networks may offer well-being benefits, perhaps reflecting the social connectedness and social capital derived from their use. SNS use is associated with higher levels of satisfaction with health and life overall. Heavy users (those reporting four or more hours of use per day) of SNS, however, generally report lower levels of well-being. This extends existing research, including the findings of Verduyn et al. (2017), by highlighting negative well-being effects of heavy SNS use among those reporting active use. The second stage of the analysis used multinomial logistic regression to provide additional findings with

respect to life-course characteristics of those reporting different levels of SNS use. The multinomial analysis suggested that heavy SNS users are predominantly younger (in education), unemployed or economically inactive, and in some cases are subject to socio-economic disadvantage including low incomes or challenging household circumstances (high levels of ill/elderly care), which is reflected in lower levels of subjective well-being. These findings correspond with the existing literature, while providing further insight into the characteristics of those reporting different SNS use. The final stage of analysis, using ANCOVA and change-score techniques, provided longitudinal evidence on the impacts of SNS use on subjective well-being. In particular, we find further evidence of the potential negative impacts of heavy SNS use. Heavy SNS users report reductions in satisfaction with leisure, income and life overall.

The findings in this paper are important in confirming the potential well-being benefits and negative effects of SNS use. In particular, the findings suggest that extensive SNS use has potentially considerable negative well-being effects. The paper is subject to certain limitations. The SNS measures used do not capture multi-dimensional usage, and as such are limited in the insight they can provide into the nature of SNS use. The data from Understanding Society also does not allow analysis of both passive (following) and active types of SNS use which could provide further insight into patterns of use and well-being impacts throughout the life-course. Further research is also required that will build on the apparent causality present in the relationships observed between SNS use and well-being. It is important to develop our findings which measure changes in well-being relative to SNS use and gain fuller understanding over a longer period of the drivers of these apparent well-being impacts associated with heavier SNS use. Notwithstanding these limitations, our findings contribute to the existing evidence base which is largely based on cross-sectional and small-

scale studies, as we present important insight into the relationship between SNS use and well-being using robust data from a large-scale longitudinal survey of the UK, Understanding Society. These findings suggest well-being benefits may be associated with use of SNS, but that heavy users report reductions in subjective well-being.

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Table 1: Panel ordinal probit regression models: subjective well-being and use of SNS

	Panel ordinal probit regression models							
	Models 1-4: Age				Models 5-8: Economic Status			
	Satisfaction with ...				Satisfaction with ...			
	Leisure	Health	Income	Life overall	Leisure	Health	Income	Life overall
<i>Economic status: reference is inactive</i>								
Employed	—	—	—	—	0.176***	0.256***	0.163***	0.203***
Self-employed	—	—	—	—	0.009	0.110***	0.070***	0.110***
Unemployed	—	—	—	—	0.080***	0.093***	-0.266***	-0.102***
Retired	—	—	—	—	0.832***	0.290***	0.603***	0.548***
Education	—	—	—	—	0.134***	0.387***	0.247***	0.376***
<i>Age: reference is 16-24</i>								
25-29	-0.081***	-0.083***	-0.187***	-0.104***	—	—	—	—
30-39	-0.138***	-0.202***	-0.263***	-0.197***	—	—	—	—
40-49	-0.087***	-0.274***	-0.278***	-0.290***	—	—	—	—
50-59	0.048**	-0.300***	-0.189***	-0.250***	—	—	—	—
60-69	0.529***	-0.106***	0.210***	0.103***	—	—	—	—
70 or over	0.733***	-0.079***	0.433***	0.296***	—	—	—	—
Gender (female)	-0.060***	0.006***	0.087***	0.081***	-0.078***	0.000	0.061***	0.066***
<i>Highest level of education: reference is no qualifications</i>								
Degree or equivalent	0.168***	0.188***	0.208***	0.121***	0.121***	0.172***	0.161***	0.085***
Further education ('A' level)	0.077***	0.086***	0.074***	0.058***	0.048***	0.077***	0.039*	0.029*
Intermediate education (GCSE)	0.056***	0.065***	0.047***	0.038***	0.036***	0.056***	0.021	0.016
<i>Marital status: reference is unmarried</i>								
Married or civil partnership	0.019*	-0.082***	-0.149***	-0.242***	0.002	-0.017	-0.101***	-0.182***
Divorced or separated	-0.080***	-0.171***	-0.327***	-0.319***	-0.053***	-0.180***	-0.309***	-0.318***
Widowed	0.102***	-0.063***	-0.081***	-0.157***	0.124***	-0.057***	-0.025	-0.116***
Monthly personal income (£,000s)	-0.010***	0.013***	0.092***	0.028***	-0.002	0.010***	0.090***	0.027***
Working hours (per week)	-0.005***	0.004***	0.003***	0.003***	-0.007***	0.000	0.000	0.000
Overtime hours (per week)	-0.014***	0.002*	0.002***	-0.002*	-0.015***	0.001	0.002*	-0.002**
<i>Care (ill/elderly) hours per week: reference is zero</i>								
1-4	-0.017	0.035**	0.008	0.010	-0.008	0.019	0.005	-0.003
5-9	-0.066***	-0.020**	-0.053***	-0.028	-0.060***	-0.037*	-0.058***	-0.044**
10-19	-0.086***	-0.041	-0.078***	-0.069***	-0.083***	-0.055**	-0.083***	-0.083***
20-34	-0.013	-0.007	-0.017*	-0.001	-0.013	-0.011	-0.019**	-0.005
40-49	-0.342***	-0.124***	-0.171***	-0.243***	-0.339***	-0.123***	-0.166***	-0.239***
50 or more	-0.405***	-0.071***	-0.109***	-0.279***	-0.394***	-0.049*	-0.095***	-0.258***
Hours watching television per day	0.009***	-0.039***	-0.024***	-0.026***	0.008***	-0.038***	-0.020***	-0.023***

Meal w/ family/friends in last 7 days	0.123***	0.115***	0.217***	0.148***	0.143***	0.112***	0.244***	0.143***
Number of close friends	0.007***	0.004***	0.005***	0.009***	0.008***	0.004***	0.006***	0.010***
<i>Hours spent on social networking sites daily: reference is no SNS membership</i>								
Infrequent use (not every day)	-0.002	0.031**	-0.001	0.021	-0.032**	0.040***	-0.025*	0.014
Less than one hour	0.005	0.027***	0.002	0.029***	-0.036***	0.050***	-0.022**	0.031***
1-3 hours	0.004	-0.012	-0.035**	0.010	-0.035***	0.025*	-0.047***	0.025*
4 or more hours	-0.029	-0.058**	-0.113***	-0.085***	-0.058**	-0.006	-0.094***	-0.047**
<i>Model diagnostics</i>								
Pseudo R2	0.037	0.010	0.025	0.017	0.039	0.010	0.025	0.018
Log likelihood	-125720.00	-124110.50	-126811.00	-109963.10	-125457.90	-124056.50	-126753.80	-109874.30
LR Statistic	9789.33	2489.12	6494.47	3874.03	10295.06	2575.82	6589.10	4036.35
Prob(LR Statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of observations	71,428	71,444	71,407	71,441	71,422	71,438	71,401	71,435

Source: Understanding Society wave 3 (2011-12) and 6 (2014-15)

Notes: ***p < .001, **p < .005 and *p < .010.

Missing values for working hours and overtime entered as zero. Other measures of time-use including housework hours and leisure activities (arts, culture, sport) missing from the analysis as not collected in the same survey years as engagement in social networking sites.

Table 2: Multinomial logistic regression models: Hours spent on SNS daily

Multinomial logistic regression models: Hours spent on social networking sites daily								
Reference category is no time spent on social networking sites								
	Model 1: Age				Model 2: Economic Status			
	Infrequent use (not every day)	Less than one hour	1-3 hours	4 or more hours	Infrequent use (not every day)	Less than one hour	1-3 hours	4 or more hours
Constant	-1.633***	0.411***	0.480***	-0.037	-2.569***	-1.181***	-1.692***	-2.763***
<i>Economic status: reference is inactive</i>								
Employed	—	—	—	—	-0.054	-0.160***	-0.104*	-0.093
Self-employed	—	—	—	—	0.115***	0.017	0.059**	0.075*
Unemployed	—	—	—	—	-0.040	-0.123**	0.075	0.459***
Retired	—	—	—	—	-0.87***	-1.447***	-1.979***	-2.360***
Education	—	—	—	—	0.561***	0.990***	1.431***	1.644***
<i>Age: reference is 16-24</i>								
25-29	-0.018	-0.443***	-0.750***	-1.223***	—	—	—	—
30-39	-0.493***	-0.992***	-1.554***	-2.114***	—	—	—	—
40-49	-0.927***	-1.780***	-2.558***	-3.277***	—	—	—	—
50-59	-1.388***	-2.339***	-3.353***	-4.195***	—	—	—	—
60-69	-1.744***	-2.922***	-4.216***	-5.269***	—	—	—	—
70 or over	-2.425***	-3.966***	-5.364***	-6.629***	—	—	—	—
Gender (female)	0.028	-0.310***	-0.394***	-0.555***	-0.037	-0.378***	-0.468***	-0.653***
<i>Highest level of education: reference is no qualifications</i>								
Degree or equivalent	1.153***	1.081***	0.556***	0.201*	1.328***	1.364***	0.940***	0.640***
Further education ('A' level)	0.841***	0.856***	0.605***	0.236**	1.015***	1.160***	1.034***	0.787***
Intermediate education (GCSE)	0.726***	0.667***	0.429***	0.389***	0.839***	0.853***	0.690***	0.722***
<i>Marital status: reference is unmarried</i>								
Married or civil partnership	-0.081**	-0.029	-0.210***	-0.365***	-0.451***	-0.644***	-1.115***	-1.538***
Divorced or separated	0.174***	0.174***	0.085	0.118	-0.281***	-0.614***	-1.074***	-1.355***
Widowed	-0.328***	-0.217***	-0.199*	-0.464*	-0.957***	-1.262***	-1.650***	-2.259***
Monthly personal income (£,000s)	0.077***	0.041***	-0.054***	-0.030	0.053***	-0.005	-0.147***	-0.179***
Working hours (per week)	0.005***	0.006***	0.005***	-0.003*	0.008***	0.012***	0.012***	0.007***
Overtime hours (per week)	-0.003	-0.004*	0.000	0.004	0.000	0.001	0.007***	0.015***
<i>Care (ill/elderly) hours per week: reference is zero</i>								
1-4	0.092*	0.028	-0.054	-0.035	0.012	-0.125***	-0.267***	-0.264***
5-9	-0.054	-0.049	0.109	0.149	-0.138*	-0.224***	-0.142**	-0.142
10-19	-0.166*	-0.202***	-0.150*	-0.024	-0.230**	-0.348***	-0.370***	-0.295**
20-34	0.004	-0.025	-0.064	-0.009	-0.007	-0.049*	-0.105**	-0.059

40-49	-0.322	0.199*	0.081	0.480*	-0.362	0.099	-0.076	0.260
50 or more	-0.197	-0.088	0.238**	0.232	-0.223*	-0.155**	0.149	0.089
Hours watching television per day	-0.043***	-0.061***	0.030***	0.116***	-0.053***	-0.078***	0.012*	0.094***
Meal w/ family/friends in last 7 days	0.008	0.092**	0.205***	0.223***	0.239***	0.462***	0.020***	0.019***
Number of close friends	0.003	0.021***	0.027***	0.028***	-0.001	0.015***	0.626***	0.715***
<i>Subjective well-being measures</i>								
Satisfaction with amount of leisure	-0.013	-0.008	0.010	0.041**	-0.031***	-0.038***	-0.029***	-0.007
Satisfaction with health	0.020**	0.016**	0.000	-0.002	0.032***	0.034***	0.024***	0.025
Satisfaction with income	-0.013	-0.015**	-0.033***	-0.061***	-0.026**	-0.029***	-0.040***	-0.054**
Satisfaction with life overall	0.019	0.033***	0.024**	-0.045**	0.026*	0.049***	0.045***	-0.018
<i>Model diagnostics</i>								
Pseudo R2	0.1690				0.1324			
-2 Log likelihood	-74,941.01				-78,234.72			
LR Statistic	30,472.22				23,874.04			
Prob(LR Statistic)	0.000				0.000			
Number of observations	71,357				71,351			

Source: Understanding Society wave 3 (2011-12) and 6 (2014-15)

Notes: ***p < .001, **p < .005 and *p < .010.

Missing values for working hours and overtime entered as zero. Other measures of time-use including housework hours and leisure activities (arts, culture, sport) missing from the analysis as not collected in the same survey years as engagement in social networking sites.

Table 3: Panel change models: satisfaction and SNS use

	ANCOVA and change-score models											
	Leisure			Health			Income			Life overall		
	ANCOVA (Age) ^a	ANCOVA (Economic Status) ^a	Change-score ^b	ANCOVA (Age) ^a	ANCOVA (Economic Status) ^a	Change-score ^b	ANCOVA (Age) ^a	ANCOVA (Economic Status) ^a	Change-score ^b	ANCOVA (Age) ^a	ANCOVA (Economic Status) ^a	Change-score ^b
Satisfaction (wave 3)	0.187	0.184	—	0.162	0.161	—	0.239	0.239	—	0.236	0.236	—
<i>Hours spent on social networking websites daily: reference is no SNS membership</i>												
Infrequent use	0.005	-0.028*	-0.047*	0.007	0.016	0.016	-0.003	-0.029*	-0.002	0.027	0.025	0.021
Less than one hour	-0.001	-0.041*	-0.067*	-0.018	0.003	-0.022	-0.022	-0.043**	-0.021	0.017	0.025	0.029
1-3 hours	-0.010	-0.040	-0.157*	-0.085*	-0.038	-0.002	-0.119**	-0.113**	-0.156*	-0.125**	-0.092*	-0.106
4 or more hours	-0.111	-0.135*	-0.341***	-0.042	0.023	-0.004	-0.226***	-0.207***	-0.214*	-0.200***	-0.148**	-0.303**
Constant	—	—	0.216***	—	—	0.169***	—	—	0.349***	—	—	0.071***

<i>Model diagnostics</i>												
Pseudo R2	0.066	0.068	0.001	0.031	0.032	0.001	0.068	0.068	0.001	0.051	0.051	0.001
No. observations	26,217	26,214	27,575	26,225	26,222	27,584	26,196	26,193	27,549	26,226	26,223	27,585

Source: Understanding Society wave 3 (2011-12) and 6 (2014-15)
Notes: ***p < .001, **p < .005 and *p < .010.
^a Estimated with ordinal probit regression with all control variables.
^b Estimated with OLS.

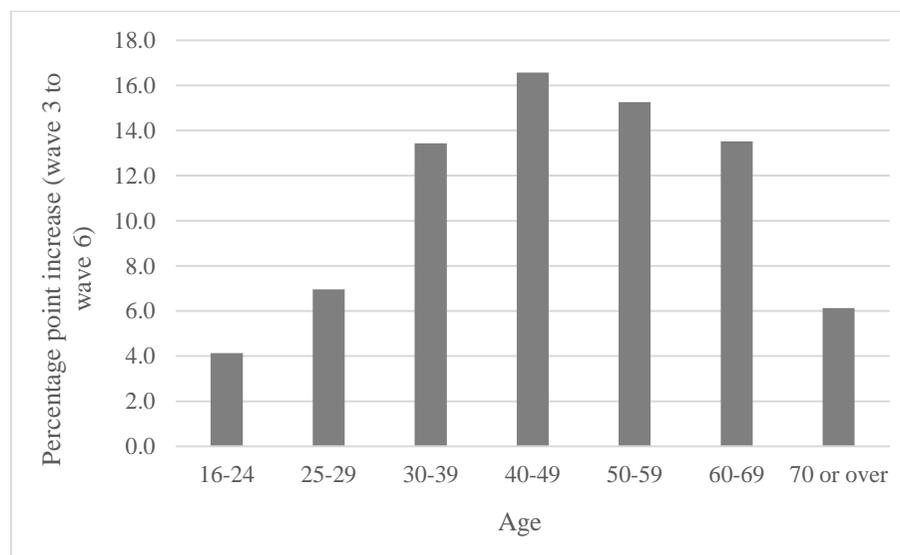


Figure 1: Change in SNS membership between wave 3 and 6 of Understanding Society (Source: Understanding Society, wave 3 (2011-12) and 6 (2014-15))