

Are Internet and Social Network Usage Associated with Wellbeing and Social Inclusion of Seniors? – The Third Age Online Survey on Digital Media Use in Three European Countries

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Abstract. Research on the psychosocial effects of Internet and social network usage in seniors is either contradictory or sparse. As part of the Third Age Online project, this paper reports a cross-sectional survey conducted in Germany, the Netherlands and in Switzerland. The survey, utilizing regression analysis, examined whether or not social inclusion and mental wellbeing were predictors of Internet usage and social network usage. Results showed that social inclusion variables were associated with both Internet usage and social network usage. Internet usage was associated with respondents who were both less and more socially included. Mental wellbeing was positively related to Internet usage but not to social network usage. In further studies, longitudinal designs are needed to reveal the directions of causality between Internet/social network usage and mental wellbeing/social inclusion.

Keywords: Internet, social networks, mental wellbeing, social inclusion, elderly.

1 Introduction

The association of Internet usage with the wellbeing and social inclusion in the elderly is a contested topic. Recent research has drawn contradictory conclusions on this issue. Several studies have found positive and even causal relations between Internet usage and emotional states, wellbeing and quality of life [1-4]. Other studies and reviews have found opposite results [5, 6]. The same is true for the association of Internet usage and social connectedness. Whereas some research has found that going online at an older age may help against isolation and loneliness [7, 8] other studies deny this connection [9] or have found mixed results [10].

Social network usage in the elderly population and its effects on their wellbeing and social inclusion is a rather new topic [11]. Recent research has revealed that many seniors are not familiar with social networks [12]; therefore, strong empirical evidence is lacking. However, some studies have shown that many seniors are quite reluctant to use social networks and that those who do use it are already well socially connected in real life [13].

Many studies which examine the relation between Computer/Internet use, wellbeing, and social relations have methodological shortcomings. Their sample sizes are rather small (often around 200-300 subjects) and therefore, the possibilities of applying appropriate multivariate statistical methods are limited. Additionally, most studies employ a cross-sectional study design which does not allow for the drawing of firm causal conclusions.

In this paper we report results of the first wave of a longitudinal survey with a large sample that was carried out as part of the Third Age Online (TAO) project. The TAO research consortium consists of scholars in Germany, the Netherlands and Switzerland. The TAO project aims to facilitate seniors' access to the Internet and to social networks via software development, support, E-Learning, training and business support for seniors' non-profit communities. Among others, a central research question of this project and of the survey is whether or not going online could enhance the wellbeing and social inclusion of seniors.

2 Methods

Research was conducted using an online survey and an offline survey for seniors who did not use the Internet at that time. The online survey was set up via the Webplatform 'SurveyMonkey'¹ in two languages (Dutch and German) and in three versions (Dutch, German, Swiss-German). German and Swiss-German versions were developed due to the subtle differences in the wording of some of the questions and due to the differences in the educational systems of Germany and Switzerland.

Apart from specific questions regarding Internet usage and subjective experiences while using the Internet, the online and the offline survey both contained the same questions. Additionally, offliners were questioned about their reasons for not going online.

Several Dutch, German and Swiss Internet and gerontology related organisations were asked to distribute the surveys' URLs to their members and to their wider networks. It was intentional that the participants distributed the URLs. The purpose of doing this was to further their personal networks, and to recruit a diverse sample via the 'Snowball effect'.

The offliners' paper and pen survey was distributed via institutional and personal networks of the research team. Additionally, seniors living in residential facilities were approached.

¹ www.surveymonkey.com

2.1 Instruments

The questionnaire was developed from a variety of sources. It was intended to, as much as possible, rely upon well-known and already tested questionnaires and instruments. The socio-demographic questions and the questions on social inclusion (e.g., frequency of meeting friends, pro-social activities in charity and non-profit organizations) were mainly taken from the European Social Survey (ESS) data set². The ESS is a representative population survey which is regularly repeated and carried out in 30 European countries, including the Netherlands, Germany and Switzerland.

To analyze seniors' wellbeing, we used a well-known and internationally widely administered instrument, the 'Mental Health Index – 5' (MHI-5) [14]. The MHI-5 is part of the 'Short Form – 36' (SF-36) and is one of the most widely used Quality of Life instruments in health sciences world-wide. This instrument has been tested with elderly respondents and has revealed sufficient psychometric quality [15]. It has also been validated as a screening instrument for depression in the elderly; therefore, the results may provide some hints as to whether the respondents in our sample have a more positive or a more negative emotional state. Because the MHI-5 has been previously translated and tested in Dutch and German as part of the SF-36, translation was not necessary. In our sample, the scale's internal consistency (Cronbach's alpha) was good (0.8121).

To analyse the effects of going online for individuals, we used the Psychosocial Consequences Scale (PCS), which is an 18-item subscale of the Internet Consequences Scale (ICONS) [16]. This scale covers possible psychosocial consequences of Internet usage, such as isolation, changes in self-esteem and changes in the frequency of communication. The PCS has been translated and back-translated from English into Dutch and German and has been cognitively tested with elderly respondents. The internal consistency (Cronbach's alpha) was excellent in our sample (0.9018).

The questions on Internet usage were based on several questions and aspects of the Graphic, Visualization, & Usability Center's (GVU) WWW User Survey [17]. The whole survey was cognitively pre-tested with a total of 20 elderly respondents in Switzerland and in the Netherlands while using a computer and Internet access via Surveymonkey.

2.2 Analysis

In order to analyse the association of Internet and social network usage with social inclusion and wellbeing, we conducted descriptive and inferential statistical analyses. In the descriptive analysis, we compared sociodemographic data, social inclusion data and the wellbeing of on- and offliners.

For inferential statistics, we used logistic regression analysis. Onliners were coded as 1 and offliners as 0; the same logic applies to social network usage (1) and non-usage (0). The analytic procedure was as follows: all relevant independent variables were entered into a logistic regression analysis with a dichotomous format. For model selection we subsequently used the Akaike Information Criterion (AIC; [18]) with a

² www.europeansocialsurvey.org

backward selection. The selected variables were then entered into a logistic regression analysis to achieve the final model. All analyses have been carried out by using the statistical software package STATA, version 10.1.

3 Results

We recruited 2912 respondents for the online survey (Switzerland [CH]: 561; Germany [DE]: 1.925; the Netherlands [NL]: 426) and 214 for the offline survey (CH: 67; DE: 144; NL: 3). Since there were only minor sociodemographic differences between the country subsamples, we report the results on the full sample. To ensure the representativeness of our sample, we compare the results of some important variables to the latest European Social Survey (ESS) data from 2010, which contained questions on media usage, such as the Internet. We selected a data sample, which contained data on all participants aged 60 years and older from Germany, the Netherlands, and Switzerland.

Our online respondents were on average 68.6 years of age (ESS data: 67.2), and the offline respondents were 74.9 years of age (ESS: 73.1). The gender distribution in the online group was 61.1% males and 38.9% females (ESS: 60.0% males; 40.0% females), and in the offline group, it was 37.3% males and 62.7% females (ESS: 43.0% males; 57.3% females). 72.5% of the TAO onliners had a current partnership (ESS: 73.8%), whereas in the offliners group, the rate was lower with 54.0% (ESS: 58.1%). Details and statistics are provided in Table 1.

Table 1. Characteristics of Onliners and Offliners; Percentages (N=3,126)

	Onliners	Offliners	Total	p-Value Chi- square
Gender: Male	61.05	37.25	59.44	<0.001
Age: 70 plus	44.10	71.70	46.04	<0.001
Education: Tertiary and higher	48.79	35.71	47.89	<0.001
Partnership	72.49	53.99	71.19	<0.001
Residential Area: City/Suburb	45.96	47.17	46.04	0.732
Having someone to talk with	91.03	92.96	91.17	0.339
Not living alone	74.59	53.05	73.06	<0.001
Meeting friends at least weekly	70.15	68.57	70.04	0.630
Pro-social activities min. monthly	56.84	45.81	56.09	0.002
MHI-5 above median	51.75	37.57	50.71	<0.001

Besides the significant gender and age differences, we also found significant education differences (Table 1). Offliners were less likely to have a tertiary or higher education. Regarding social inclusion, offliners generally seemed to be less included. They had fewer partnerships, they were more often living alone and they were

less committed to pro-social activities like working for non-profit organizations. The onliners' mental health score was better, as the rate of online respondents above the median was 14% higher in comparison to the offliners' score. We found no significant differences with the questions regarding the residential area, whether or not the respondents had a person to talk to about personal affairs and regarding the frequency of meeting friends.

After having completed the model selection procedure for the regression analysis, the variables in Table 2 were entered into in the final model. Some variables were recoded in order to receive odds Ratios above 1. In health statistics and epidemiology, odds ratios indicate the ratio of the probability of occurrence of an event to that of non-occurrence.³

Onliners were more likely to be males, more likely to be younger, more highly educated and more likely to have a higher level of wellbeing. In terms of social inclusion, respondents who did not live alone and who were more committed to pro-social activities were more likely to be online. However, those without a partnership and those who had no person to talk to were also more likely to be online. All variables in the table are significant predictors of the online status.

Table 2. Final logistic regression model on Internet use (OR: Odds Ratio; SE: Standard Error; p-value: Result of testing on significance; CI: Confidence Interval); N=2346

	OR	SE	p-value	Lower 95%-CI	Upper 95%-CI
Male gender (vs. female)	2.34	0.43	0.000	1.63	3.37
Less than 70 years old (vs. older)	3.34	0.60	0.000	2.35	4.74
Tertiary and higher education (vs. lower education)	1.47	0.25	0.025	1.05	2.06
Higher mental wellbeing (MHI-5 above median; vs. below)	1.56	0.26	0.008	1.12	2.17
No partnership (vs. being in a partnership)	2.31	0.85	0.023	1.12	4.75
Having no person to talk to about personal affairs (vs. having a person)	2.12	0.76	0.037	1.05	4.29
Not living alone (vs. living alone)	2.93	1.05	0.003	1.45	5.92
Pro-social activities (non-profit organizations etc.) at least once a week (vs. less)	1.55	0.26	0.008	1.12	2.16

³ For more detailed information on odds ratios and logistic regression analysis, see: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2938757/>

In the onliner group, 37.7% of respondents used social networks such as Facebook. We found several descriptive statistical differences between users and non-users (see Table 3 - offliners were excluded from the analyses). In terms of sociodemographic characteristics, social network users were significantly younger, less educated and lived less frequently in a city or suburb. Social network users were significantly better socially included in several regards. They met their friends more often and were more committed to pro-social activities. However, we found no significant differences between either having a partnership or having a person to talk with about personal matters. We also did not find a significant difference in their mental wellbeing.

Table 3. Characteristics of Social Network Users and Social Network Non-Users; Percentages (N=2,674)

	Social network users (N=1,007)	Social network non-users (N=1,667)	Total	p-Value Chi-square
Gender: Male	61.81	61.34	61.52	0.810
Age: 70 plus	37.19	47.43	43.60	<0.001
Education: Tertiary and higher	43.16	52.27	48.83	<0.001
Partnership	72.48	72.20	72.30	0.876
Residential Area: City/Suburb	41.62	48.21	45.73	<0.001
Having someone to talk with	91.01	91.04	91.03	0.981
Not living alone	75.28	73.78	74.35	0.397
Meeting friends at least weekly	74.65	67.39	70.13	<0.001
Pro-social activities min. monthly	60.83	54.99	57.19	0.003
MHI-5 above median	51.10	52.72	52.11	0.452
PCS above median	59.45	42.63	49.18	<0.001
Online banking at least weekly	59.44	48.60	52.69	<0.001
Online information seeking daily	76.65	59.04	65.66	<0.001
Online shopping at least weekly	24.24	14.58	18.20	<0.001
Online public administration affairs at least weekly	8.81	4.34	6.02	<0.001
Online entertainment at least weekly	46.11	31.37	36.89	<0.001
Youtube at least weekly	44.22	21.17	29.89	<0.001
Wikipedia at least weekly	56.85	49.14	52.04	<0.001
PC use six + hours per week	56.91	49.30	52.17	<0.001
Computer use since before 1990	48.59	38.90	57.46	<0.001

In terms of Internet usage patterns, there were significant differences. Social network users generally used any kind of website more often than social network non-users. Social network users were also using a PC more hours per week than non-users. We found a significant difference in the PCS score; the rate of those who had experienced more positive consequences while using the Internet were much higher in the social network users group. Long-term computer users were also using social networks significantly more often than those who started using computers later than 1990.

In Table 4 we report the variables and their characteristics of the final logistic regression model, which we selected following the procedure described in the ‘Methods’ section. Social network usage was predicted by a younger age, a lower education, better ‘real life’ social inclusion, long-term computer usage, and higher rates of visiting other kinds of websites. Positive consequences of Internet usage also predicted social network usage. The only variable in the model that was not deemed to be a significant predictor was the residential area.

Table 4. Final logistic regression model on social network use (OR: Odds Ratio; SE: Standard Error; p-value: Result of testing on significance; CI: Confidence Interval); N=1865

	OR	SE	p-value	Lower 95% -CI	Upper 95% -CI
Less than 70 years old (vs. older)	1.52	0.16	0.000	1.24	1.87
Lower than tertiary education (vs. higher)	1.41	0.14	0.001	1.15	1.73
Residential area: city/suburb (vs. not)	1.00	0.02	0.905	0.97	1.04
Meeting friends at least once a week (vs. less)	1.30	0.15	0.025	1.03	1.62
Pro-social activities (non-profit organizations etc.) at least once a week (vs. less)	1.31	0.14	0.011	1.06	1.61
Using a computer since before 1990 (vs. afterwards)	1.34	0.14	0.004	1.10	1.64
Online information seeking daily (vs. less often)	1.63	0.18	0.000	1.30	2.03
Online entertainment at least weekly (vs. less often)	1.67	0.18	0.000	1.36	2.05
Youtube at least weekly (vs. less often)	1.99	0.22	0.000	1.60	2.48
Positive Internet consequences (PCS above median vs. below)	1.79	0.18	0.000	1.46	2.19

4 Discussion

Although this survey was not intended to be a representative survey, upon comparison with the main sociodemographic variables of the 2010 European Social Survey, it was revealed that our large sample of onliners and even our small sample of offliners were fairly representative of the elderly population in the participating countries. Regarding our main research question, we found both mental wellbeing and social inclusion items to be associated with using the Internet. Internet usage was associated with good mental health even after controlling for several sociodemographic and social inclusion items – which was done while conducting the logistic regression analysis. Social inclusion was also related to Internet usage, however, not in a linear direction. On one hand, those who were well socially included in ‘real life’ used the Internet. On the other hand, we found that variables indicating social exclusion also predicted Internet usage.

This *prima facie* contradictory finding can possibly be explained with the assumption that Internet usage serves the same needs, namely the expansion of personal networks, but in different groups. Internet usage in the elderly does expand already existing broad personal networks, but it may also serve as a tool to escape loneliness. Our research corroborates earlier findings that also found contradictory results in multivariate analyses [10].

As is well-known, the rate of social network users tends to be lower with older age [19]. Our results support earlier research that younger, socially included, and computer-ripened seniors are more likely to use social networks. Because social network usage usually follows the same characteristics as Internet usage, an unexpected finding was that seniors with a tertiary education were more reluctant to use social networks than those with a lower education. However, this is congruent with a recent US survey which reported a similar pattern in an age-independent sample. In that paper, whereas the rate of Internet use increased steadily with a higher education, this was not the case for social network use [20]. Doubts about social networks’ benefits and privacy concerns may be more present in seniors who have a higher education.

Even after controlling for several other confounding variables, some social inclusion items were associated with social network usage; social network users are generally more included in real social life.

Interestingly, mental wellbeing was not related to using social networks. This finding is supported by a recent US study on Facebook usage with seniors, where the authors also did not find any relation between using social networks and quality of life in the elderly [13].

Our study has notable limitations. First, the cross-sectional survey design does not allow for the drawing of causal conclusions. Second, although both onliners’ and offliners’ socio-demographic characteristics were fairly representative when comparing the data with a standard population survey, the small offliners’ subsample size clearly limits the study’s significance. And third, the sampling procedure via mainly web-based seniors’ organizations surely poses the risk of a bias towards Internet-affine users. These limitations are, however, counterbalanced by the large online sample size and the use of internationally validated questions and instruments.

In conclusion, our research suggests that Internet usage has an impact on social inclusion insofar that interesting associations between both of the elderly groups, those who are less and those who are more socially included, became obvious. Internet usage may serve the needs of both the well connected and the socially isolated seniors. Internet usage is also associated with good mental health. Social network usage does not seem to be related to mental wellbeing; it is, however, positively associated with social inclusion. At this stage of our research and because our results stem from a cross-sectional survey, we cannot make any causal claims nor can we predict whether or not internet or social network usage are able to enhance real life inclusion and mental health. Future research on longitudinal data from this survey will allow us to draw more firm conclusions.

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References

1. Bessiere, K., Pressman, S., Kiesler, S., Kraut, R.: Effects of internet use on health and depression: a longitudinal study. *J. Med. Internet Res.* 12, e6 (2010)
2. Erickson, J., Johnson, G.M.: Internet Use and Psychological Wellness during Late Adulthood. *Canadian Journal on Aging-Revue Canadienne Du Vieillissement* 30, 197–209 (2011)
3. Leung, L.: Effects on Internet Connectedness and Information Literacy on Quality of Life. *Soc. Indic. Res.* 98, 273–290 (2009)
4. Litwin, H., Shiovitz-Ezra, S.: Social Network Type and Subjective Well-Being in a National Sample of Older Americans. *Gerontologist* 51, 379–388 (2010)
5. Dickinson, A., Gregor, P.: Computer use has no demonstrated impact on the well-being of older adults. *Int. J. Human-Computer Studies* 64, 744–753 (2006)
6. Gilhooly, M.L.M., Gilhooly, K.: J., Jones, R.B.: Quality of Life: Conceptual Challenges in Exploring the Role of ICT in Active Ageing. In: Cabrera, M., Ma-lanowski, N. (eds.) *Information and Communication Technologies for Active Ageing: Opportunities and Challenges for the European Union*, pp. 49–77. IOS Press, Amsterdam (2009)
7. Fokkema, T., Knipscheer, K.: Escape loneliness by going digital: A quantitative and qualitative evaluation of a Dutch experiment in using ECT to overcome loneliness among older adults. *Aging & Mental Health* 11, 496–504 (2007)
8. Foley, P.: Does the Internet help overcome social exclusion? *Electron. J. E-Government* 2, 139–146 (2004)
9. Xie, B.: Using the Internet for offline relationship formation. *Social Science Computer Review* 25, 396–404 (2007)

10. Hogeboom, D.L., McDermott, R.J., Perrin, K.M., Osman, H., Bell-Ellison, B.A.: Internet use and social networking among middle aged and older adults. *Educ. Gerontology* 36, 93–111 (2010)
11. Bennett, J.: *Online Communities and the Activation, Motivation and Integration of Persons Aged 60 and Older: A Literature Review*. Bern University of Applied Sciences, Bern (2011)
12. Ariyachandra, T., Crable, E.A., Brodzinski, J.D.: Seniors' perceptions of the web and social networking. *Issues Information Systems* 10, 324–332 (2010)
13. Sundar, S.S., Behr, R.A., Oelfeld-Hirsch, A.: Retirees on Facebook: Can online social networking enhance their health and wellness? In: CHI, Vancouver, pp. 2287–2292 (2011)
14. Berwick, D.M., Murphy, J.M., Goldman, P.A., Ware, J.E., Barsky, A.J., Weinstein, M.C.: Performance of a five-item mental health screening test. *Med. Care* 29, 169–176 (1991)
15. Friedman, B., Heisel, M., Delavan, R.: Validity of the SF-36 five-item mental health index for major depression in functionally impaired, community-dwelling elderly patients. *J. Am. Geriatr. Soc.* 53, 1978–1985 (2005)
16. Clark, D.J., Frith, K.H.: The development and initial testing of the Internet Consequences Scales (ICONS). *Cin-Computers Informatics Nursing* 23, 285–291 (2005)
17. Kehoe, C., Pitkow, J., Sutton, K., Aggarwal, G., Rogers, J.D.: *Results of GVU's Tenth World Wide Web User Survey*. Georgia Institute of Technology, Atlanta, GA (1999)
18. Akaike, H.: A new look at the statistical model identification. *IEEE T. Automat. Control* 19, 716–723 (1974)
19. Madden, M.: *Older adults and social media*. Pew Research Center, Washington, DC (2010)
20. Zickuhr, K., Smith, A.: *Digital differences*. Pew Research Center, Washington, DC (2012)