



## Full length article

## Does social network site use buffer against well-being loss when older adults face reduced functional ability?

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## ABSTRACT

We examine the role of the Internet in dealing with problems in later life by analyzing whether direct and buffering models of social support can be applied to social network site (SNS) use. Whereas the direct model implies a positive effect of time spent using SNSs on subjective well-being, and a negative effect on social loneliness, the buffering model suggests that SNS use should reduce the (negative) consequences of stressors. Using a large, longitudinal survey from the Netherlands, we find evidence for the buffering model but not for the direct-effects model. Functional disability had a negative impact on (changes in) well-being and this effect was smaller when older individuals used SNSs more. Furthermore, we found a similar buffering effect of making online purchases, which we interpret as support for the idea that replacing offline with online activities may be a compensation strategy. This implies that Internet use may play a role in coping with health-related problems connected to later stages of the life course.

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Although older adults have traditionally been conceived of as laggards when it comes to using the Internet (Selwyn, Gorard, Furlong, & Madden, 2003), more recent research suggests that they may be catching up to younger age cohorts (Pew Research Center, 2014). This is an interesting development, since several studies have hinted at the potential of the Internet in helping them to adjust to day-to-day problems that can accompany aging (Coelho & Duarte, 2016; Hayes, van Stolk-Cooke, & Muench, 2015; Wright, 1999, 2000). Interviews with older adults participating in online communities, for example, showed that the community was an important resource for receiving feedback and comforting (Pfeil, Zaphiris, & Wilson, 2009). Yet, research that has considered the elderly has tended to involve small-scale intervention studies (see Coelho & Duarte, 2016 for an overview) or focused on older technologies such as e-mail or general personal computer and Internet use (Heo, Chun, Lee, Lee, & Kim, 2015; Shapira, Barak, & Gal, 2007; Slegers, van Boxtel, & Jolles, 2012; Waldron, Gitelson, & Kelly,

2005).

Despite a growing amount of research in this area, we need to know more about the extent to which older adults derive benefits from the Internet. Research is particularly essential to better understand the use and implications of more recent technologies like social network sites (SNS). SNS use may be particularly beneficial for older individuals who may be in need of things this technology can readily offer (social interactions, coping resources, etc.), especially when they begin to experience daily-functioning problems, such as limited mobility, presbycusis, or other issues. In the present study, we used data from a large, longitudinal survey of older adults living in the Netherlands to examine two different pathways through which SNS use impacts subjective well-being and social loneliness. In the following sections, we first provide background information about social support among older adults and then evaluate two complementary explanations for the outcomes of older adults' SNS use (direct and buffering effects).

### 1. Social support, SNS use, and health outcomes among older adults

Social support generally involves the connection between social

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relationships and well-being (Cohen, Gottlieb, & Underwood, 2000). Although it is a critical resource throughout the lifespan, there is reason to believe that older adults have unique support needs. Vaux (1988) argues that a person's needs, circumstances, and roles change throughout the lifespan. These changes may alter the form, amount, and network characteristics of support considered appropriate (Löckenhoff & Carstensen, 2004; Vaux, 1988). Lack of adequate social support among older individuals has been linked to higher morbidity and mortality rates, increased depression, and a variety of other mental health problems (Kawachi & Berkman, 2001; Thoits, 2011; Vanderhorst & McLaren, 2005).

Two general explanations have been offered for the effects of social support on well-being. First, the *direct-effects model* asserts that simply being involved in social relationships can lead to physical and psychological benefits (Aneshensel & Stone, 1982; Thoits, 1982), even in the absence of a specific stressor. Ties between individuals influence human health positively if they satisfy the need to be socially and emotionally connected with others (Sorkin, Rook, & Lu, 2002). Researchers have found that older adults benefit from the direct effects of companionship, which may lead to reduced stress, lower levels of morbidity and mortality, and improved psychological well-being (Antonucci, 1990; Rook, 1995). Yet, questions remain about whether *online* support can affect mental and physical health outcomes in similar ways. A second, potentially complementary, theoretical framework is the *buffering model* of social support, which posits that specific stressful events prompt individuals to seek out support (Cohen & Wills, 1985; Vaux, 1988). The buffering model suggests that social support serves to directly mitigate a stressor or one's appraisal of the stressor. For example, an older adult may receive advice to help solve a problem or feedback to change his or her perceptions of its severity. Researchers have linked the buffering model to positive health outcomes in terms of morbidity and mortality (Berkman & Syme, 1979; Cohen, 1988; House, Landis, & Umberson, 1988).

In recent years, several studies have been published examining the implications of support from online sources among older adults. Pfeil and Zaphiris (2007) investigated an online support community for older adults and found that older individuals enjoyed building a sense of community in this setting where they exchange all levels of supportive communication. Kanayama (2003) reported that older people liked the additional time provided by online communication to construct and think about what they want to contribute. Other researchers have found positive associations between perceived support availability and older adults' use of the Internet to communicate with others (Erickson & Johnson, 2011) and, more specifically, their friends and adult children (Waldron et al., 2005).

Although previous research suggests the potential of online support resources, adequate attention has not been given to the relationship between social support within SNSs and health outcomes for older adults. Yet, there is evidence to suggest the importance of SNS for support among other age groups. A survey conducted by researchers at the Pew Research Center showed that SNS users had significantly more support available than non-SNS users (Hampton, Goulet, Rainie, & Purcell, 2011). Support perceived or available in SNSs has also been linked with well-being in several studies (Liu & Yu, 2013; Wright et al., 2013). In one study, the number of supportive interactions via SNS was positively associated with participants' positive affect (Oh, Ozkaya, & LaRose, 2014). Despite not being conducted with older adults, these studies underscore the potential of SNSs as a support resource.

The few studies on older individuals' SNS use that have been published so far provide some preliminary, supporting evidence.

For example, social bonding was a major motivation for Facebook use among seniors in a study by Jung and Sundar (2016). In addition, Hayes et al. (2015) found differences in how older and younger adults used Facebook and some indications that well-being outcomes of Facebook use may differ across generations. Finally, Bell et al. (2013) found that older adults mainly used Facebook to keep in touch with family, and suggested that social media may play a role in keeping older individuals who suffer from age-related problems connected in the near future.

The direct- and buffering-effect models offer two pathways through which SNS use might impact the well-being of older adults. First, the direct-effect model (Kawachi & Berkman, 2001; Lin, Woelfel, & Light, 1985) suggests that SNS use might directly contribute to well-being. Through providing a sense of belonging or enhancing perceptions that one has a supportive network, SNS use should foster a more or less constant flow of small, well-being enhancing elements. The benefits of SNS use among older adults should be observed regardless of whether a stressor is present (cf. Thoits, 2011). We tested this idea by looking at the (direct) effect of time spent on SNSs on subjective well-being and social loneliness, controlled for prior scores on these variables, arguing that online social interactions should make older individuals feel better in terms of subjective well-being and reduce feelings of social loneliness or missing a wider social network (see De Jong-Gierveld & Van Tilburg, 2006).

**Hypothesis 1.** Time spent on SNSs is associated with (a) an increase in subjective well-being, and (b) a decrease in social loneliness.

The buffering-effect model offers a second, complementary pathway through which SNS use might impact the well-being of older adults. In accordance with the buffering-effect model, the benefits of SNS use on well-being should be especially visible in the presence of stressors or negative life events (Van Ingen & Wright, 2016). In this project, we focused on functional disability, which refers to "limitations in performing independent living tasks [...] necessary to function personally and in the community" (Spector & Fleishman, 1998, p.546). In other words, functional disability involves one's ability to accomplish every-day tasks in one's home and life. It is an important problem among older adults, which can lead to depression (Astrom, Adolfsson, & Asplund, 1993) and reductions in perceived quality of life (Logsdon, Gibbons, McCurry, & Teri, 1999).

Previous research has shown that time spent using online social networks is related to the amount of online problem-focused and socioemotional coping resources mobilized after a negative life event (Van Ingen, Utz, & Toepoel, 2016). We attempted to determine whether older individuals who are confronted with functional disabilities feel better off when they interact using SNSs, assuming that these interactions lead to social support exchanges or other types of coping assistance. In particular, we predicted that time spent on SNSs would moderate the impact of functional disability on changes in subjective well-being and social loneliness. The impact of functional disability on changes in subjective well-being and social loneliness should be buffered among older adults who use the Internet more frequently.

**Hypothesis 2.** Time spent on SNSs moderates the relationship between functional disability and (a) subjective well-being, and (b) social loneliness. The effects of functional disability on subjective well-being and social loneliness will be smaller among older adults who spend more time using SNSs than among adults who spend less time on SNSs.

The mechanisms through which Internet use may help protect well-being among older individuals are not necessarily merely social. For instance, participants in a study by Shapira et al. (2007) reported stronger sense of control and feelings of empowerment after they had learned to use the Internet. In addition, Slegers et al. (2012) found that older individuals agreed more strongly than younger individuals with the statement that computer and Internet use provided help in dealing with everyday problems. This should be especially relevant to those who are suffering from functional disability. If these older individuals can use the Internet to replace some of the offline activities they have difficulties with by online activities (in our case: by spending time on online shopping) this may (partly) protect their well-being by giving them the feeling that they are still capable of managing their own affairs. Although we would not expect this to reduce feelings of (social) loneliness, it does imply that practical Internet use may also decrease the negative impact of functional disability on subjective well-being.

**Hypothesis 3.** Time spent on online shopping moderates the relationship between functional disability and subjective well-being. The effect of functional disability on subjective well-being will be smaller among older adults who spend more time on online shopping than among those who spend less time on online shopping.

## 2. Method

The Longitudinal Internet Studies for the Social Sciences (LISS) is a large survey based on a true probability sample of the population of the Netherlands of 16 years of age and older. Data collection is coordinated by CentERdata at Tilburg University (see [www.lissdata.nl](http://www.lissdata.nl)). Questionnaires are answered online. The survey includes non-Internet users, who were equipped with a computer and Internet access, and who received guidance in using them. This is important, because research has shown that even in the Netherlands, with one of the highest Internet adoption rates in the world, adding non-users to an Internet panel improves the quality of the data (Leenheer & Scherpenzeel, 2013). Surveys lasting 15–30 min are conducted monthly and respondents are paid 15 euros per hour to complete the questionnaires. Refreshment samples are drawn in order to deal with attrition.

We used data from different modules collected during 2012–2014 (see variables). Our effective sample size – after list-wise deletion and selection of respondents older than 55 years – was 2032 for the analyses of subjective well-being and 2162 for the analyses of social loneliness. We used this cut-off for age because functional disability is less common under 55.

### 2.1. Variables

*Subjective well-being* was measured with one item, which captures well-being as state<sup>1</sup>: “How do you feel at the moment?”. The answer categories ranged from very bad (1) to very good (7). The measures we used came from questionnaires completed during November 2014 and May 2012.

*Social Loneliness* is one of two components of loneliness captured by the De Jong Gierveld loneliness scale, and it reflects “missing a wider social network” (De Jong-Gierveld & Van Tilburg, 2006). It was measured by three items: “there are enough people I can count on in case of a misfortune”, “I know a lot of people that I can

fully rely on”, “there are enough people to whom I feel closely connected”. Respondents were asked to choose from three possible responses: no, more or less, and yes. The items were reverse coded (higher scores reflect greater loneliness) and the scale has good internal consistency (Cronbach’s  $\alpha = 0.80$  in 2013 and 0.79 in 2014). The timing of the loneliness model is somewhat different from the subjective well-being model. The loneliness items come from a different (monthly) questionnaire, completed during February 2013 and February 2014.

*Functional disability* was measured with a combined ADL (Activities of Daily Living) and IADL (Instrumental Activities of Daily Living) scale (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963; Lawton & Brody, 1969). Respondents received the following question: “Below you will find a number of actions that some people have difficulties with. Can you indicate, for each activity, whether you can perform it without any trouble, with some trouble, with a lot of trouble, only with the help of others or not at all? This question does not apply to problems which you expect will not last longer than three months.” Thirteen items were included: dressing; walking across the room; bathing/showering; eating, including cutting food; getting in/out of bed; using the toilet; reading a map; preparing a hot meal; shopping; making telephone calls; taking medicine; house-keeping/gardening; and taking care of financial affairs. We combined all items into one scale variable (by taking the mean; Cronbach’s  $\alpha = 0.80$ ) in order to enhance the sensitivity of the measure (Spector & Fleishman, 1998). All respondents completed this measure during November 2012. Table 1 shows descriptive statistics of the variables in our study.

Respondents were asked whether they ever spent time on a list of Internet activities (yes or no), and subsequently how many hours per week they usually spent on these activities. For the present analyses, we focus on *time spent using SNSs* and *time spent on online shopping*. All respondents completed this measure during February 2013.

### 2.2. Analytical strategy

A series of lagged regression models were constructed to evaluate the hypotheses. All models followed the same basic form. An initial model was tested containing functional disability, SNS use (or online shopping), and the lagged outcome variable (i.e., the outcome measure at time one) as predictors. Respondents’ sex was included as a control variable. A second model included the preceding variables along with the interaction between functional disability and SNS use (or online shopping). In other words, the regression equation we estimate in our full models can be represented as:

$$Y_t = b_0 + b_1 Y_{t-1} + b_2 FD_{t-1} + b_3 INT_{t-1} + b_4 FD_{t-1} \times INT_{t-1} + b_5 W_{t-1} + e_t$$

where Y is subjective well-being or social loneliness, FD is functional disability, INT (internet) is time spent using SNSs or time

**Table 1**  
Descriptive statistics.

Variable	N	Mean	SD	Min	Max
Subjective well-being (2014)	3646	5.59	1.14	1	7
Subjective well-being (2012)	2696	5.71	1.08	1	7
Functional disability	2543	0.18	0.34	0	4
SNS use	2462	0.62	2.02	0	40
Online shopping	2461	0.38	1.20	0	30
Social loneliness (2014)	3558	1.31	0.38	1	3
Social loneliness (2013)	2460	1.29	0.37	1	3

<sup>1</sup> Alternatively, an item capturing subjective well-being as trait (how do you feel in general?) was also available. Auxiliary analyses showed that the use of this item would have led to conclusions that are identical to the ones in this paper.

**Table 2**  
Internet use by age.

	% uses SNSs	Weekly hours spent on SNSs (among users)	% buys products online	Weekly hours spent on buying products online (among users)
56–65 yrs	36	2.43	59	0.86
66–75 yrs	19	2.25	43	0.70
76+ yrs	10	1.94	20	0.57
Mean	26	2.37	48	0.79

spent on online shopping, and *W* (women) is a dummy variable representing gender differences. The equation includes current  $Y$  ( $Y_t$ ) as dependent variable and lagged  $Y$  ( $Y_{t-1}$ ) as an independent variable. In models 1 and 3 of Table 3, and in model 1 of Table 4, we estimate this equation without the interaction term. Including the lagged outcome variable in the models made it possible to evaluate the degree to which the predictors were associated with changes in the outcome variable across the two measurement points. Separate models were tested for the two study outcomes: subjective well-being and social loneliness.

If a direct effect of SNS use occurred, then the time spent using SNSs should be a significant predictor of changes in subjective well-being and social loneliness. If a buffering effect occurred, then there should be an interaction effect between functional disability and SNS use on both subjective well-being and social loneliness (compensating the negative functional disability effect). The associations between functional disability and changes in the two outcome variables should be weaker among older adults who used SNSs more frequently and stronger among older adults who used SNSs less frequently. In other words, older individuals feel worse off when they experience daily-functioning problems but the use of social network sites may result in a less steep decline.

### 3. Results

#### 3.1. Preliminary analyses

Prior to testing the hypotheses, we first conducted some preliminary analyses to provide descriptive data about older adults' Internet and SNS use. Most older individuals used the Internet in the Netherlands in 2013. 88% of our sample of individuals older than 55 indicated that they sometimes used the Internet "besides when completing the questionnaires of [the] panel". Furthermore, our data showed that older individuals were still lagging behind considerably when it comes to adopting new Internet applications. Whereas the vast majority (83% of total sample 55+) used email, only 26% used SNSs and 48% used the Internet to buy products (Table 2). To put this into perspective: among those aged 16 to 25 86% used SNSs and 76% bought products online (not shown in Table 2). There was a steep, downward age curve in the adoption of SNSs and online shopping. The chance that a person aged 56 to 65 used the Internet for these purposes was around three times larger than a person aged 76+. In other words, the oldest individuals who used these applications are likely early adopters in their group.

To get an idea of how quickly things change among older individuals we can compare these percentages to data one year later (2014). By that time, SNS use had already gone up to 36% in the total sample (with 16% in the oldest group) and the share that used the Internet for shopping had gone up to 51% (23% in the oldest group). As Table 2 shows, the age curves in time spent online are considerably less steep. The "youngest old" spent 2.43 h a week on SNSs on average, against 1.94 h a week among those older than 76. In the case of online shopping this was 0.86 versus 0.57 h.

#### 3.2. Testing the direct and buffering effects

Hypotheses 1a and 1b predicted that time spent using SNSs would predict changes in older adults' subjective well-being and social loneliness. Models 1 and 3 tested these hypotheses and are reported in Table 3. As previously noted, all models controlled for an earlier measure of the dependent variable, as well as gender. As expected, functional disability was associated with worse mood (model 1;  $b = -0.571$ ). However, it was not a large effect, as it corresponded to a standardized effect of  $\beta = -0.168$ . When controlled for functional disability and gender, SNS use had no (direct) effect on (changes in) subjective well-being. The same was true for the effect of SNS use on loneliness (model 3). These results led us to reject Hypotheses 1a and 1b.

Hypotheses 2a and 2b focused on the buffering effects of SNS use on subjective well-being and social loneliness. Time spent using SNSs was predicted to interact with functional disability for change in subjective well-being and social loneliness. Models 2 and 4 were used to test these hypotheses, and the results have been reported in Table 3. We found support for Hypotheses 2a and 2b. The interaction effect was statistically significant for subjective well-being and social loneliness<sup>2</sup>. Decomposing these interactions showed that the more time older individuals spent using SNSs, the smaller the negative effects of functional disability on well-being.

How large is the buffering effect? One intuitive way to answer that would be to compare the functional disability effect of non-users to the functional disability effect of those who spend an average amount of time on SNSs (2.37 h/week; see Table 2). With the interaction term in the model, the effect displayed for functional disability in model 2 ( $b = -0.620$ ) is now the effect among those who spend 0 h at SNSs. For the average SNS user that effect is reduced to  $b = -0.456$  ( $-0.620 + 0.069 \times 2.37$ ). In other words, the negative effect of functional disability on subjective well-being is 26% smaller for the average SNS user when compared with a non-user. In the case of social loneliness, similar calculations show that the effect is reduced by 20%.

Hypothesis 3 predicted that time spent on online shopping would also buffer the physical disability effect on subjective well-being. As illustrated in Table 4, time spent online shopping interacted with functional disability to predict changes in subjective well-being. Decomposing this interaction showed that the more time older individuals spent on online shopping, the smaller the (negative) functional disability effect on subjective well-being. These results supported Hypothesis 3.

#### 3.3. Robustness checks

As a final step in our analyses we performed several robustness

<sup>2</sup> In addition, we tested similar models with emotional loneliness as dependent variable (not shown). As expected, we did not find an interaction effect between SNS use and function disability on this type of loneliness ( $b = 0.010$ ;  $SE = 0.007$ ;  $p = 0.149$ ;  $\beta = 0.032$ ). This confirms that social loneliness is the most relevant dimension of loneliness in relation to Internet use, and that emotional loneliness is driven by other factors (e.g., missing a partner).



**Table 3**  
Regression analyses of subjective well-being and social loneliness on functional disability and Internet use (respondents 55+ years).

	(1) Subjective well-being		(2) Subjective well-being		(3) Social loneliness		(4) Social loneliness	
	<i>b</i> (SE)	$\beta$	<i>b</i> (SE)	$\beta$	<i>b</i> (SE)	$\beta$	<i>b</i> (SE)	$\beta$
Subjective well-being (prior wave)	0.478** (0.020)	0.473	0.481** (0.020)	0.476				
Social loneliness (prior wave)					0.611** (0.016)	0.630	0.610** (0.016)	0.630
Functional disability	−0.571** (0.067)	−0.168	−0.620** (0.068)	−0.183	0.059* (0.025)	0.039	0.074** (0.026)	0.050
SNS use (hrs/week)	0.005 (0.010)	0.009	−0.021 (0.013)	−0.039	0.005 (0.004)	0.022	0.013* (0.005)	0.055
Functional disability × SNS use			0.069** (0.022)	0.078			−0.019* (0.008)	−0.051
Women	−0.016 (0.039)	−0.007	−0.011 (0.039)	−0.005	−0.025 (0.015)	−0.027	−0.027 (0.015)	−0.029
Intercept	3.079** (0.123)		3.071** (0.123)		0.527** (0.025)		0.524** (0.025)	
Observations	2032		2032		2162		2162	

Notes. Standard errors (SE) are in parentheses.

\* $p < 0.05$ , \*\* $p < 0.01$ .

**Table 4**  
Regression analyses of subjective well-being on functional disability and Internet use (respondents 55+ years).

	(1) Subjective well-being		(2) Subjective well-being	
	<i>b</i> (SE)	$\beta$	<i>b</i> (SE)	$\beta$
Subjective well-being (prior wave)	0.477** (0.020)	0.472	0.475** (0.020)	0.470
Functional disability	−0.571** (0.067)	−0.168	−0.640** (0.072)	−0.189
Online shopping (hrs/week)	−0.003 (0.016)	−0.003	−0.042 (0.022)	−0.048
Functional disability × Online shopping			0.186** (0.072)	0.068
Women	−0.016 (0.039)	−0.007	−0.015 (0.039)	−0.007
Intercept	3.088** (0.122)		3.114** (0.123)	
Observations	2031		2031	

Notes. Standard errors (SE) are in parentheses.

\* $p < 0.05$ , \*\* $p < 0.01$ .

checks. A critical reader may wonder whether the interaction effects of SNS use and online shopping really result from those particular activities or instead from Internet use in general. In order to check this we performed two additional analyses. Both of these analyses supported the idea that the effects we found are really about SNS use and online shopping.

First, we attempted to control for total time spent on Internet use. We created a new measure of time spent using the Internet for all activities, *except* SNS use or online shopping (depending on the model). Total time spent online did not alter well-being outcomes in these models and neither did it change the significance of the interaction effects on subjective well-being (SNS use × functional disability or online shopping × functional disability). The interaction effect of functional disability and SNS use on social loneliness became marginally significant when controlling for total Internet time and when using a two-tailed test ( $b = -0.016$ ;  $SE = 0.009$ ;  $p = 0.061$ ). However, since our hypothesis includes the direction of the effect one could also argue that a one-tailed test is appropriate here. In that case the effect (with  $p = 0.030$ ) would still be significant according to conventional standards.

Second, we checked whether an Internet-use variable without any theoretical meaning would show similar effects. We analyzed the effects of (time spent on) reading online news and magazines in place of SNS use or online shopping. As expected we found no interaction effects between online reading and functional disability on well-being outcomes (subjective well-being:  $b = -0.009$ ,  $SE = 0.030$ ,  $p = 0.776$ ; social loneliness:  $b = -0.001$ ,  $SE = 0.012$ ,  $p = 0.957$ ). Taken together, these robustness checks offer evidence that the effects observed in this study are unique to SNS use and

online shopping and not simply an artifact of total time spent online.

#### 4. Discussion

The results of this study contribute to scholarship on older adults and the social implications of communication technologies by helping to better understand how and with what effects older individuals use SNSs. Drawing from the direct and buffering explanations for the benefits of social support, we considered the impact of SNS use as well as online shopping on older adults' changes in subjective well-being and social loneliness. Our analyses did not provide support for a direct effect of SNS use on well-being. This is in line with some of the studies among younger or general populations (e.g. Song et al., 2014). However, the main conclusion of our study is that this type of Internet use can act as a buffer that protects well-being in older age. In addition, we conclude that the buffering effects of Internet use may not be restricted to social applications. Older adults who engaged in online shopping more frequently were less negatively impacted by greater levels of functional disability. These findings are in line with the idea that the Internet may play a role in coping with negative life events, such as health problems (Van Ingen & Wright, 2016; Van Ingen et al., 2016). In response to those problems individuals may turn to their online social networks and discuss their problems, ask for advice, or try to find someone who has experienced similar problems. When they receive social support with help of the Internet, it may reduce the impact (e.g., stress) of the problems they are facing.

The opportunities that the Internet offers seem particularly

important for those who suffer from reduced physical ability. Paradoxically, the ones that could profit most from online support are the least involved in the (online) activities that generate the support. However, our results show that if older adults adopt these activities there are gains. There are at least two possible pathways to improved well-being. First, when individuals are no longer capable of getting out of the house without help, or when they are very restricted in their mobility, online interactions and support may relieve some of the stress that accompanies these problems. Second, there may be substitutions from offline to online activities. People's social lives are likely to suffer from reduced physical ability. Part of the missed social interactions can be compensated by interactions online. Similarly, some practical activities may be performed online instead of offline (e.g. online shopping could partly replace offline shopping). In turn, this may mean that older individuals still feel more in control of their lives and capable of managing their own affairs and hence that they protect their well-being. This interpretation is consistent with qualitative studies in which participants reported feelings of empowerment after they had received Internet training (Cody, Dunn, Hoppin, & Wendt, 1999; Shapira et al., 2007).

To be sure, we are not the first to examine buffering effects of Internet use. Mikal, Rice, Abeyta, and DeVilbiss (2013) provide overviews of how computer-mediated social support can help overcome the stress resulting from several “transitions”. Moreover, studies that analyze the effects of online support groups on well-being (e.g. Rains & Young, 2009) are also about buffering effects in a certain sense, although they do not include individuals without problems and can therefore not estimate the effect of stressful events. However, to the best of our knowledge, we are the first to analyze the buffering effects of SNSs in a random sample of older individuals. The results underscore the potential importance of Internet use among this group.

#### 4.1. Limitations

The effects we found for social loneliness were considerably weaker than for subjective well-being. This could be due to our research design. The change in loneliness we modeled did not come right after the measurement of functional disability but slightly (4 months) later. It is plausible that the effect will be larger when changes are captured immediately. However, this limitation is somewhat offset by the benefit of having longitudinal data on relatively large group of older adults - a difficult population to sample, particularly over time. It also may be that the negative effect of functional disability (and subsequently the buffering effect by SNS use) on subjective well-being is simply larger than its positive effect on social loneliness. Mood changes rather quickly over time and is probably more sensitive to events than social loneliness. Future research should look at this more in depth.

A second possible limitation is that the data we used came from a large, general survey. The advantage of that is that we were able to link Internet use to other relevant topics, like functional disability and well-being, and test our ideas using a large sample. However, the down side is that we have little in-depth information about what older individuals actually do online, who they meet, and what kinds of support they exchange or what they purchase. Future research should therefore complement our study by using different research designs (e.g., case studies), which provide more information about the mechanisms that cause buffering effects of Internet use.

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#### Appendix

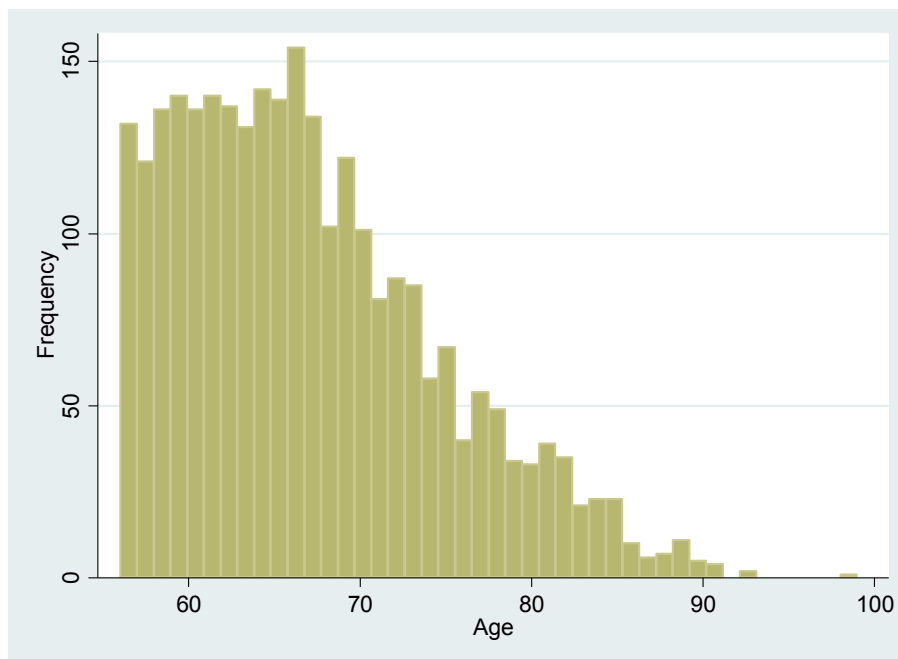


Fig. A1. Frequency distribution of age.

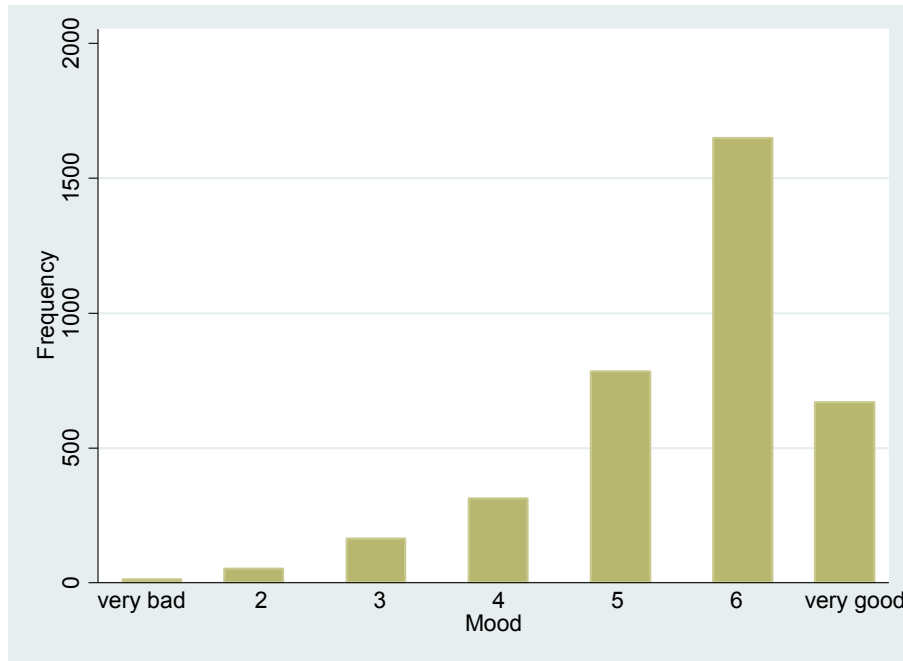


Fig. A2. Frequency distribution of subjective well-being (2014).

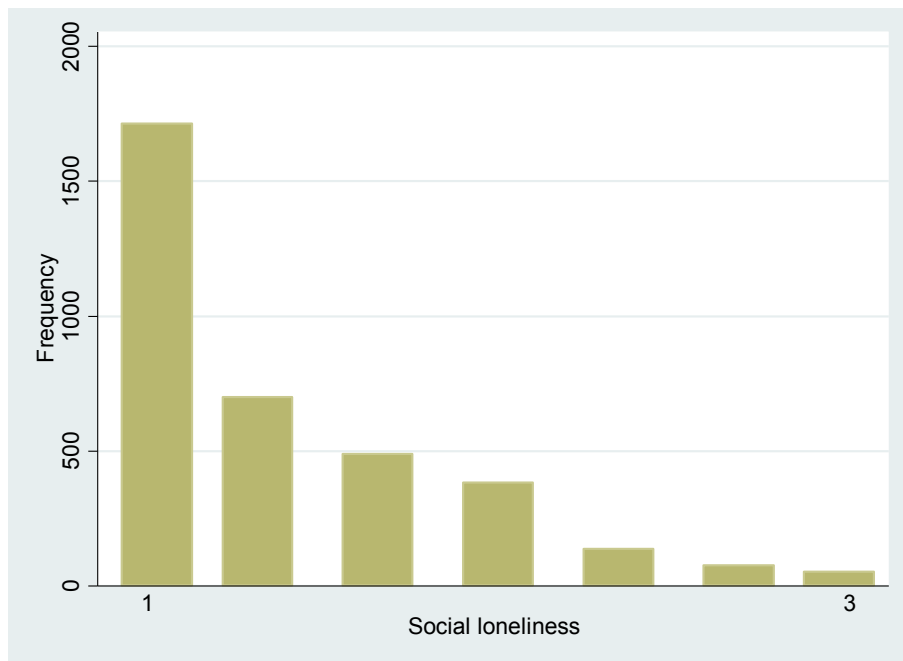


Fig. A3. Frequency distribution of social loneliness (2014).

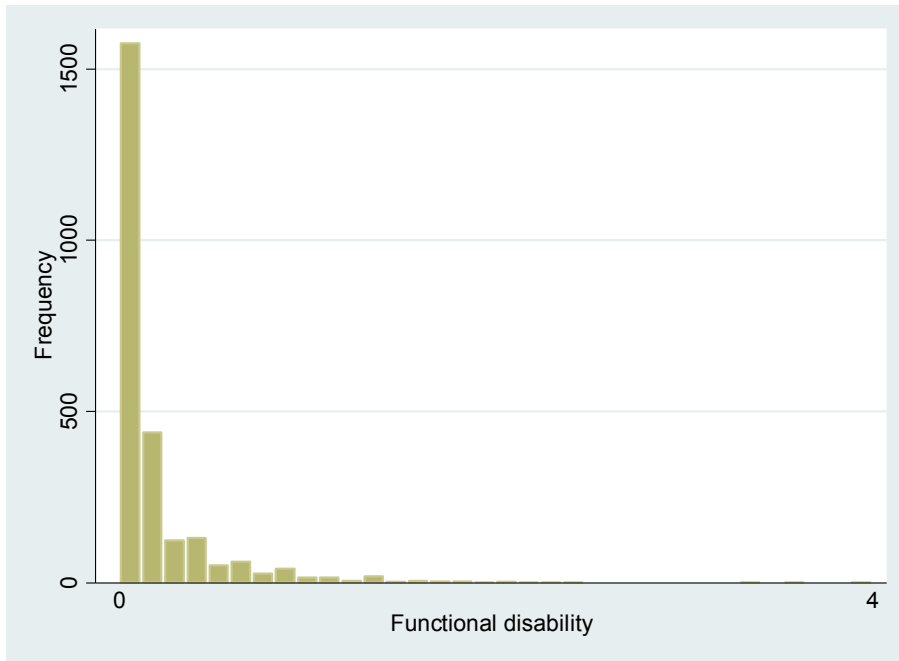


Fig. A4. Frequency distribution of functional disability.

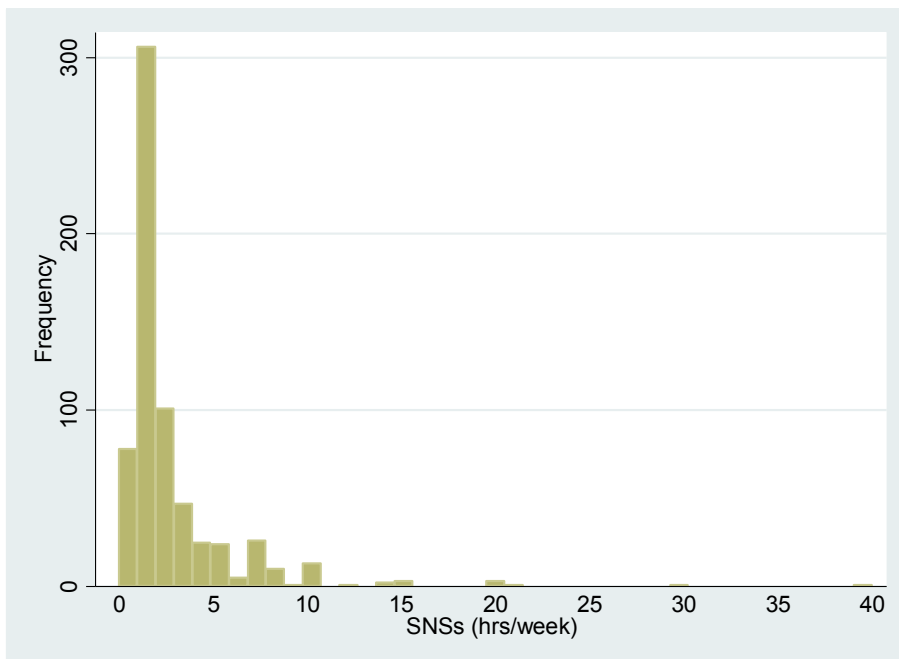


Fig. A5. Frequency distribution of time spent on SNS use among SNS users.



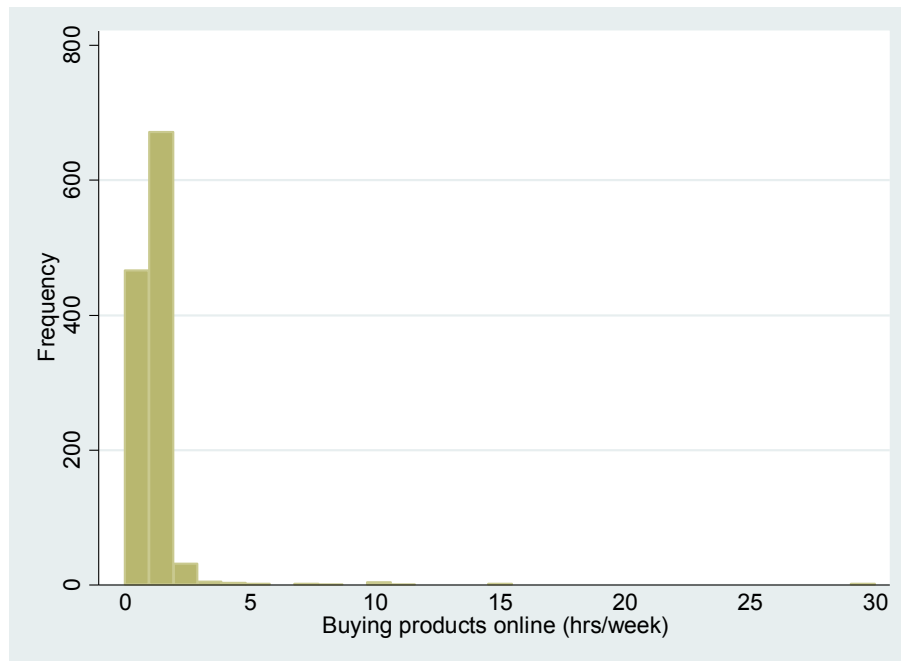


Fig. A6. Frequency distribution of time spent on online shopping among users.

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