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**Nordic population-based study on internet use and perceived meaningfulness  
in later life: How they are linked and why it matters**

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## **Abstract**

**Aim:** The aim was to explore the association between perceiving life as meaningful and internet and related internet-based activities among older adults in two regions in Finland and Sweden.

**Methods:** The data was collected through a population-based survey (N= 9386) as part of the GERDA-project conducted in 2016. In order to analyse the associations between perceiving life as meaningful and internet use and related activities, Odds Ratios with 95 % confidence intervals were calculated using binary logistic regression analysis – where socio-demographic factors and health status were controlled for.

**Results:** Statistical significant associations were found between perceiving life as meaningful and internet use in later life. When looking further at the specific internet-based activities under study – activities related to leisure and entertainment showed a statistically significant connection to perceived meaningfulness in later life, after controlling for socio-demographic factors and health status.

**Conclusions:** The results indicate that there is a statistically significant positive association between internet use and perceiving life as meaningful in later life. Especially online activities related to leisure and entertainment seem to be associated to perceived meaningfulness. Although causal direction could not be determined, the results suggest that internet use may support experienced wellbeing in everyday life among older persons, through the unlimited access of interest-driven activities that it provides.

**Keywords:** Older persons, Internet, Gerontechnology, Meaningful life, Meaningful activity, Finland, Sweden, Surveys and Questionnaires

**Word count: 3096**

## **Introduction**

Meaning in life is often understood as having clear life missions or a sense of higher purpose (1). However, a meaningful life does not necessarily have to entail higher causes or life missions. Life can also be perceived as meaningful if it contains elements that provides meaning to the individual's everyday life – hence defining meaning in life in terms of meaningfulness (1). The sources of meaning can naturally vary over time and from person-to-person and, therefore, subjective experiences - focusing on what it is that makes us experience meaningfulness (2) - are important when studying these issues. Older adults themselves have highlighted social activities such as volunteering and meeting friends and family – in addition to different kinds of hobbies - as key carriers of meaning in everyday life (3, 4). However, age-related changes in the functional ability can constitute challenges and hinder a person from leading life as desired (5). Fortunately, the digitised society of today offers several online services that are regarded by the older users themselves as useful in order to carry out meaningful activities (6).

The steady increase of internet-users within the older population in western countries (from 23 % of the over 75 years-old in 2010 to 69 % in 2019 in Sweden) (7) has led to a growing number of studies from various disciplines exploring if and how the use of internet-based services can be connected to and support older adults' wellbeing (8). Studies with this type of focus report that engaging in different online activities seem to have a generally advantageous impact on factors associated with mental health and wellbeing in later life, such as decreased loneliness (e.g. 9), depression and anxiety (e.g. 10), in addition to enhanced social connectedness and support (11). However, besides the generally advantageous influence, the growing international evidence base of studies covering the connection between internet usage and loneliness (e.g. 12) moreover indicates that different internet-based activities may yield varying influences

(also negative) on the older individual's wellbeing. Thus, it is of great importance to examine the content of older adults' internet use in order to shed further light on this connection.

Based on previous research, both perceiving life as meaningful and using the internet seem to be beneficial for the psychological, emotional and social dimensions of wellbeing in later life. However, there is a limited amount of studies focusing on these two components and the association between them. Therefore, the aim of this article is to explore the association between internet use, the use of specific internet-based activities and perceiving life as meaningful, among older adults in two regions in Finland and Sweden. Further, the association analysis will be controlling for potential co-variates in terms of socio-demographic factors and self-rated health status.

## **Methods**

### *Study design and data material*

A population-based cross-sectional survey study was conducted in 2016 in Västerbotten (Sweden) and in Österbotten (Finland), as a part of the Gerontological Regional Database and Resource Center (GERDA) project. The aim of the GERDA project was to gather information regarding older adults' health and living condition. The survey was posted to all individuals born in 1950, 1945, 1940, 1935 and 1930, living in rural areas and the city of Seinäjoki (Finland), to every second person living in the city of Vaasa (Finland) and to every third person of the same age cohorts living in the city of Umeå (Sweden) and Skellefteå (Sweden) (in total 14,805 persons). The population register was obtained from the National Tax Board in Sweden and the Population Register Centre in Finland (see 13 in references for detailed method report written for the GERDA study in 2010). Totally, 9386 participated in the survey study and the response rate was 63.40 per cent.

### *Measurements and variables*

In Table 1 and 2, all of the variables included in the study are presented in detail.

A set of socio-demographic variables were included in the analysis. These variables were recoded, and the cut-off points for the recoding process were chosen in accordance with other scientific articles based on the GERDA study (e.g. 14). The analysis also included a variable measuring self-rated health. The recoding process of the socio-demographic variables and self-rated health status are displayed in Table 1.

Perceiving life as meaningful was measured with a single-item question that was dichotomised for the binary regression analysis. The dichotomizing process, the survey question and response options are presented in Table 2.

Two different survey questions regarding internet use were included in the study. A variable measuring internet use, separating independent internet users from persons using internet with the support of others and non-users, was created and dichotomised. Furthermore, five separate variables measuring internet activities, created from a multiple answer question, were used to measure recent internet-based activities. These variables were also recoded into dummy-variables and treated as separate categorical variables in the statistical analysis. The variables and the recoding process are displayed in Table 2.

*Insert Table 1 and 2 about here*

### *Ethics*

The Regional Ethical Review Board in Umeå, Sweden, approved the data collection (05/084 & 2016/367–32). In Finland, no ethical approval is needed for anonymous postal surveys. The ethical principles of the Helsinki Declaration were carefully followed during drafting of the article.

## *Analysis*

The program SPSS, version 24, was used for statistical analysis. The distribution (%) of all included variables is reported by study regions in Table 3 and the distributions (%) of perceiving life as meaningful among the socio-demographic variables, self-rated health and internet-related variables are presented in Table 4. In order to explore the between-group comparison of perceived meaningfulness in relation to internet use and related activities and the socio-demographic variables and health status, a Pearson's Chi-square test was conducted (Table 4). In order to further analyse the association between internet use, related internet-based activities and perceived meaningfulness in life, Odd ratios (OR) with 95 % confidence intervals were calculated using a stepwise binary regression analysis (Table 5). Furthermore, multiple independent variables (internet usage, internet-activities, socio-demographic variables and self-rated health) were simultaneously analysed with the dependent variable (perceived meaningfulness), controlling for potential co-variables among the independent variables (15). Furthermore, the goodness of fit of the logistic regression models was tested using Hosmer and Lemeshow Test, which is commonly used for assessing whether there is an agreement between the observed and the expected frequencies in model populations in logistic regression analysis (15).

The missing values, in the collected data, ranged from N = 3 (0.003 %) – 437 (4.7 %), where the lowest number was for gender and the highest for internet use. The missing values for perceiving life as meaningful were 211 (2.2 %). A missing value analysis was performed for all the variables included in the analysis, which displayed a random pattern. The complete dataset can be received upon request.

## **Results**

### *Descriptive statistics*

In total, 46.6 per cent of the participants were from Sweden and 53.4 per cent from Finland (see Table 3). The sample had a higher representation of women and a vast majority of the study participants were in a relationship when the study was conducted. Moreover, 59.6 per cent of the whole study sample were using the internet independently. The most used internet-based activity, among the internet-using sample, was usage related to practicalities (instrumental use), closely followed by usage related to information gathering (informational use). 63.8 percent (cases) of the internet users had been using internet for social networking and support during the last month and 50.7 percent (cases) for leisure and entertainment. Only 5.2 percent indicated that they had used the internet for other activities lately. It is, however, important to keep in mind that the internet activities were measured with a multiple answer question and that the older adults indicated several internet activities. Overall, 80.1 per cent of the total sample perceived their life as meaningful.

*Insert Table 3 about here*

*The association between internet use, internet-based activities and perceived meaningfulness in life*

Statistical significant differences were found for all socio-demographic variables, except for gender and study regions, and health status with regard to perceiving life as meaningful (Table 4). Significant differences between independent internet users, internet users with support and non-users were detected from the data analysis – over 85 per cent within the group of independent internet-users and over 80 per cent of the internet users with support perceived their life as meaningful, compared to 70 per cent of the group of non-users.

*Insert Table 4 about here*

The logistic regression analysis (Table 5) further explored the association between internet use and related internet activities and perceived meaningfulness in later life in four steps. Four regression models are presented, the final model being the most advanced. The indicated OR:s, retrieved from the analysis, predict the differences in perceiving life as meaningful among the different groups under study (e.g. independent internet users, internet users with support vs. non-users).

The first step of the analysis explored the association between internet use and perceived meaningfulness. The results indicate that there is a statistically significant association between using the internet both independently and with the support of others and perceiving life as meaningful (Model 1 in Table 5). Both independent internet users and users that received support had more than two times higher odds for perceiving life as meaningful, compared to non-users.

In the next step (Model 2 in Table 5), a set of socio-demographic variables together with the variable measuring self-rated health status were added to the analysis. The results indicate that using internet both independently and with support have statistically significant associations to perceived meaningfulness— also after adjusting for the added variables. Perceived meaningfulness had several significant co-variables among the added variables – such as gender, marital status, income-level and self-rated health (see Table 5, Model 2 for more details). For instance, the older respondents who rated their health status as very good had five times higher odds of perceiving their life as meaningful, compared to respondents with a poor self-rated health. Similar association patterns were also found for income level.

The third step of the analysis explored the association between different internet-based activities and perceived meaningfulness. In Model 3 (Table 5), the variable measuring general internet use in Model 1 and 2 was replaced by the five variables measuring internet-based activities (i.e. the content of the internet use). The analysis showed that all of the internet-based activities

under study had statistically significant associations to perceiving life as meaningful, compared to not engaging in them.

Comparable to the analysis conducted in Model 2, the same set of socio-demographic variables and self-rated health were added to the final step of the analysis (Model 4 in Table 5). After adjusting for these variables, only the internet-based activity leisure/entertainment managed to show a statistically significant association to perceived meaningfulness. However, the OR was very close to statistically significant for social network and support, as well as for the variable “other activities”. Several significant co-variables were found among the socio-demographic (gender, same age groups as in Model 2, marital status, income level) variables and self-rated health status. Thus, these variables seem to partially explain the association found between using the internet for leisure/entertainment activities and perceiving life as meaningful.

The values of the Hosmer and Lemeshow goodness-of-fit statistics showed that the models used for the logistic regression analysis fit the data material (Table 5).

*Insert Table 5 about here*

## **Discussion**

This study adds to the public health field by highlighting evaluative aspects of older adults' wellbeing (i.e. focusing on the subjective dimension of positive mental health as opposed to e.g. mental ill health) in relation to internet use and related everyday internet activities. Understanding the association between internet use and experienced wellbeing in later life is becoming increasingly important due to increased presence of digital technology in everyday life and recent large public investments in welfare technology and digitalisation in the Nordic countries (16).

In-between-group comparisons of older adults perceiving and not perceiving life as meaningful identified a significant difference with regard to internet use. Using internet independently and

with the support from another person significantly increased the odds for perceiving life as meaningful, after adjusting for socio-demographic variables and self-rated health. The complex association between internet use and different components of wellbeing in later life has increasingly been explored in previous studies, which have indicated positive influences (e.g. 11, 17), but also no direct effect at all (18). In turn, present evidence base suggests that internet use might have indirect effect on older adults' wellbeing - hence, the connection between internet use and wellbeing in later life might be moderated by other factors such as offline social interaction (19). Thus, the significantly increased odds for perceiving life as meaningful for the older adults who used the internet with support of another person found in this study might be related to the offline social interaction that occurs between persons when using the internet together. The analysis, additionally, demonstrated that the association between perceived meaningfulness in life and internet use have a number of statistically significant co-variables in terms of socio-demographic variables and self-rated health. However, neither these variables nor the offline social interaction from receiving support with using the internet can alone explain the association between internet use and perceived meaningfulness in life, since also the independent internet use variable demonstrated a statistically significant association, after adjusting for socio-demographic variables and self-rated health status.

Based on previous study findings, the things you do on the internet (activities) seem to matter when it comes to the connection to wellbeing (20). In an attempt to further explore and clarify this association, this study also tested specific internet-based activities association to perceived meaningfulness in life. The results further displayed that, after controlling for socio-demographic variables and self-rated health status, leisure/entertainment activities were the only internet-based activities with statistically significant association to perceiving life as meaningful. Concerning internet use for leisure/entertainment activities and the association to different aspects of wellbeing, also previous studies are presenting similar results (21), where

using the internet for leisure activities contributed to an increased life satisfaction and decreased depression levels. In addition, qualitative findings (6) describe the use of the internet for leisure activities as rewarding and as something that expanded the older adults' everyday life. These functions were especially highlighted because they were driven by the older persons' own interests, unlike online banking or healthcare services that were experienced as being forced upon them from society.

How is internet use and perceived meaningfulness in later life linked then? The results of the study indicate that internet use and related internet-based activities (as well as various socio-demographic variables and health status) seem to matter when it comes to perceiving later life as meaningful. However, more studies, preferably longitudinal, are needed in order to explore causal interference between them. One possible link between internet use and perceived meaningfulness could be based on online services facilitating and increasing the opportunities for older adults to engage in activities perceived as meaningful. Namely, the internet can be seen as a tool, facilitating engagement in meaningful activities - and participating in meaningful activities can in turn, as suggested by previous studies (22), contribute to perceiving life as meaningful. Moreover, additional studies exploring whether older persons with limitations in daily, social and leisure activities are enjoying benefits of using internet-based activities compared to persons with no limitation are needed in order to further investigate the suggested link.

### **Study limitations and strengths**

One limitation with the study at hand is the cross-sectional design. The main weakness with this type of design is that causality measurements are not possible. However, a benefit with logistic regression analysis is that it allows the researcher to study group differences of the variables under study while controlling for other potential co-variates. By controlling for socio-demographic variables and health status, the study at hand recognizes that many factors may

influence the association between internet use and perceived meaningfulness in life. These factors were, however, not the main outcome of this specific study, examining the link between internet use and experienced wellbeing.

The logistic regression analysis demands artificial grouping of the study sample, which can be seen as an additional limitation with the method. The authors are aware of that the cut-off points used in the analysis are rough and that data as well as nuances of some of the variables might have been lost during the recoding process. On the other hand, as the focus was on categorical variables in this study, not dividing the sample into groups (or using too many groups) could have led to losing statistical power in the analysis, since there would have been a small number of participants in some of the cells (24). Therefore, the somewhat artificial grouping of the sample in the present study can be seen as reasonable.

The survey questions regarding internet use and meaningfulness in life were not optimal. The amount of missing values (437) (even though pointing at a missing at random pattern) for the internet variable could be seen as an indication of the internet questions being difficult to interpret. It should also be kept in mind, in the interpretations of the study findings, that the internet-based activities were measured by a multiple answer question, and that the informants frequently indicated several internet-based activities. Moreover, perceived meaningfulness in life was in this study measured with a single-item question. Undoubtedly, a single-item question cannot capture all of the components of perceived meaning in life. On the other hand, this question may have been experienced by the respondents as quite easy to grasp in an otherwise rather extensive, all-embracing postal survey (82 questions) covering several scales and measurements. In addition, in a recent review (25) identifying and appraising existing instruments to evaluate mental wellbeing in old age, no existing instrument regarding evaluative and experienced wellbeing (e.g. experienced meaning) was recommended due to poor quality or limited usability due to lack of language translations. Therefore, the use of a single-item

question can be justified in this study. Consequently, there is a need to develop instruments for measuring both internet-based activity as well as evaluative and experienced wellbeing in later life further.

Finally, the extensive postal survey might also have created a risk of bias due to self-selection sampling. Older adults with more severe health problems may not have completed the survey (due to e.g. the high number of questions), which might have resulted in both higher numbers of persons perceiving their life as meaningful as well as internet users within the study sample than if more persons with poorer health status had participated in the survey.

Overall, the limitations of the study could be argued to be compensated by its strengths of being based on a larger high-quality survey data, combining two Nordic geographical regions and covering various groups within the heterogeneous group of older adults. In addition, the study at hand adds to the limited body of research examining the often-overlooked evaluative and experienced dimensions of wellbeing in an ageing population.

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### **Conflict of interest**

The authors declare that there is no conflict of interest.

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Table 1. Socio-demographic variables, self-rated health status, and the recoding process

| Variables   | Response options   | Recoded variables used in analysis |
|---|--|------------------------------------|
| <b>Socio-demographic variables</b>                |  |                                    |
| Gender  | Men<br>Women   | *                                  |
| Age   | 65<br>70<br>75<br>80<br>85   | *                                  |
| Study region                                      | Finland<br>Sweden  | *                                  |
| Marital status                                    | Unmarried<br>Divorced<br>Widow/Widower                                     | Single                             |
|   | In a relationship<br>Living with a partner<br>Married                      | In a relationship                  |
| Educational level                                 | 6 years or less (Elementary school)  | Low                                |
|   | 7 years or more (High School, Upper Secondary School, Vocational training) | Middle                             |
|   | University or university of applied science education                      | High                               |
| Income level                                      | 0-5000 SEK/ 0-500 €<br>5001-10 000/ 501-1000                               | Low                                |
| “Your monthly income after taxes?”                | 10 001-15 000/ 1001-1500<br>15 001-20 000/ 1501-2000                       | Middle                             |
|   | More than 20 000/ 2000   | High                               |
| <b>Self-rated health</b>                          |  |                                    |
| “In general, how would you describe your health?” | Bad<br>Fair<br>Good<br>Very good<br>Excellent                              | Fair/bad<br>Good<br>Very good      |

\*The original variables were used in the analysis

Table 2. Meaningfulness in life and internet variables and the recoding process.

| <b>Variables</b>   | <b>Response options</b>   | <b>Recoded variables used in the analysis</b>   |
|--|---|---|
| <b>Meaningfulness in life</b><br>“How meaningful do you perceive your life at the moment?”   | Very meaningless<br>Relatively meaningless<br>Hard to tell<br><br>Relatively meaningful<br>Very meaningful  | Not meaningful<br><br>Meaningful  |
| <b>Internet use</b><br>“Are you using the Internet (via computer, tablet computer, smart phone or similar devices)?”                                       | No, someone else is managing my errands on the internet for me<br>No, I do not use the internet<br><br>Yes, with support from others<br><br>Yes, independently  | Not internet users<br><br>Internet user with support<br><br>Internet users  |
| <b>Internet-based activities</b><br>“Have you been using internet for the following purposes during the last month?”<br><br>Multiple answers were allowed. | Utilities <sup>1</sup><br>Work or studies<br><br>News updates or information gathering <sup>2</sup><br><br>Leisure/Entertainment <sup>3</sup><br><br>Communication with relatives and/or friends <sup>4</sup><br>Communication to create new contact <sup>5</sup><br>Support groups<br><br>Else, what? <sup>6</sup> | Instrumental use<br><br>Informational use<br><br>Leisure/Entertainment<br><br>Social networking and support<br><br>Other activities |

<sup>1</sup> bank, travel arrangements, social security

<sup>2</sup> newspapers, news forums

<sup>3</sup> music, movies, games, forums connected to interests

<sup>4</sup> email, Skype, Facebook, social networks

<sup>5</sup> Facebook, forums, online dating

<sup>6</sup> blog, sports, games, church services

Table 3. Distribution (%) of the sociodemographic variables, self-rated health, perceived meaningfulness and internet use among older adults in Finland and Sweden.

|   | <b>Sweden</b><br>N= 4375<br>(46.6) | <b>Finland</b><br>N= 5011<br>(53.4) | <b>All</b><br>N= 9386 |               |
|---|------------------------------------|-------------------------------------|-----------------------|---------------|
| <b><u>Gender</u></b>                        |                                    |                                     |                       |               |
| <b>Men</b>                                  | 2123 <b>(48.6)</b>                 | 2211 <b>(44.1)</b>                  | 4334 <b>(46.2)</b>    |               |
| <b>Women</b>                                | 2249 <b>(51.4)</b>                 | 2800 <b>(55.9)</b>                  | 5049 <b>(53.8)</b>    |               |
| <b><u>Age</u></b>                           |                                    |                                     |                       |               |
| <b>65</b>                                   | 1207 <b>(27.6)</b>                 | 1544 <b>(30.9)</b>                  | 2751 <b>(29.4)</b>    |               |
| <b>70</b>                                   | 1345 <b>(30.8)</b>                 | 1518 <b>(30.4)</b>                  | 2863 <b>(30.6)</b>    |               |
| <b>75</b>                                   | 864 <b>(19.8)</b>                  | 828 <b>(16.6)</b>                   | 1692 <b>(18.1)</b>    |               |
| <b>80</b>                                   | 599 <b>(13.7)</b>                  | 701 <b>(14.0)</b>                   | 1300 <b>(13.9)</b>    |               |
| <b>85</b>                                   | 356 <b>(8.1)</b>                   | 403 <b>(8.1)</b>                    | 759 <b>(8.1)</b>      |               |
| <b><u>Marital Status</u></b>                |                                    |                                     |                       |               |
| <b>Single</b>                               | 1186 <b>(27.5)</b>                 | 1285 <b>(25.8)</b>                  | 2471 <b>(26.6)</b>    |               |
| <b>In a relationship</b>                    | 3133 <b>(72.5)</b>                 | 3695 <b>(74.2)</b>                  | 6828 <b>(73.4)</b>    |               |
| <b><u>Educational level</u></b>             |                                    |                                     |                       |               |
| <b>Low</b>                                  | 1980 <b>(45.7)</b>                 | 1512 <b>(30.4)</b>                  | 3472 <b>(37.5)</b>    |               |
| <b>Middle</b>                               | 1389 <b>(32.4)</b>                 | 2171 <b>(43.7)</b>                  | 3560 <b>(38.5)</b>    |               |
| <b>High</b>                                 | 942 <b>(22.0)</b>                  | 1283 <b>(25.8)</b>                  | 2225 <b>(24.0)</b>    |               |
| <b><u>Income Level</u></b>                  |                                    |                                     |                       |               |
| <b>Low</b>                                  | 1201 <b>(28.3)</b>                 | 1129 <b>(23.5)</b>                  | 2330 <b>(25.7)</b>    |               |
| <b>Middle</b>                               | 2045 <b>(48.2)</b>                 | 2161 <b>(44.9)</b>                  | 4206 <b>(46.5)</b>    |               |
| <b>High</b>                                 | 997 <b>(23.5)</b>                  | 1519 <b>(31.6)</b>                  | 2516 <b>(27.8)</b>    |               |
| <b><u>Self-rated Health</u></b>             |                                    |                                     |                       |               |
| <b>Moderate/poor</b>                        | 1471 <b>(34.0)</b>                 | 1905 <b>(38.4)</b>                  | 3376 <b>(36.3)</b>    |               |
| <b>Good</b>                                 | 1468 <b>(33.9)</b>                 | 1512 <b>(30.5)</b>                  | 2980 <b>(32.1)</b>    |               |
| <b>Very good</b>                            | 1387 <b>(32.1)</b>                 | 1547 <b>(31.2)</b>                  | 2934 <b>(31.6)</b>    |               |
| <b><u>Perceiving life as meaningful</u></b> |                                    |                                     |                       |               |
| <b>Not Meaningful</b>                       | 835 <b>(20.0)</b>                  | 977 <b>(19.9)</b>                   | 1830 <b>(19.9)</b>    |               |
| <b>Meaningful</b>                           | 3402 <b>(80.0)</b>                 | 3943 <b>(80.1)</b>                  | 7345 <b>(80.1)</b>    |               |
| <b><u>Internet use</u></b>                  |                                    |                                     |                       |               |
| <b>Not internet users</b>                   | 1325 <b>(31.4)</b>                 | 1651 <b>(34.9)</b>                  | 2976 <b>(33.3)</b>    |               |
| <b>Internet user with support</b>           | 341 <b>(8.1)</b>                   | 296 <b>(6.3)</b>                    | 637 <b>(7.1)</b>      |               |
| <b>Internet users</b>                       | 2550 <b>(60.5)</b>                 | 2786 <b>(58.9)</b>                  | 5336 <b>(59.6)</b>    |               |
| <b><u>Internet-based activities</u></b>     |                                    |                                     |                       |               |
| <b>(Multiple answer question)</b>           |                                    |                                     | N and (%)             | (% ) cases    |
| <b>Instrumental use</b>                     | 2388 <b>(54.6)</b>                 | 2598 <b>(51.8)</b>                  | 4986 <b>(53.1)</b>    | <b>(82.8)</b> |
| <b>Informational use</b>                    | 2365 <b>(54.1)</b>                 | 2540 <b>(50.7)</b>                  | 4905 <b>(52.3)</b>    | <b>(81.4)</b> |
| <b>Leisure/Entertainment</b>                | 1492 <b>(34.1)</b>                 | 1562 <b>(31.2)</b>                  | 3054 <b>(32.5)</b>    | <b>(50.7)</b> |
| <b>Social network and Support</b>           | 1879 <b>(42.9)</b>                 | 1967 <b>(39.3)</b>                  | 3846 <b>(41.0)</b>    | <b>(63.8)</b> |
| <b>Other activities</b>                     | 107 <b>(2.4)</b>                   | 207 <b>(4.1)</b>                    | 311 <b>(3.3)</b>      | <b>(5.2)</b>  |

Table 4. The distribution of experiencing life as meaningful among all the included variables and a Pearson's Chi-square test presenting between-group comparison of perceived meaningfulness.

|   | <b>Not Meaningful (%)</b> | <b>Meaningful (%)</b> | <b>All (%)</b> | <b>x<sup>2</sup></b> |
|---|---------------------------|-----------------------|----------------|----------------------|
| <b><u>Gender</u></b>                    |                           |                       |                |                      |
| Men                                     | 847 (20.1)                | 3377 (79.9)           | 4948 (46.1)    | <i>p</i> = .806      |
| Women                                   | 982 (19.8)                | 3966(80.2)            | 4948 (53.9)    |                      |
| <b><u>Age</u></b>                       |                           |                       |                |                      |
| 65                                      | 338 (12.4)                | 2379 (87.6)           | 2717 (29.7)    | <i>p</i> ≤ .001      |
| 70                                      | 457 (16.3)                | 2349 (83.7)           | 2806 (30.7)    |                      |
| 75                                      | 363 (21.9)                | 1291 (78.1)           | 1654 (18.1)    |                      |
| 80                                      | 362 (28.7)                | 899 (71.3)            | 1261 (13.8)    |                      |
| 85                                      | 308 (43.0)                | 408 (57.0)            | 716 (7.8)      |                      |
| <b><u>Study region</u></b>              |                           |                       |                |                      |
| Finland                                 | 977 (19.9)                | 3943 (80.1)           | 4920 (53.6)    | <i>p</i> = .821      |
| Sweden                                  | 853 (20.0)                | 3402 (80.0)           | 4255 (46.2)    |                      |
| <b><u>Marital status</u></b>            |                           |                       |                |                      |
| Single                                  | 783 (32.7)                | 1613 (67.3)           | 2396 (26.4)    | <i>p</i> ≤ .001      |
| In a relationship                       | 1031 (15.4)               | 5663 (84.6)           | 6694 (73.6)    |                      |
| <b><u>Educational level</u></b>         |                           |                       |                |                      |
| Low educational level                   | 843 (25.1)                | 2515 (74.9)           | 3358 (37.1)    | <i>p</i> ≤ .001      |
| Middle educational level                | 625 (18.7)                | 2843 (81.3)           | 3495 (38.6)    |                      |
| High educational level                  | 307 (13.9)                | 1894 (86.1)           | 2201 (24.3)    |                      |
| <b><u>Income Level</u></b>              |                           |                       |                |                      |
| Low                                     | 598 (26.3)                | 1677 (73.7)           | 2275 (25.6)    | <i>p</i> ≤ .001      |
| Middle                                  | 825 (20.0)                | 3310 (80.0)           | 4135 (46.5)    |                      |
| High                                    | 340 (13.7)                | 2143 (86.3)           | 2483 (27.9)    |                      |
| <b><u>Self-rated health</u></b>         |                           |                       |                |                      |
| Moderate/poor                           | 1162 (35.4)               | 2122 (64.6)           | 3284 (36.1)    | <i>p</i> ≤ .001      |
| Good                                    | 434 (14.8)                | 2496 (85.2)           | 2930 (32.2)    |                      |
| Very good                               | 208 (7.2)                 | 2681 (92.8)           | 2889 (31.7)    |                      |
| <b><u>Internet use</u></b>              |                           |                       |                |                      |
| Not internet users                      | 866 (30.2)                | 2005 (69.8)           | 2871 (32.8)    | <i>p</i> ≤ .001      |
| Internet users with support             | 107 (17.2)                | 516 (82.8)            | 623 (7.1)      |                      |
| Internet users                          | 839 (14.3)                | 5048 (85.6)           | 5887 (67.2)    |                      |
| <b><u>Internet-based activities</u></b> |                           |                       |                |                      |
| Instrumental use                        | 694 (14.1)                | 4226 (85.9)           | 4920 (53.6)    | <i>p</i> ≤ .001      |
| Informational use                       | 677 (14.0)                | 4167 (86.0)           | 4844 (52.8)    |                      |
| Leisure/Entertainment                   | 383 (12.7)                | 2639 (87.3)           | 3022 (32.9)    | <i>p</i> ≤ .001      |
| Social network and Support              | 499 (13.1)                | 3300 (86.9)           | 3799 (41.4)    | <i>p</i> ≤ .001      |
| Other activities                        | 42 (13.7)                 | 264 (86.3)            | 306 (3.3)      | <i>p</i> = .006      |

Table 5. Odds ratio (OR) and their 95 % confidence intervals (CI) of having meaning in life according to 4 logistic regression models as well as the result from the Hosmer and Lemeshow Test of goodness of fit.

|  | <b>All N = 8758</b>                                   |  |   |   |
|--|---|--|---|---|
|  | <b>Model 1</b><br>Internet usage (three indicators)   | <b>Model 2</b><br>Internet usage + Socio-demographic variables + self-rated health | <b>Model 3</b><br>Internet-based activities             | <b>Model 4</b><br>Internet-based activities + Socio-demographic variables + Self-rated health |
| <b>Internet use</b>                        |   |  |   |   |
| Non internet user                          | 1.00  | 1.00   |   |   |
| Internet user with support                 | <b>2.083</b> (1.667-2.603)                            | <b>1.418</b> (1.104-1.821)   |   |   |
| Independent internet user                  | <b>2.674</b> (2.392-2.990)                            | <b>1.273</b> (1.100-1.474)   |   |   |
| <b>Internet-based activities</b>           |   |  |   |   |
| Instrumental use                           |   |  | 1.00<br><b>1.417</b> (1.229-1.635)                      | 1.00<br>1.009 (.858-1.187)  |
| Informational use                          |   |  | 1.00<br><b>1.353</b> (1.163-1.574)                      | 1.00<br>1.004 (.849-1.188)  |
| Leisure/Entertainment                      |   |  | 1.00<br><b>1.301</b> (1.121-1.511)                      | 1.00<br><b>1.192</b> (1.015-1.401)  |
| Social network and support                 |   |  | 1.00<br><b>1.307</b> (1.126-1.517)                      | 1.00<br>1.73 (.996-1.382)   |
| Other activities                           |   |  | 1.00<br><b>1.294</b> (.926-1.807)                       | 1.00<br>1.436 (.992-2.078)  |
| <b>Socio-demographic variables</b>         |   |  |   |   |
| <b>Gender</b>                              |   |  |   |   |
| Men  |   | 1.00   |   | 1.00  |
| Women                                      |   | <b>1.559</b> (1.372-1.773)   |   | <b>1.494</b> (1.318-1.694)  |
| <b>Age</b>                                 |   |  |   |   |
| 65   |   | 1.00   |   | 1.00  |
| 70   |   | .862 (.730-1.018)  |   | .875 (.743-1.032)   |
| 75   |   | <b>.757</b> (.630-.910)  |   | <b>.779</b> (.650-.934)   |
| 80   |   | <b>.677</b> (.554-.827)  |   | <b>.689</b> (.567-.837)   |
| 85   |   | <b>.481</b> (.380-.608)  |   | <b>.468</b> (.374-.585)   |
| <b>Marital status</b>                      |   |  |   |   |
| Single                                     |   | 1.00   |   | 1.00  |
| In a relationship                          |   | <b>2.282</b> (2.002-2.601)   |   | <b>2.318</b> (2.042-2.632)  |
| <b>Study region</b>                        |   |  |   |   |
| Finland                                    |   | 1.00   |   | 1.00  |
| Sweden                                     |   | 1.021 (.905-1.152)   |   | 1.010 (.898-1.137)  |
| <b>Educational level</b>                   |   |  |   |   |
| Low  |   | 1.00   |   | 1.00  |
| Middle                                     |   | .961 (.837-1.104)  |   | .989 (.865-1.131)   |
| High                                       |   | 1.081 (.903-1.295)   |   | 1.055 (.882-1.261)  |
| <b>Income level</b>                        |   |  |   |   |
| Low  |   | 1.00   |   | 1.00  |
| Middle                                     |   | <b>1.319</b> (1.144-1.520)   |   | <b>1.276</b> (1.112-1.464)  |
| High                                       |   | <b>1.409</b> (1.165-1.703)   |   | <b>1.383</b> (1.148-1.665)  |
| <b>Self-rated health</b>                   |   |  |   |   |
| Moderate/poor                              |   | 1.00   |   | 1.00  |
| Good                                       |   | <b>2.657</b> (2.316-3.046)   |   | <b>2.659</b> (2.326-3.039)  |
| Very good                                  |   | <b>5.517</b> (4.640-6.559)   |   | <b>5.440</b> (4.594-6.442)  |
| <b>Hosmer and Lemeshow goodness-of-fit</b> | <b>Model 1</b> = $\chi^2 = 0,000$ ,<br>df= 1, p= 1,00 | <b>Model 2</b> = $\chi^2 = 10.028$ ,<br>df= 8, p= 0.263                            | <b>Model 3</b> = $\chi^2 = 9,588$ ,<br>df= 6, p= 0.143, | <b>Model 4</b> = $\chi^2 = 6.598$ ,<br>df = 8, p= 0.581                                       |