

Happy and Healthy Aging. The Analysis of the Relationship Between Age, Health, Education and Happiness on International Social Survey Programme Data

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The goal of this paper was the analysis of a relationship between subjective health, aging, education level and happiness based on the data from the International Social Survey Programme (ISSP). Health gets worse with age, and the effect was strongest in postsocialist Europe; the effect of education was weaker than the effect of age – the weakest in postsocialist countries. The interaction between age and education was significant in 4 out of 5 regions (non-significant in wealthy ones outside Europe), indicating a moderating effect of education on the negative relationship between age and health. Declared levels of happiness in postsocialist countries were the lowest among the analyzed regions in each age group, with a clear downward trend in the older age groups. It was shown that women declared a lower level of happiness compared to men in postsocialist countries.

Keywords: health, happiness, aging, education.

Szczęśliwe i zdrowe starzenie się. Analiza związku między wiekiem, zdrowiem, wykształceniem i szczęściem na podstawie danych z Międzynarodowego Programu Badań Społecznych

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Celem niniejszej pracy była analiza relacji pomiędzy subiektywnym stanem zdrowia, starzeniem się, poziomem wykształcenia i szczęściem w oparciu o dane z Międzynarodowego Programu Badań Społecznych (ISSP). Zdrowie pogarsza się wraz z wiekiem, a wpływ ten najmocniej był widoczny w krajach postsocjalistycznej Europy. Wpływ wykształcenia był słabszy niż wpływ wieku – najsłabszy w krajach postsocjalistycznych. Interakcja między wiekiem i wykształceniem była znacząca w 4 z 5 badanych regionów (nieistotna w bogatych krajach spoza Europy), co wskazuje na łagodzący wpływ wykształcenia na negatywny związek między wiekiem i zdrowiem. Deklarowany poziom szczęścia w krajach posocjalistycznych był najniższy spośród analizowanych regionów w każdej grupie wiekowej, z tendencją spadkową w starszych grupach wiekowych. Wykazano, że kobiety deklarowały niższy poziom szczęścia w porównaniu z mężczyznami w krajach postsocjalistycznych.

Słowa kluczowe: zdrowie, szczęście, starzenie się, wykształcenie.

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The relation between negative emotions and health is well known in medicine and public health. In the literature, there are several proofs confirming that negative emotions (anger, anxiety, stress, sadness, unhappiness, depression) could harm human body, deregulate or change physiological balance in the body, and serve as a good predictor of developing several serious diseases like stroke, hypertension, myocardial infarct, diabetes, gastric ulcer, and many others. Anxiety and chronic anger and anxiety can change heart's electrical stability and disrupt cardiac function, additionally hastening atherosclerosis and increasing systemic inflammation (Kubzansky, 2000; Frasure-Smith, 1995; Todaro, 2003; Symonides, 2014). Positive emotions or subjective happiness could have better impact on health and quality of life. With advances in medicine helping more people to live longer lives, the number of people over the age of 65 is expected to grow from an estimated 524 million in 2010 to nearly 1.5 billion in 2050, with most of the increase occurring in the developing countries, which will require a radical societal change (WHO report, 2015). The world is facing a situation without precedent: we soon will have more older people than children and more people at extreme old age than ever before. As both the proportion of older people and the length of life increase throughout the world, key questions arise. Will population aging be accompanied by a longer period of good health, a sustained sense of well-being, and extended periods of social engagement and productivity, or will it be associated with more illness, disability, and dependency? However, chronological (biological) aging differs from the subjective aging, which refers to how individuals perceive their own aging process. It is seen as the result of an intricate process involving personal experiences, social interactions, intergroup stereotypes, cultural values, and societal structures (Diehl, 2014). It is well known that subjective aging affects health and survival. Subjective aging could influence health through both cognitive and behavioral pathways. Maintaining a positive perception of one's own aging process is generally considered an adaptive cognitive strategy in later life because it maintains a consistent and positive self-concept in a culture generally devaluing old age (Westerhof, 2005).

In the face of the aging societies, the relationship of age with health and happiness and the fact that happiness has been linked to economic indicators are worthy of exploration (Frey, 2002). According to that author happiness depends on three sets of factors:

- Demographic and personality factors such as age, gender and family circumstances, as well as nationality, education and health;
- Economic factors, in particular unemployment, income, and inflation;
- Political factors such as the extent of possibilities for citizens to participate in politics, and the degree of governmental decentralization.

The relationship between age and happiness was investigated in a number of research studies both in psychology and economy. Some researchers suggest a positive relationship between these two variables (Carstensen, 2011;

Stone, 2010), other indicate the curvilinear relationship, with a dip in happiness occurring during midlife (Morgan, 2015). Studies performed in Poland (Czapiński, 2012) show the opposite relationship, with happiness tending to steadily decrease with age. There is a limited number of studies focusing on the cross-national analysis of the relationship between age and happiness, which could bring us closer to understanding these disparate results. What is more, relatively few studies focused on more complex relationships. There are still some open questions. For example, can good health eliminate the negative impact of aging on happiness? What about education? Can education level have an impact on happiness during life cycle?

The purpose of this work was the analysis of the relationship between subjective health, aging, education level and happiness based on the data from the International Social Survey Programme (ISSP). The ISSP is a continuing annual program of cross-national collaboration on surveys covering topics important for social science research and brings together pre-existing social science projects and coordinates research goals, thereby adding a cross-national, cross-cultural perspective to the individual national studies (<http://www.issp.org/>). The analysis of the data has been inspired by the order of the World Bank for the implementation of the report on “Cognitive and Non-cognitive Skills over the Life Cycle”.

1. Method

1.1. Sample

A 2007 wave of ISSP survey contains (Leisure Time and Sports) module, which includes several variables related to health, and social and physical activities. For the purposes of the analyses in this paper, an additional subdivision within the European and non-European countries was introduced, resulting in the following 5 regional groups:

| | | |
|------------------------------------|---|-------|
| 1. Wealthy Europe | N | 13760 |
| 2. Postsocialist Europe | N | 10047 |
| 3. Wealthy outside Europe | N | 6090 |
| 4. Far East | N | 5580 |
| 5. South America and Africa | N | 10203 |
| Total | N | 45680 |

Tab. 1. Regions with number of participants

The list of the countries included in each category and numbers of participants are presented in Table 2. This division was made due to culture and education differences, particularly in older generation, between particular subgroups.

| Wealthy Europe | | Postsocialist Europe | | Wealthy countries outside Europe | | Far East | | South America and Africa | |
|----------------|------|----------------------|------|----------------------------------|------|-------------|------|--------------------------|------|
| Country | N | Country | N | Country | N | Country | N | Country | N |
| Austria | 931 | Bulgaria | 935 | Australia | 2528 | Taiwan | 1994 | Argentina | 1615 |
| Belgium | 1150 | Croatia | 1083 | Israel | 1187 | Japan | 1123 | Chile | 1373 |
| Cyprus | 958 | Czech Republic | 1145 | New Zealand | 941 | South Korea | 1361 | Dominican Republic | 1964 |
| Finland | 1242 | Hungary | 952 | United States | 1434 | Philippines | 1102 | Mexico | 1443 |
| France | 1928 | Latvia | 975 | | | | | Uruguay | 1314 |
| Germany | 1568 | Poland | 1169 | | | | | South Africa | 2494 |
| Ireland | 1879 | Russia | 1792 | | | | | | |
| Norway | 1117 | Slovak Republic | 1068 | | | | | | |
| Sweden | 1252 | Slovenia | 928 | | | | | | |
| Switzerland | 916 | | | | | | | | |
| Great Britain | 819 | | | | | | | | |

Tab. 2. The list of participating countries and numbers of participants

1.2. Variables

Age. For the purpose of some analyses (mainly interactions), participants were divided into two age groups: those 50 or below and those over 50 years old.

Gender (1: males; 2: females)

Happiness. The level of respondents' happiness was measured by their response to the question "If you were to consider your life in general these days, how happy or unhappy would you say you are, on the whole...". Their response was recorded on a 4-point scale, ranging from 1 (Very happy) to 4 (Not at all happy). The values were reversed.

Health was measured with respondents' response to the following question: "In general, would you say your health is..." with answers recorded on a 4-point scale ranging from 1 (Excellent) to 4 (Poor) (reversed).

Education level. For the purpose of some of the analyses, education level (measured as years of education) was split into two groups (lower/higher education), using median split within each country (name of the variable: edu2).

2. Results

Firstly, the relationship between the subjective level of health and sociodemographic variables (age, gender, and education) was analyzed.

Secondly, the relationship between subjective level of happiness and sociodemographic variables (age, gender, and education) was analyzed with the subjective health level as a mediator.

All analyses were performed in 5 groups of countries separately with special emphasis put on postsocialist Europe.

2.1. Health as a dependent variable

Figure 1 presents the declared level of health (Y-axis) separately for different country groups and divided by gender, age group (6 groups: 21–30, 31–40, 41–50, 51–60, 61–70, 71–80), and education level (low, high).

| Country category | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---------------------------|------|----------|-------------------|----------------------------|
| 1. Wealthy Europe | 0.33 | 0.11 | 0.11 | 0.98 |
| 2. Postsocialist Europe | 0.45 | 0.20 | 0.20 | 1.01 |
| 3. Wealthy outside Europe | 0.26 | 0.07 | 0.07 | 1.05 |
| 4. Far East | 0.29 | 0.08 | 0.08 | 1.05 |
| 5. South America, Africa | 0.34 | 0.11 | 0.11 | 1.06 |

Tab. 3. Percentage of variance in HEALTH explained in regions

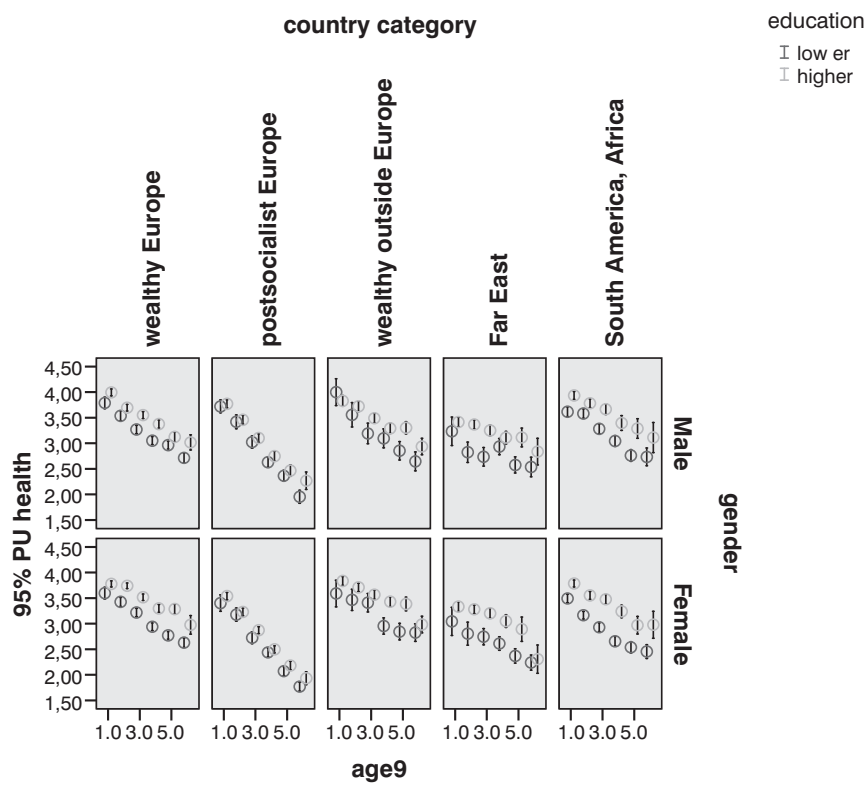


Fig. 1. The relationship between subjective health and sociodemographic variables (gender, age, education) for 5 groups of countries

| | | b | Std. Error | Beta | t | p |
|--------------------------------|----------------------|----------|-------------------|-------------|----------|----------|
| 1. Wealthy Europe | (Constant) | 3.674 | .050 | | 73.572 | 0.000 |
| | age2 | -.497 | .018 | -.238 | -28.099 | .000 |
| | age*education | .029 | .008 | .029 | 3.534 | .000 |
| | Gender | -.076 | .017 | -.037 | -4.512 | .000 |
| | education | .332 | .017 | .160 | 19.019 | .000 |
| 2. Postsocialist Europe | (Constant) | 4.324 | .060 | | 72.597 | 0.000 |
| | age2 | -.910 | .021 | -.400 | -43.187 | 0.000 |
| | age*education | .050 | .010 | .048 | 5.278 | .000 |
| | Gender | -.258 | .021 | -.113 | -12.520 | .000 |
| | education | .165 | .022 | .070 | 7.584 | .000 |

Tab. 4 cont.

| | | b | Std. Error | Beta | t | p |
|----------------------------------|----------------------|----------|-------------------|-------------|----------|--------------|
| 3. Wealthy outside Europe | (Constant) | 3.490 | .088 | | 39.619 | .000 |
| | age2 | -.451 | .028 | -.206 | -16.238 | .000 |
| | age*education | .024 | .013 | .023 | 1.820 | .0690 |
| | Gender | .037 | .027 | .017 | 1.363 | .1730 |
| | education | .305 | .032 | .121 | 9.490 | .000 |
| 4. Far East | (Constant) | 2.903 | .096 | | 30.099 | .000 |
| | age2 | -.291 | .033 | -.127 | -8.862 | .000 |
| | age*education | .038 | .013 | .039 | 2.855 | .004 |
| | Gender | -.122 | .028 | -.055 | -4.303 | .000 |
| | education | .443 | .033 | .190 | 13.328 | .000 |
| 5. South America, Africa | (Constant) | 3.838 | .060 | | 64.432 | 0.000 |
| | age2 | -.561 | .024 | -.226 | -23.148 | .000 |
| | age*education | .026 | .012 | .021 | 2.214 | .027 |
| | gender | -.254 | .021 | -.111 | -11.916 | .000 |
| | education | .427 | .022 | .187 | 19.503 | .000 |

Tab. 4. Health as a dependent variable

It is interesting to note that while the effect of age and education on HEALTH was significant ($p < 0.001$) in all regions of the world covered by the analysis, the model fits best Postsocialist Europe ($R^2 = 0.20$), with approximately two times lower percentage of variance in HEALTH explained in other regions (R^2 between 0.07 and 0.11).

As can be expected, health got worse with **age**, and the effect is strongest in Postsocialist Europe, indicated by $b = -0.910$, and ranges in other regions from -0.291 (Far East) to -0.561 (South America, Africa).

Figure 1 above indicates that in Postsocialist Europe this relationship was fairly linear, and the level of declared health depends mainly on age (the older declare worse health), while the influence of education level was not so important. This relationship looks quite similar in Wealthy Europe and South America, Africa, but the regression was not so steep. In the Far East the declared level of health depended on age to a much lesser extent, while in Wealthy outside Europe – on education.

The effect of **education** (significant in all countries) was weaker than the effect of age – the weakest in postsocialist countries, indicated by $b = 0.165$, and ranged in other regions from 0.305 (Wealthy outside Europe) to 0.427 (Far East).

The **interaction of age and education** was significant in 4 out of 5 regions (non-significant in Wealthy outside Europe), indicating a moderating effect of education on the negative relationship between age and health (Post-socialist Europe $b = 0.050$, Far East $b = 0.038$, Wealthy Europe $b = 0.029$ and South America, Africa $b = 0.026$).

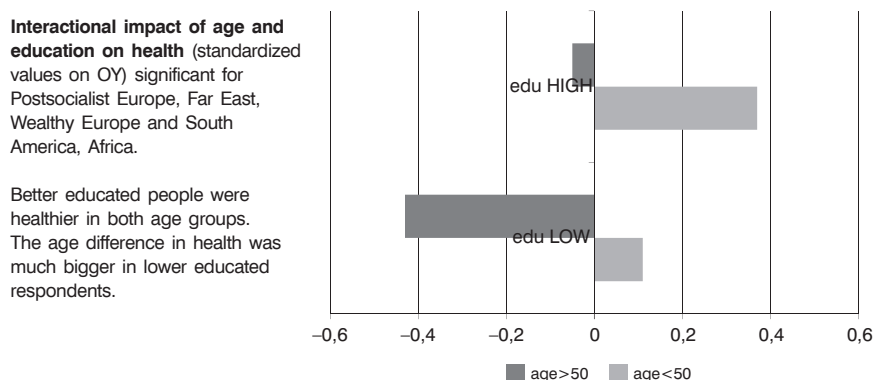


Fig. 2. Interactive impact of age and education level on health

The correlation coefficient between health and happiness was high and its significance did not differ neither with regards to the region of the world, nor to the age group (50 or less vs. 50+), and ranged from **0.282 to 0.419**.

2.2. Happiness as a dependent variable

Further, happiness was treated as a depended variable to see whether it was affected by any sociodemographic variables, and whether these relationships differ across analyzed groups of countries. Figure 3 presents the declared level of happiness (Y-axis) separately for different country groups and divided by gender, age group (6 groups: 21–30, 31–40, 41–50, 51–60, 61–70, 71–80), and education level (low, high).

| Regions | | AGE |
|---------------------------|---|-------|
| 1. Wealthy Europe | r | -.061 |
| | p | .000 |
| 2. Postsocialist Europe | r | -.208 |
| | p | .000 |
| 3. Wealthy outside Europe | r | .023 |
| | p | .074 |
| 4. Far East | r | -.049 |
| | p | .000 |
| 5. South America, Africa | r | -.084 |
| | p | .000 |

Tab. 4. Relationship between age and happiness in analyzed regions

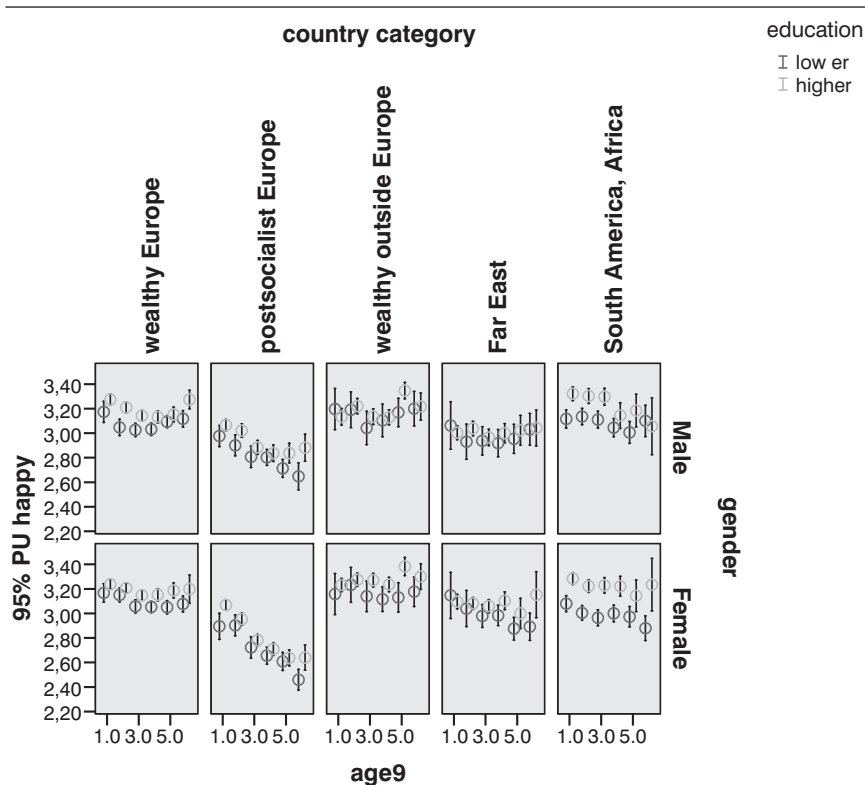


Fig. 3. The relationship between subjective level of happiness and sociodemographic variables (gender, age, education) for 5 groups of countries

Declared levels of happiness in postsocialist countries were the lowest among the analyzed regions in each age group, with a clear downward trend in the older age groups. It was shown that women declared lower level of happiness compared to men in postsocialist countries. In all age groups and analyzed regions the level of happiness was connected with education. Lower education was a good predictor of a lower level of happiness particularly in older groups of responders.

Because the <age → happiness> relationship could be contaminated by “the third variable” effect, the next analysis checked for the impact of 3 possible “third variables”: gender, education level, and health.

Incorporating gender or education into the analysis as the third variable did not affect the relationship much. However, adjusting for health changed the NEGATIVE <age → happiness> relationship into a POSITIVE one in Europe. Instead of saying that “older are less happy”, we will see the opposite: “older seems to be happier”, even if this relationship is weak.

| Correlation coefficients between AGE and happiness | Regions | Adjusted for: | | |
|--|---------|---------------|-----------|--------|
| | | gender | education | health |
| Wealthy Europe df = 13776 | r | -.061 | -.04 | .075 |
| | p | .000 | .00 | .000 |
| Postsocialist Europe df = 9585 | r | -.205 | -.19 | .014 |
| | p | .000 | .00 | .173 |
| Wealthy outside Europe df = 5963 | r | .025 | .04 | .135 |
| | p | .054 | .01 | .000 |
| Far East df = 5488 | r | -.050 | -.03 | .024 |
| | p | .000 | .06 | .078 |
| South America & Africa df = 10152 | r | -.084 | -.05 | .015 |
| | p | .000 | .00 | .122 |

Tab. 5. Relationship between age and happiness in analyzed regions, controlling for gender, education, or subjective level of health

Next, regression analyses were performed separately for each of the 5 country groups. Below, you will find the generalized results obtained for each of the predictors.

Age. The effect of age on happiness differed depending on the region. It significantly predicted happiness in Wealthy Europe ($b = 0.094$), Postsocialist Europe ($b = 0.045$), Wealthy outside Europe ($b = 0.137$) and South America and Africa ($b = 0.045$). In all these countries declared happiness was the lower, the older the respondent was. This relationship was not as straightforward in Wealthy Europe and Far East (especially among those better educated) – the relationship looked slightly U-shaped: the lowest happiness was declared among middle-aged respondents, while the younger or the older they were, the higher their reported happiness was. The most visibly linear relationship occurred in Postsocialist Europe, with happiness steadily decreasing with age.

Gender. Gender predicted the level of declared happiness in all country groups, except for South America and Africa. Women were happier than men in Wealthy Europe ($b = 0.023$), Wealthy outside-Europe countries ($b = 0.057$), and the Far East ($b = 0.071$). However, men were happier in postsocialist European countries ($b = -0.03$).

Education. Higher education predicted a higher reported level of happiness in Wealthy Europe ($b = 0.023$), Postsocialist Europe ($b = 0.048$), and South America and Africa ($b = 0.112$). Education did not predict happiness in Wealthy outside Europe and Far East.

Health. Health was a highly significant predictor of happiness in all analyzed country groups – the better the declared health, the higher the happiness. Unstandardized regression coefficients range from $b = 0.275$ for Postsocialist Europe to $b = 0.182$ for the Far East.

Age and Education interaction. The interaction between age and education is only significant for the postsocialist countries ($b = 0.013$). As can be seen in Figure 4, higher education helps to predict a higher level of happiness mainly among those who are older (50+).

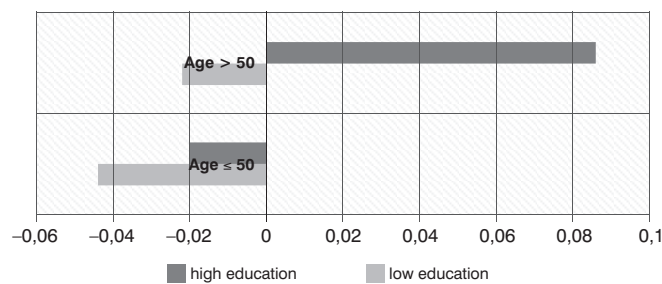


Fig. 4. Interactional effect between age and education on happiness for the postsocialist countries

Age and health interaction. The interaction between age and health proved to be a non-significant predictor for all of the analyzed country groups – the effect of health on happiness does not depend on the age group.

Age and gender interaction. The effects of age on declared happiness depended on respondent's gender in Wealthy Europe ($b = -0.011$), Postsocialist Europe ($b = -0.015$), Wealthy outside-Europe countries ($b = -0.020$), and Far East ($b = -0.022$). However, as you can see in Figure 5, the effect we observe in postsocialist countries was slightly different from the one visible in the other regions. In postsocialist countries, higher level of declared happiness was visible mostly among males (with women declaring generally

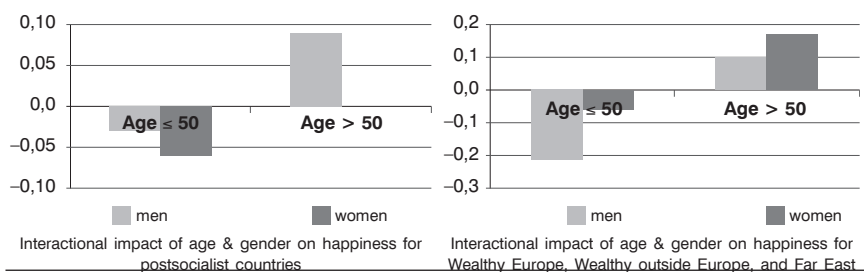


Fig. 5. The interaction between age and gender on declared happiness

lower levels of happiness, throughout different age groups – increasing slightly with age). In other countries, there was a visible and high increase in reported levels of happiness among older males and females, with women reporting higher levels of happiness.

3. Discussion

As people move towards old age they lose things they treasure – vitality, mental sharpness and looks; they also gain what people spend their lives pursuing: happiness. People who are happy live healthier, longer lives, and recover better from illnesses (Ostir, 2008). The economics of happiness or happiness economics is the quantitative and theoretical study of happiness, positive and negative affect, well-being, quality of life, life satisfaction and related concepts, typically combining economics with other fields such as psychology, health and sociology. It typically treats such happiness-related measures, rather than wealth, income or profit, as something to be maximized. Contemporary economists are increasingly interested in happiness, life satisfaction and well-being as one of the indicators of money utility. Three major economic factors influencing happiness have been identified: unemployment, income level and inflation (Frey, 2002). However, after 1995 Easterlin paradox was discovered in the literature. The paradox relied on the fact that while richer people are happier, income growth does not increase people's and societies' happiness (Easterlin 1995). It was clearly shown in this research that demographic factor (age) and education level have an impact both on the declared status of health and happiness. A particularly closer relation was shown in postsocialist countries.

Educational philosophers contend that education increases autonomy, human flourishing, and thus happiness, but empirical studies rarely explore the mechanisms in depth to account for the positive association between education and happiness. The results presented in this paper provide evidence of the relevance of education to happiness. It seems that policies directed to stimulate education might have positive effects on individual happiness. A number of papers have focused on the relationship between education and declared happiness. Although some empirical studies find a positive effect of education on the declared happiness level, the empirical evidence on the link between these two variables is not conclusive (Becchetti, 2007; Cuñado, 2012; Yang, 2008). Cunado and Gracia have shown similar results in Spanish population, where the educational level of each individual has a positive and significant effect on happiness (Cuñado, 2012). It was also interesting that there were both direct and indirect effects (through income and labor status) of education on happiness, namely people with a higher education level had higher incomes and were more likely to be employed, and thus, reported higher levels of happiness. Furthermore, and after controlling for income, labor status and other socioeconomic vari-

ables, we still find that education has a positive (and direct) impact on happiness.

The relation between happiness and health is a purpose of several studies in medicine and psychology. Lower heart rate and blood pressure are usually observed in happy people. Steptoe and Wardle (Steptoe, 2005) conducted a study where participants rated their happiness over 30 times in one day and then again three years later. The initially happiest participants had a lower heart rate on follow-up (about six beats slower per minute), and the happiest participants during the follow-up had better blood pressure. Also heart rate variability, which refers to the time interval between heartbeats and is associated with risk of various diseases, could be lower in happy participants of the study (Bhattacharyya, 2008). People who expressed positive emotions like joy, happiness, excitement, enthusiasm, and contentment had 22 percent lower risk of heart disease within 10 years' period (Davidson, 2010). Happiness could strengthen the immune system, reduce stress hormones in the body (Marland, 2006; Papousek, 2010). Other research suggests that positive emotion also mitigates pain in the context of disease (Zautra, 2005).

The elderly people face another condition that often afflicts them, namely frailty. The condition is characterized by impaired muscle strength, endurance, control of balance and puts elderly people at risk of disability and death. Happiness is associated with improvements in more severe, long-term conditions as well, not just shorter-term aches and pains. It was also documented that happier elderly people were less likely to have a stroke in the subsequent six years (Ostir, 2001). And finally happiness could prolongate our life. In a 2011 study, almost 4,000 English adults aged 52–79 reported how happy, excited, and content they were multiple times in a single day. Here, happier people were 35 percent less likely to die over the course of about five years than their unhappier counterparts (Steptoe, 2011). Happiness and well-being are not only the barometer of the state of affairs, but also fulfill an important function in the formation of quality of life. The benefits of positive emotions, life satisfaction and optimism are the most measurable, objective and manifold. Happy people live better, and it has been shown that happiness influences mental and physical health, life expectancy (Levy, 2002), social and intimate relationships (Lucas, 2003), career and income (Diener, 2002).

In the study of Hogan et al. (Hogan, 2016) happiness of younger residents of 5 big cities in Europe, US and Canada is a function of having easy access to cultural, shopping, transport, park and sports amenities and the attractiveness of their cities (i.e. place variables). The happiness of older residents is associated more with the provision of quality governmental services (i.e. performance variables). Declared levels of happiness in postsocialist countries was the lowest among the analyzed regions in each age group, with a clear downward trend in the older age groups. It was shown that

women declared a lower level of happiness compared to men in postsocialist countries and in all age groups and analyzed regions the level of happiness was connected with education. Lower education was a good predictor of a lower level of happiness particularly in older groups of responders.

Place and performance variables also have an effect on health and social connections, which are strongly linked to happiness of all residents. A better understanding of the changing relationship of health with age and happiness could be crucial if we would like to create a future that takes full advantage of the powerful resources inherent in older populations. To do so, research needs to be better coordinated worldwide and some of appropriate data systems and research capacity to monitor and understand these patterns and relationships, specifically longitudinal studies that incorporate measures of health, economic status, family, and well-being, must be developed.

Happiness is a multifactorial and in many cases very subjective feeling, depending not only on demographic factors but also on many others both subject-related like health, education level, marriage and related to non-subject factors like the country's economy. However, happiness is not identical to utility, but it well reflects people's satisfaction with life. For many purposes, it can be considered a useful approximation to utility.

Based on the result of this study and results of other studies happiness should be a public health concern and policy makers should encourage institutions to focus on some initiatives increasing happiness of citizens, particularly in older age.

Limitations

A single measure of happiness that has been used previously in large surveys (Gallup, 1976). Human needs and satisfactions: a global survey. *Public Opin Quart* 40(4): 459–467, but has not to our knowledge been validated. The relationship between subjective assessment of health was analyzed with only three selected parameters: age, education and subjective perception of happiness. Social capital measures were based on self-report and are likely to be confounded by depression in some. This is a cross-sectional survey, so we cannot determine the direction of causality. Unhappiness may lead to withdrawal from social participation, whereas social participation may also increase happiness. For sure more complex analyses are required to provide a wide perspective and would be an interesting area for future study.

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