

Introduction

Sociological, gerontological and other theories argue that social activity contributes to higher subjective well-being (SWB) in middle and older age, and the majority of empirical studies support this (Baker et al., 2005; Litwin, Shiovitz-Ezra, 2006). Recent studies indicate that the benefits of social activity in terms of SWB vary between countries (Bian et al., 2018). More precisely, involved in volunteering individuals in countries with low population involvement in volunteering are happier and more life satisfied (Plagnol, Huppert, 2010) and subjectively healthier (Sirven, Debrand, 2008) than their counterparts in countries with high population involvement in volunteering. The question then becomes whether or not this relationship is the same for middle-aged and older individuals in European countries.

In this study, we extend this line of research by examining the differences in the influence of formal (volunteering) and informal (social contacts) social activity on SWB of middle-aged and elderly people (50 years and over) in European countries including Russia using random slope multilevel models. We focus on life satisfaction and happiness, i.e. the evaluative and affective measures of SWB (Diener et al., 1985; Tinkler & Hicks, 2001). The research is based on the European Social Survey¹, wave 6 (2012).

The findings of the study may have significant implications for policy makers in the field of active ageing and social policy towards the elderly. The search of beneficial forms of social activity for individual SWB specific for particular countries plays a key role in the raising of life quality and well-being of older people.

Literature review

Subjective well-being (SWB) has attracted wide attention in research in the recent decades. Socio-economic status (SES), marital status, health, etc. are well-known determinants of SWB, i.e. in the middle and older age (Pinquart & Sorensen, 2000; Pinquart & Sorensen, 2001; George, 2010). Older individuals tend to report higher SWB than middle-aged individuals (Ferrer-i-Carbonell & Cowdy, 2007). Gender differences in SWB are partly explained by the differences in SES of men and women but the disadvantages of the last grow in older age due to widowhood, chronic illness (Pinquart & Sorensen, 2001).

A number of studies have been found that social activity increases individual SWB in middle and older age (Baker et al., 2005; Litwin, Shiovitz-Ezra, 2006; Haller, Hadler, 2006). Another strand of literature explores that different social roles or types of social activity may have different impact in SWB (Menaghan, 1989; Thoits, 1992). For instance, on the basis of meta-analysis of 42 studies, Adams et al. (2011) concluded that informal social activity, i.e.

¹ <https://www.europeansocialsurvey.org/>

outside organizations, has a stronger influence on individual SWB in middle and older age than formal social activity.

More recent studies have presented some evidence that SWB determinants vary between countries (Fleche et al., 2012; Puntsher et al., 2014). The national differences in SWB determinants are often associated with the level of socio-economic development and cultural background (Pichler and Wallace, 2007; Fleche et al., 2012; Sotheix and Lonqvist, 2014). Examining European regions, Puntcher et al. (2014) emphasized social capital, measured by activity in organizations, close social ties, general and institutional trust, as the main force for differences in life satisfaction and happiness. Thus, we hypothesize that *the influence of social activity on individual SWB in middle and older age varies between European countries* (Hypothesis 1).

Another strand of literature has associated the influence of social activity on SWB with population engagement in this activity across countries (Sirven, Debrand, 2008²; Plagnol, Huppert, 2010; Oarga et al., 2015). From the economic theory, social activity can be viewed as a positional good that has value because its scarcity (Bartolini, 2008). According to satisfaction treadmill theory, SWB increases when personal aspirations become achievements but after a while, aspirations adapt to new circumstances, and new aspirations and achievements are necessary for further SWB growth (Bruni, Stanca, 2008). A few empirical studies have reinforced these ideas and found larger effect of voluntary activity on SWB (higher ‘rate of return’) in European countries with lower population engagement in voluntary organizations (Sirven, Debrand, 2008; Plagnol, Huppert, 2010). However, other research has shown that informal social activity in the form of helping behavior has a stronger association with life satisfaction in European countries with more widespread helping behavior (Oarga et al., 2015). The explanation of this finding lies in field of conformity with social norms when social approval and recognition enhance SWB (Cialdini & Goldstein, 2004). Despite the mentioned above studies, little is known about the rates of return of social activity in middle and older ages. We hypothesize that *the influence of social activity on individual SWB is higher in countries with lower population engagement in social activity* (Hypothesis 2).

Previous empirical studies have shown that volunteering as well as time spent with relatives or friends have the largest effect on SWB in high-income countries (Calvo et al., 2012; Sarracino, 2008) that may be caused by different motives for this activity in wealthy and poor countries. In poor countries, almost all significant for SWB activities are extrinsic and rather a means to reach other goal while in wealthy countries, these activities are intrinsic and important for individuals themselves (Sarracino, 2008). Another explanation lies in the field of different

²The authors estimated the effect of participation in voluntary associations on individual subjective health.

values: in wealthy countries, materialistic values are replaced by postmaterialistic, and belonging and participation in society dominant over economic sphere of life (Inglehart, 2000). In contrast to these findings for the whole population across the world, for European seniors larger effect of volunteering on SWB has been observed in poorer South-East than in richer North-West (Okulicz-Kozaryn, Morawski, 2020). Unfortunately, the authors do not provide a clear explanation of this finding except higher marginal utility of volunteering in countries with lower rates of volunteering. We extend this research by examining not only voluntary but social activity in a broader sample of European countries and suggest that *the influence of social activity on individual SWB is higher in wealthier countries than in poorer ones* (Hypothesis 3).

Data

We based our research on the data of cross-national European Social Survey (ESS) conducted in 2012, wave 6. This wave contains questions about SWB and social contacts as well as a rotating module with question about voluntary activity. We applied design weights and population size weights according to the ESS recommendations to perform cross-country comparison³. The research sample includes 23,766 individuals at the age of 50 years and over from 26 countries⁴.

We specify SWB as life satisfaction and happiness according to the affective approach (Tinkler and Hicks, 2001; George, 2010). To define the level of happiness, respondents were asked to estimate, overall, how happy would they say they were on a scale from 0 «extremely unhappy» to 10 «extremely happy». The level of life satisfaction is evaluated with question «All things considered, how satisfied are you with your life as a whole nowadays?» where 0 means «extremely dissatisfied» and 10 «extremely satisfied». We recoded both variables into binary ones with alternatives «more likely to be unhappy»/ «more likely to be unsatisfied» for 0 to 4 scores and «more likely to be happy»/ «more likely to be satisfied» for 5 to 10 scores in order to apply logit multilevel models described below and simplify the results interpretation.

The explanatory variables are formal and informal social activity. Formal social activity is defined as work for voluntary or charitable organizations during last 12 months (*voluntary activity*⁵). We divided respondents in two categories: those, who never participated in volunteering (67% of interviewees) and those, who did it at least once⁶. Informal social activity is assumed as social meetings with friends, relatives and colleagues excluding for work or duty

³ https://www.europeansocialsurvey.org/docs/methodology/ESS_weighting_data_1.pdf

⁴ Number of interviewees by countries is given in Appendix 1

⁵ How often have you been involved in work for voluntary or charitable organizations during last 12 months?

⁶ Categories «at least once a week / once a month / once every three months / once every six months / less often»

(*social contacts*⁷). We recorded possible frequencies in two categories such as «meetings once a week or more often»⁸ and «meetings several times a month or less often»⁹. These two variables describe both intra and extra-family social activity.

Besides the explanatory variables we also control for the socio-demographic characteristics such as age, quadratic form of age, gender, education level (general/ professional or secondary special/ higher or post-graduate), marital status, type of settlement (rural/ urban), and employment status (employed/ not employed); personal characteristics such as subjective general health (very good/ good/ fair/ bad/ very bad), belonging to any particular religion or denomination (yes/ no) and perception of living conditions in the form of feeling safe walking alone after dark in the area of living (safe/ unsafe) and number of individuals in the household¹⁰.

Methods

In order to take into account cross-country differences in the influence of social activity on individual SWB we apply random intercept and random slope logit multilevel regression analysis. These models consist of fixed and random parts and allow to correct standard errors of between-group variance and countries residuals underestimated in traditional econometric models (Steele, 2008; 2010). In our two-level models, individuals and countries form the first and second group levels.

In random intercept model random part has two components such as country-level (u_j) and individual (e_{ij}) residuals. Cross-country relationship between dependent and independent variables is represented with 26 parallel predicted lines. Each country line intercepts the y-line at the point of $\beta_0 + u_j$, where β_0 is an overall mean of dependent variable across all countries, i.e. SWB measure in our model. The slope of cross-country lines is the same for all countries and equals to the linear coefficient of corresponding independent variable. In our research these are the variables of social contact or voluntary activity. The regression equation of random intercept model with binary dependent variable took the following form (1):

$$\log\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right) = \beta_0 + \beta_1 x_{ij} + \dots + \beta_{15} x_{ij} + u_j \quad (1)$$

where the response probability π_{ij} on x_{ij} was defined as $\pi_{ij} = \Pr(y_{ij} = 1) = E(y_{ij} | x_{ij}, u_j)$.

Unlike random intercept models, random slope models allow the country lines to vary randomly across specified variable. We supposed that the influence of social activity on individual SWB can vary between countries, which implies the addition of a new term $u_{1j} x_{ij}$ in

⁷How often do you meet socially with friends, relatives or work colleagues rather than for reasons of either work or pure duty?

⁸Categories «once a week / several times a week / every day»

⁹Categories «several times a month / once a month / less than once a month / never»

¹⁰ Descriptive statistics are given in Appendix 2

random part of the model. Country lines intercept y-line at the same point as in random intercept model. The slopes are different for all countries and equal to $\beta_1 + u_{1j}$. The equation of random slope logit model with one random coefficient, is extended to the following (2):

$$\log\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right) = \beta_0 + \beta_1 x_{ij} + \dots + \beta_{15} x_{ij} + u_{0j} + u_{1j} x_{ij} \quad (2)$$

Table 1 –Models description

| | |
|--------------|---|
| Model 1 (M1) | Random intercept with control variables |
| Model 2 (M2) | Model 1 with social contacts |
| Model 3 (M3) | Model 1 with voluntary activity |
| Model 4 (M4) | Model 1 with voluntary activity and social contacts |
| Model 5 (M5) | Model 2 with random slope for social contacts |
| Model 6 (M6) | Model 3 with random slope for voluntary activity |
| Model 7 (M7) | Model 4 with random slope for social contacts |
| Model 8 (M8) | Model 7 with random slope for both voluntary activity and social contacts |

Results

We test the relevance of random intercept and random slope models on the base of likelihood ratio tests¹¹ (LR-test) for nested models¹². The null hypothesis assumes that a simpler model describes data better than more complicated one. Calculated test statistic is compared with a chi-squared distribution with degrees of freedom equal to the number of extra parameters in the more complex model (Steele, 2008).

At the first step, we tested random intercept model with control variables only (M1). Then, we added the variables of social contacts and voluntary activity separately (M2 and M3 correspondingly) and simultaneously (M4) to the initial random intercept model M1. Finally, we added random slope for social contacts, voluntary activity and both types of social activity (M5 – M8). This research design was applied for happiness as well as for life satisfaction. LR-test statistics for our models are given in Table 2.

Table 2 – LR-test for life satisfaction and happiness models

| | Life satisfaction | | | | Happiness | | | |
|---------|-------------------|------------|--------------|-------------|--------------|------------|--------------|-------------|
| | LR-statistic | To compare | LR-test | Chi-squared | LR-statistic | To compare | LR-test | Chi-squared |
| Model 1 | -7332.15 | | | | -9227.78 | | | |
| Model 2 | -7288.70 | M1 vs M2 | 39.49 | 3.84 | -9208.04 | M1 vs M2 | 86.90 | 3.84 |
| Model 3 | -7317.12 | M1 vs M3 | 23.63 | 3.84 | -9215.97 | M1 vs M3 | 30.06 | 3.84 |
| Model 4 | -7276.09 | M2 vs M4 | 20.47 | 3.84 | -9197.81 | M2 vs M4 | 25.22 | 3.84 |
| | | M3 vs M4 | 36.33 | 3.84 | | M3 vs M4 | 82.06 | 3.84 |
| Model 5 | -7315.20 | M2 vs M5 | 12.85 | 5.99 | -9215.83 | M2 vs M5 | 7.82 | 5.99 |
| Model 6 | -7284.79 | M3 vs M6 | 0.29 | 5.99 | -9201.61 | M3 vs M6 | 3.83 | 5.99 |
| Model 7 | -7272.44 | M4 vs M7 | 19.70 | 3.84 | -9191.76 | M4 vs M7 | 24.70 | 3.84 |
| Model 8 | -7276.09 | M7 vs M8 | 1.06 | 7.81 | -9192.30 | M7 vs M8 | 5.94 | 7.81 |

¹¹LR statistics is calculated as $LR = -2\log L_1 - (-2\log L_2)$

¹²When a more complex model can be built from a simpler with additional parameters

According to the LR-tests, the influence of frequent social contacts on individual SWB significantly differs by countries. M6 with slope for voluntary activity does not improve simpler model M3, while M5 with slope for social contacts fits the data more than random intercept model M2. The model M7 with both types of social activity in the equation along with slope for social activity turned to be the most fitted. More complicated model with two slopes (M8) is not significant. These results are the same for happiness as well as for life satisfaction.

After the comparison of the models, we obtained the research design shown in Figure 1 for both components of SWB. We specified significant transition with solid line and insignificant transition with dotted line.

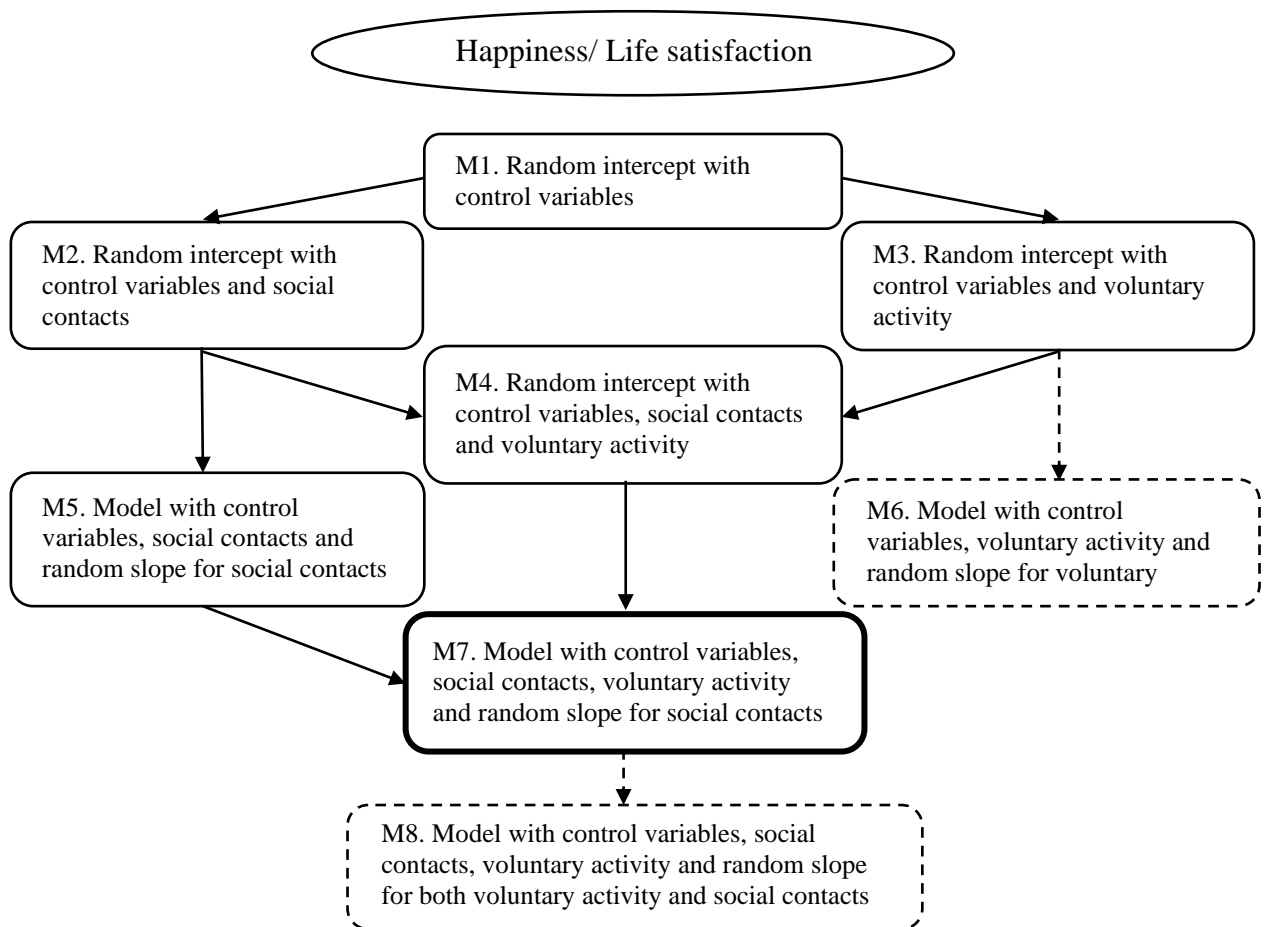


Figure 1 – The research design

Random slope logit multilevel models for life satisfaction and happiness

On the basis of LR-test statistics described in the previous section we chose the multilevel model with random coefficient for social contacts (M7) as the optimal model for life satisfaction as well as for happiness. The regression coefficients of M1 – M7 models did not change significantly, thus, here and after, we discuss the results of M7 models only.

We begin the description of the regression results with socio-demographic characteristics in terms of odds ratio (OR) (Table 3). Age is positively and linearly associated with happiness:

every additional year of life increases the odds of being happier by 6.5% (OR=1.065); the regression coefficient of squared age is insignificant for happiness. Life satisfaction also rises with age but up to 54.5 years old, and then begins to decline (the regression coefficients for age and squared age are significant and equalled to 0.109 and -0.001 correspondingly).

Women of 50+ years old are happier and more life satisfied than men of the same age (OR=1.296 for happiness and OR=1.201 for life satisfaction). Living in cities and towns reduces the odds of being more life satisfied by 8.5% (OR=0.915), compared to living in villages or countryside. No differences between types of settlement are revealed for happiness.

The worse the self-reported health is, less happy and life satisfied is a person. Fair and poor self-reported health decreases the odds of being happier by 67.4% (OR=0.326) and 86% (OR=0.140) correspondingly, compared to very good health. The odds of being more life satisfied declines somewhat moderate: by 60.2% (OR=0.398) and 81.1% (OR=0.189) in case of fair and poor self-reported health, compared to very good health (Table 3).

More educated middle-aged and older individuals are happier and more life satisfied, compared to their less educated peers. Secondary education rises the odds of being more life satisfied by 12.8% (OR=1.128), higher and post-graduate education does that by 44.5% (OR=1.445), compared to non-secondary education. The effect of education is even higher for happiness: OR=1.201 and OR=1.486 for secondary and higher and postgraduate education correspondingly, compared to non-secondary education (Table 3). Employment in middle and older age contributes to happiness (OR=1.369, i.e., +36.9% to the odds of being happier) and life satisfaction (OR=1.443).

Table 3 – Odds ratio of random slope logit models for SWB

| Variables | Odds ratio (OR) | |
|--|-------------------|-----------|
| | Life satisfaction | Happiness |
| | M7 | M7 |
| Age | 1.115*** | 1.065** |
| Quadratic age | 0.999*** | 0.999 |
| Gender (female) | 1.201*** | 1.296*** |
| Type of settlement (urban area) | 0.915** | 0.993 |
| Subjective health: very good – ref. | | |
| good | 0.747*** | 0.601*** |
| fair | 0.398*** | 0.326*** |
| bad | 0.189*** | 0.140*** |
| very bad | 0.092*** | 0.074*** |
| Education: non-secondary – ref. | | |
| professional or secondary | 1.128** | 1.201*** |
| higher and post-graduate | 1.445*** | 1.486*** |
| Employment (have a job) | 1.443*** | 1.369*** |
| Marital status (have a couple) | 1.642*** | 2.297*** |
| Number of individuals in household | 0.984 | 1.009 |
| Feel safe walking alone after dark (yes) | 1.476*** | 1.404*** |
| Belong to any particular religion (no) | 0.812*** | 0.785*** |
| Social contacts (once a week or more) | 1.368*** | 1.598*** |
| Voluntary activity (had during a year) | 1.231*** | 1.321*** |

| | | |
|----------|----------|-------|
| Constant | 0.045*** | 0.417 |
|----------|----------|-------|

Significance: *** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.1$

Married or cohabiting middle-aged and older individuals are much happier and much more satisfied with their life than their single peers. The presence of a spouse or partner increases the odds of being more life satisfied by 64.2% (OR=1.642) and more than twice the odds of being happier (OR=2.297), compared to single, divorced or widowed individuals of the same age. The influence of marital status on personal SWB exceeds the impact of any other factors included in the models. The number of household members seems to be non-significant for happiness and life satisfaction in middle and older age.

The self-perception of safety walking alone after dark in a local area is associated with life satisfaction (OR=1.476) and happiness (OR=1.404), compared to the feeling of unsafe. Middle-aged and older individuals who do not belong themselves to any religion are less happy (OR=0.785, i.e., reduce the odds by 21.5%) and life satisfied (OR=0.812, i.e., -18.8% to the odds of being more life satisfied), compared to their peers belonging to religion.

After the description of control variables, we turn to our major interest: the frequency of voluntary activity (formal social activity) and the frequency of social contacts (informal social activity). Social contacts with friends, relatives or colleagues except work once a week or more rise the odds ratio of being more life satisfied by 36.8% (OR=1.368) and that of being happier by almost 60% (OR=1.598), compared to less frequent contacts. The influence of voluntary activity is slightly weaker for both components of SWB. Such activity at least once a year contributes to +23.1% of odds ratio to be more life satisfied (OR=1.231) and to +32.1% of odds ratio to be happier (OR=1.321), compared to the absence of voluntary activity within a year.

In order to test the second hypothesis about higher influence of social activity on individual SWB in middle and older age in countries with lower population engagement in social activity we analyze the regression coefficients β_{1j} in the model M7 for all countries in the sample, where j indicates on a particular country. If β_{1j} exceeds β_1 that represents the overall mean slope for social contacts in the model M7, the influence of social contacts on individual SWB is higher in the j -th country than on the average in European countries, and vice versa. The population engagement in social activity is measured by the proportion of individuals with regular social contacts (at least once a week).

The proportion of middle-aged and older individuals with social contacts at least once a week ranges from 20.0% in Hungary to 73.6% in Portugal (Figures 2 and 3). The ‘rate of return’ of socials contacts in terms of SWB (β_{1j}) also varies significantly: from -0.013 in Ukraine to 0.478 in Ireland for life satisfaction (the mean slope is 0.313) (Figure 2), and from 0.217 in Russia to 0.853 in Ireland for happiness (the mean slope is 0.469) (Figure 3).

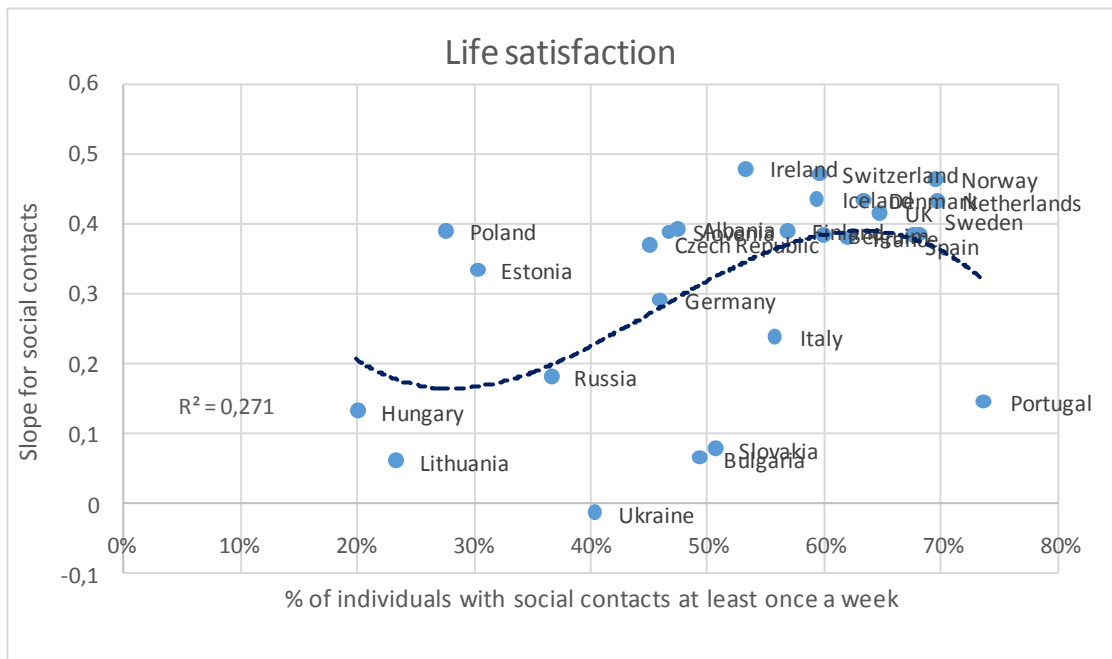


Figure 2 – Random slope for social contacts in the model M7 for life satisfaction and population engagement in social contacts

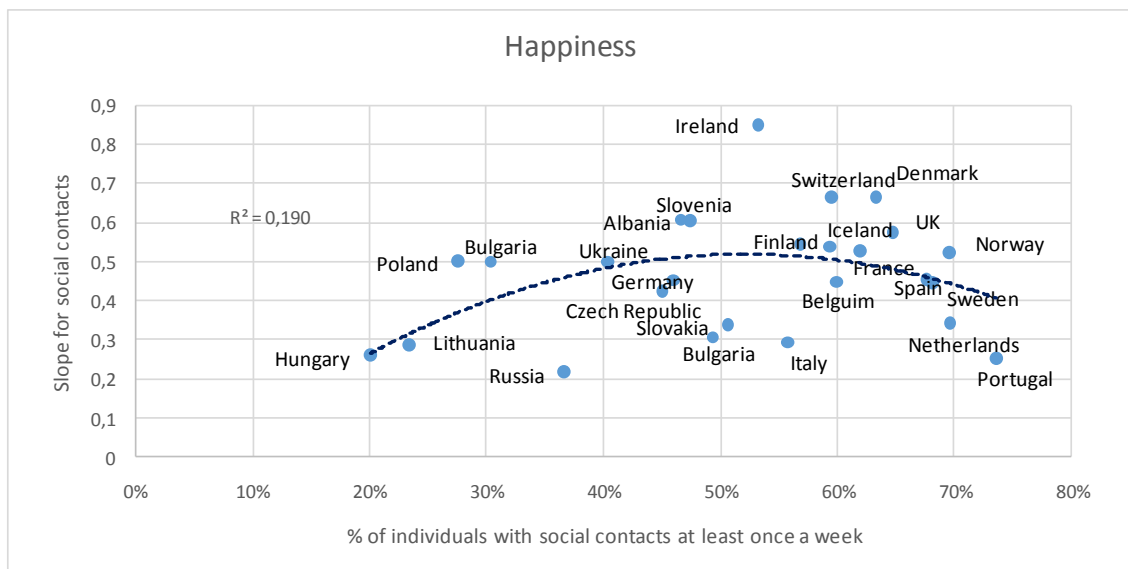


Figure 3 – Random slope for social contacts in the model M7 for happiness and population engagement in social contacts

In the case for life satisfaction, the correlation between the slope for social contacts and the proportion of middle-aged and older individuals with social contacts at least once a week looks like S-curve (Figure 2). As for happiness, quadratic function fits the data the most (Figure 3). Thus, we partially reject our third hypothesis because only very high population engagement in social contacts decreases the ‘rate of return’ of social contacts on individual SWB. This is fair for Nordic countries, Iceland, Switzerland, UK, the Netherlands, Belgium, France, Spain and Portugal.

To test our second hypothesis about the relation between the influence of social activity on individual SWB and income difference of countries we compare the regression coefficients β_{ij} in the model M7 for each country and GDP per capita in 2012 (2011 PPP\$). We found that the higher the slope for social contacts the higher GPP per capita for SWB measures as life satisfaction (Figure 4). The figure 5 shows that for happines there is non-linear dependance.

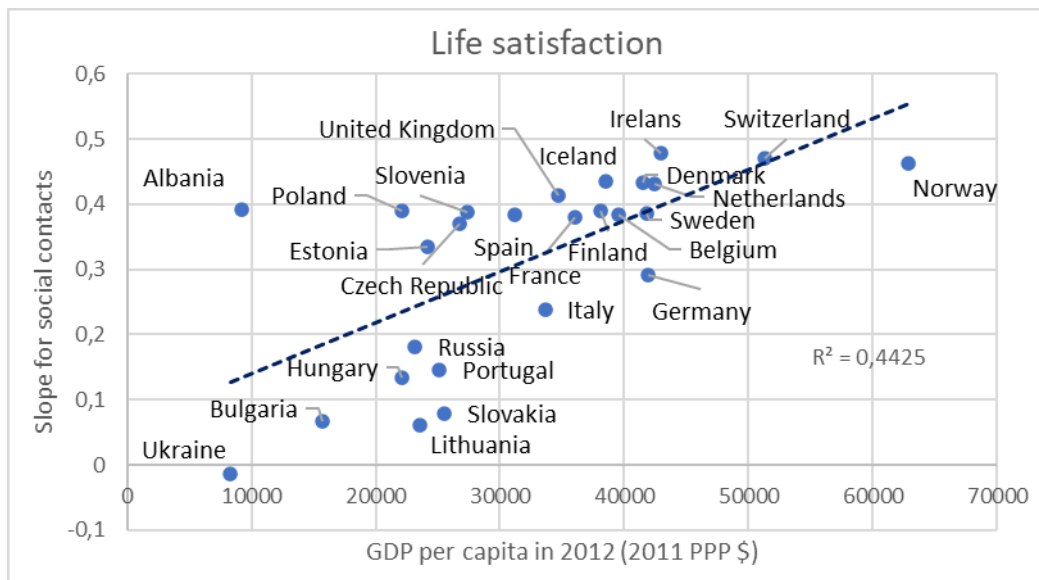


Figure 4 – Random slope for social contacts in the model M7 for life satisfaction and GDP per capita in 2012

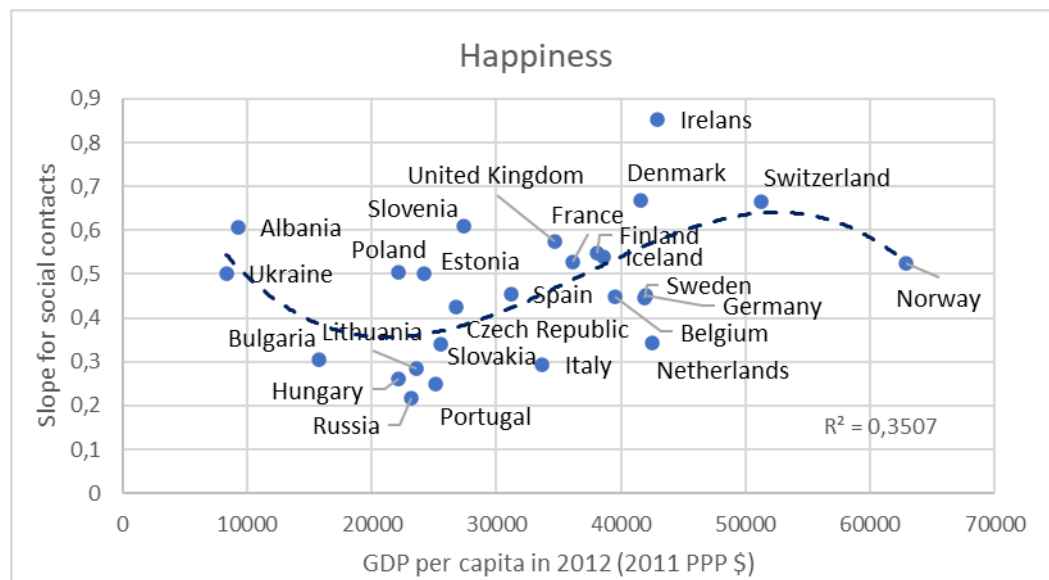


Figure 5 – Random slope for social contacts in the model M7 for happiness and GDP per capita in 2012

Conclusions

The significance of random coefficient models (M7) for happiness and life satisfaction with slope for social contacts partially confirms our first hypothesis about different influence of social activity on individual SWB in middle and older age in European countries. However, we

did not support this hypothesis for voluntary activity because the multilevel model with random coefficient for voluntary activity (M6) does not significantly improve the simpler model (M3) with random intercept for voluntary activity.

We also found that control variables have greater impact on happiness than life satisfaction except employment status and self-perception of safety walking alone after dark in a local area. Type of settlement is significant only for life satisfaction of people over 50. The influence of social activity on both components of individual SWB is significantly positive for people over 50 years old. What is more, informal social activity, measured as the frequency of social contacts, has a greater impact on personal SWB than formal social activity, measured as the frequency of voluntary activity.

We found non-linear dependence for our second hypothesis for both components of SWB. Moderate engagement in frequent social contacts gives more positive impact on SWB than low or high engagement. Also, we partially support our third hypothesis. For life satisfaction the influence of social contacts on individual SWB is higher in wealthier countries than in poorer ones, for happiness there is non-linear dependence.

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Appendix

Appendix 1 – Number of interviewees by countries

| Country | Number | Country | Number | Country | Number | Country | Number |
|----------------|--------|----------------|--------|-------------|--------|----------|--------|
| Albania | 468 | Estonia | 1210 | Iceland | 292 | Russia | 1066 |
| Belgium | 835 | Spain | 820 | Italy | 396 | Sweden | 883 |
| Bulgaria | 1374 | Finland | 1152 | Lithuania | 1057 | Slovenia | 593 |
| Switzerland | 676 | France | 1078 | Netherlands | 965 | Slovakia | 896 |
| Czech Republic | 898 | United Kingdom | 1230 | Norway | 679 | Ukraine | 1051 |
| Germany | 1481 | Hungary | 883 | Poland | 848 | | |
| Denmark | 577 | Ireland | 1149 | Portugal | 1209 | | |

Appendix 2 – Descriptive statistics

| Variable | Value | Variable | Value | Variable | Value |
|-------------------------------|-------|------------------------------------|-------|---------------------------|-------|
| Life satisfaction | | Type of settlement | | Subjective general health | |
| More likely to be unsatisfied | 19% | Rural area | 38% | Very good | 10% |
| More likely to be satisfied | 81% | Urban area | 62% | Good | 35% |
| Happiness | | Education | | Fair | 39% |
| More likely to be unhappy | 13% | General | 39% | Bad | 13% |
| More likely to be happy | 87% | Professional and secondary special | 36% | Very bad | 3% |
| Voluntary activity | | Higher and post-graduate | 25% | Walking alone after dark | |
| Never | 67% | Marital status | | Do not feel safe | 28% |
| Had during a year | 33% | No couple | 38% | Feel safe | 72% |
| Social contacts | | Have a couple | 62% | Any particular religion | |
| Several times a month or less | 49% | Employment status | | Belong | 65% |

| | | | | | |
|---------------------|-----|--|-----|---------------|------|
| Once a week or more | 51% | Not employed | 65% | Do not belong | 35% |
| Gender | | Employed | 35% | | |
| Male | 44% | Average age | | | 64.7 |
| Female | 56% | Average number of individuals in household | | | 2.14 |