

Relative Deprivation and Life Satisfaction among Europeans: Keeping up with Others

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Abstract

Relative deprivation (*RD*) defines the feeling of being deprived of something that others have. Most studies of *RD* rely on within-country reference groups. This study is one of the few studies examining the role of global reference groups in determining life satisfaction. Using the relevant data of the Eurobarometer surveys, which covers the period from 1970–2003, we show that global *RD* is an important determinant of individual life satisfaction. Finally, for the 16 European Union member countries, the effect of global comparisons is significant but smaller than the effect of within-country comparisons. The result for candidate countries is the contrary.

Keywords: life satisfaction; relative deprivation; relative gratification; global reference groups
JEL Classifications: I31, O52, Z13

Avrupa’da Göreceli Yoksunluk ve Yaşam Memnuniyeti: Diğer Ülkelere Yetişme Güdüsü

Özet

Bireyin kendini kıyasladığı gruba göre daha kötü durumda olmasının onda yarattığı hoşnutsuzluk algısına “Göreceli Yoksunluk” (*GY*) denmektedir. Bu alanda yapılan araştırmaların çoğu bireylerin kendilerini kendi ülke vatandaşlarıyla karşılaştırdığını kabul etmektedir. Bizim çalışmamız yaşam memnuniyeti üzerinde uluslararası karşılaştırma gruplarının etkisini test eden az sayıdaki çalışmalardan biridir. Çalışmamızda Eurobarometre anket verilerinden ilgili soruların yer aldığı 1970-2003 yıllarını kapsayan veriler kullanılmış, küresel *GY* etkisinin bireylerin yaşam memnuniyetlerinin önemli bir belirleyicisi olduğu sonucuna varılmıştır. 16 Avrupa Birliği üye ülkesi için küresel karşılaştırma gruplarının yarattığı *GY* etkisi ülke içi karşılaştırma gruplarının yarattığından düşük kalırken, Avrupa Birliği aday ülkeleri için bu sonucun tersi bulunmuştur.

Anahtar kelimeler: yaşam memnuniyeti; göreceli yoksunluk; göreceli memnuniyet; küresel karşılaştırma grupları
JEL Sınıflandırmaları: I31, O52, Z13

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The idea of relative deprivation (*RD*) suggests that individuals are adversely affected when they perceive themselves to be deprived relative to other individuals in their reference groups. This concept suggests that people constantly compare themselves to others and care about their relative well-being, in addition to their absolute well-being. The idea is not new. In fact, empirical investigations of *RD* date back to a study of the US military during World War II (Stouffer, et al., 1949), which notes that, on average, morale was higher among officers in the military police (where the rate of promotion was very slow) than among officers in the Air Force (where the rate of promotion was much faster). The paradoxical result was attributed to the *RD* experienced by the Air Force officers who were left behind, in comparison to the few who were promoted rapidly. Later, the theory of *RD* was elaborated on by Runciman (1966), who argued that people tend to make upward social comparisons, and benchmark themselves against those who are better off, rather than those who are worse off.

Given that people routinely compare themselves to others, the major questions are the following: “With whom do they compare themselves?” and “How much do comparisons matter?” Despite there being a large body of literature on reference groups, these questions remain largely unanswered. In this study, we argue that comparisons are not necessarily restricted to national boundaries, and that people compare themselves both to the residents of their own country and those of other countries. We argue that feeling deprived relative to the residents of other countries adversely impacts the life satisfaction of individuals. In addition, we investigate the possibility of downward comparisons, and assess whether the life satisfaction of individuals is affected by a feeling of relative gratification (*RG*), relative to the residents of countries with a lower per capita income.

In the literature, the concept of *RD* has been used in relation to various outcomes and decisions. One branch of the literature tests the link between *RD* and several health outcomes (such as self-assessed health, body mass index, mental health, or mortality), and health-related behavior (such as smoking, alcohol consumption, or exercising), as carefully reviewed by Adjaye-Gbewonyo and Kawachi (2012). Another group of studies has shown that international migration decisions are influenced by both relative and absolute income considerations (Stark and Taylor, 1989), and that the subjective well-being of migrants is responsive to fluctuations in macroeconomic conditions in their country of origin (Akay, et al., 2017).

The literature on how *RD* impacts one’s assessment of life satisfaction, on the other hand, is quite limited. Prior studies analyzed within-country comparisons and relied on various definitions of reference groups, usually guided by data availability. Examples of reference groups used in the literature include all individuals living within the same country (Easterlin, 1995); citizens within the same age, gender, educational background and residential location group (Ferrer-i-Carbonell, 2005); citizens within the same age group (McBride, 2001); citizens within the same age and gender group (Caporale, et al., 2009; Drichoutis et al., 2010); one’s colleagues (Clark and Senik, 2010); one’s professional peers (Clark and Oswald, 1996; Senik, 2008); or one’s own living conditions in the past (Goodman, 1974; Senik, 2009). Although these studies provide invaluable insights, their respective research designs do not allow for the simultaneous study of

within-country and global *RD* effects. In fact, both within-country and global income dispersions can create a sense of . With the advent of modern communication technology and the widespread use of the internet, residents of a country can easily observe, or at least get a sense of, the material possessions and incomes of people living in foreign countries. Hence, the use of solely domestic comparisons is overly restrictive, and it is more meaningful to draw on both domestic and international comparisons. Therefore, in this study, we consider both types of comparisons and evaluate their relative importance.

The literature on , or that relates to , is even more limited. In fact, an individual may feel and concurrently (based on comparisons to different groups), and feelings produced by *RG* may partially offset the negative feelings caused by . Indeed, the two “may be opposite ends of a single continuum or related but not orthogonal conditions but by focusing on only one, researchers may have only been measuring half of a construct” (Holland, 2010, p. 112). As shown by Dambrun et al. (2006) and Eksi and Kaya (2017), the impact of need not be the opposite of . To assess the relative effects of *RD* and *RG*, they should be analyzed simultaneously.

What lies at the crux of this study is the notion of reference groups that extend beyond national borders. We conjecture that people are aware of the average income in other countries, and that they compare their own income with those in other countries. In our analyses, we consider both *RD* and *RG*. In other words, we investigate and compare the roles of global and in determining individual-level life satisfaction. Moreover, considering the possibility of within-country comparisons in our analyses, we control for within-country *RD* and *RG*.

Several recent studies examine how the feeling of can go beyond national borders to influence one’s sense of well-being. Although most of them use and measures that differ from our measures, they are nonetheless relevant here, as they relate to the validity of international reference groups. For example, Delhey and Kohler (2006) used survey data to study the frame of reference of Europeans and found that Europeans predominantly have a national frame of reference. Nevertheless, they also found that people’s rating of material conditions in other countries quite realistically reflects the actual per capita income ranking of those countries. Hence, they posit that comparisons must extend to foreign countries. Whelan and Maitre (2009) agree that the effect of between-country income differences is modest, but they find that these income differences are still important to determining subjective economic stress. Sági (2011) studied life satisfaction in four post-socialist countries and found that while most people choose their reference group nationally, some consider foreign countries (mainly western European countries). A study on the subjective well-being of immigrants in Germany found that immigrants regard the country that they migrated from as their natural reference (Akay, et al. 2017). Yet, the studies that are the most relevant to ours are as follows. Bechetti et al. (2013), using the Eurobarometer survey, find that the life satisfaction of individuals is negatively affected by the national gross disposable per capita income (GDI) of neighboring countries. Grimes and Reinhardt (2015), using European and World Values Survey data, finds that the difference between the Gross National Disposable of the country relative to that of the EU15 is an important determinant of people’s subjective well-being in the Euro area.

Eksi and Kaya (2017), using the global *RD* index—defined as the fraction of individuals living in the richer countries in the world, multiplied by their mean excess income—finds that the life satisfaction of a country is significantly affected by global *RD*.

We contribute to the literature in the following dimensions. First, we use micro-level data on life satisfaction from Eurobarometer surveys to study the roles of global and in determining the life satisfaction of individuals. In this way, we extend the findings of Eksi and Kaya (2017), who studied the role of global *RD* and *RG* in explaining the average life satisfaction in a country. Using micro data enables us to control for both individual characteristics and the effects of within-country *RD* and *RG*. In line with Eksi and Kaya (2017), we find that per capita income in foreign countries matters for life satisfaction. We thereby contribute to the discussion by arguing that even when a country experiences economic growth, the growth of per capita income in other countries may render the relative standing of the country, and therefore the average life satisfaction of its residents, unchanged. Secondly, we show that global *RD* has a much stronger effect on life satisfaction than global *RG*. In other words, comparisons are mostly upward, as reported in the literature. Thirdly, we compare the effects of global and within-country comparisons and present two findings: the effect of global *RD* persists after we add within-country and to the regressions, and the dominant effect varies across country groups (i.e., among Mannheim countries, the within-country comparison effect is stronger, whereas among candidate countries, the global comparison effect is stronger). Finally, the measure that we use is more comprehensive than relative income, which is used in most of the earlier studies. *RD* is sensitive to changes not only in the income difference, but also in the share of those in the reference group. For example, a rise in the number of rich citizens in a given country would keep relative income unchanged, but worsen the *RD* that a poorer person would feel.

The remainder of the paper is organized as follows. Section 2 describes the dataset used in this study. Section 3 explains the theoretical basis of the study and its empirical methodology, and presents some descriptive statistics of the data. Section 4 explains the results of the regression analyses. Section 5 concludes the discussion.

Data

Our dataset comes from the Eurobarometer surveys, which are cross-national household surveys conducted on behalf of the European Commission. These surveys address a variety of topics related to public opinion in the European Union (EU) member states and in EU candidate countries. Our main dataset, collected by the Standard and Special Survey Series, covers 16 EU member states—namely, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, and the United Kingdom. The 1970–2002 waves of these surveys have already been brought together by the Mannheim Eurobarometer Trend File, which serves as our main data source (Schmitt, et al., 2008). We combine these data with the 2003 data from the Standard and Special Survey Series (European Commission, 2012).

We extend our main dataset with the Candidate Countries' Eurobarometer Series from the 2000–2003 period, which includes 13 countries—namely, Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, and Turkey (European Commission, 2004a; European Commission, 2004b; European Commission, 2004c; European Commission, Brussels, 2014). Data from 2004 or later could not be included, since life satisfaction and income questions were not posed to the same individuals in those years. Eurobarometer surveys are conducted several times per year on different samples. Income and life satisfaction questions are asked in different surveys each year; therefore, they are answered by different individuals. Our sample includes a total of 488,995 observations (i.e., 440,698 from the Mannheim countries and 48,297 from the candidate countries). Nonetheless, not every explanatory variable in our regression model is available throughout the entire sample period. The effective sample sizes are provided below the regression results.

The life satisfaction question posed in the surveys was as follows: “Would you say you are very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead/your life in general?” The answers were coded using a four-point scale: 4, very satisfied; 3, fairly satisfied; 2, not very satisfied; and 1, not at all satisfied.^[1]

The microeconomic variables controlled for in our regression analyses are age, age squared, and dummy variables that pertain to the following:

- Number of children (0, 1, 2, 3, 4 or more)
- Household size (0, 1, 2, 3, 4, 5, 6 or more)
- Labor market status (voluntarily unemployed, student, retired, employed, unemployed)
- Marital status (single, married, living as married, divorced, separated, widowed)
- Gender (male, female)
- Age at which full-time education ended (still studying, 14, 15, 16, 17, 18, 19, 20, 21, 22 or older)
- Income bracket of the family (In the survey, the household income question features income brackets. The number of brackets changes across both countries and time. The member state surveys usually have 12 income brackets; hence, we used a linear transformation to convert all other scales to a common 1–12 scale.^[2] This transformation affects mainly the data from the candidate countries, whose surveys have 10 income brackets).

The Eurobarometer surveys ask the respondents about the total household income earned in the previous calendar year. To compare material well-being across households of different size and composition, we calculate the equivalence-scale adjusted household income using a slightly different version of the “modified OECD scale” and assign the

1 The original coding of the question was in reverse (i.e., 1, very satisfied, and 4, not at all satisfied). We changed the ordering to facilitate the interpretation of our estimates.

2 For example, if a survey has 10 income categories and an individual belongs to the seventh category, we assign the individual to the sixth category ($7 \cdot 10 / 12 \cong 6$, rounded to the nearest integer).

following weights to household members: 0.67 to the head of the household, 0.33 to others who are 15 years or older, and 0.20 to those who are younger than 15 years.^{3]}

For example, a single-adult household with no children has an equivalence scale of 0.67, which means that it can attain the same standard of living as a childless couple with only 67% of their income. Hence, the equivalent income of the single-adult household is its actual income divided by 0.67. We take the mid-point of each income bracket as the household income; however, the application of the equivalence scale might shift the income bracket. For example, suppose that in 2000, the 10th income bracket is 120,000–149,999 in the local currency unit. We calculate the mid-point as 135,000 in the local currency unit and divide it by the equivalence scale. If the equivalence-scale adjusted income still falls within 120,000–149,999, no change is made; if it is less than 120,000 or greater than 149,000, the household's adjusted income bracket is the one within which the adjusted income falls.

Equivalent income is calculated only for Mannheim countries in the pre-2000 period, as the number of children is available in the data only for those countries and years. For the Mannheim countries, separate regressions are run with unadjusted income and equivalent income.

In our study, in addition to microdata captured through the Eurobarometer surveys, we use real per capita gross domestic product (GDP) data (in constant 2000 US dollars), obtained from the World Databank.

Method

Theoretical Basis

The concept of *RD* is based on the feeling of being deprived of something while others have it. Runciman wrote that a person is relatively deprived of *X* when “(i) he does not have *X*, (ii) he sees some other person or persons (possibly including himself at some previous or future time) as having *X* (whether or not that is or will in fact be the case), (iii) he wants *X*, and (iv) he sees it as feasible that he should have *X*” (Runciman, 1966, p. 10). The concept was later interpreted and quantified by Yitzhaki (1979), and its axiomatic foundation was given by Ebert and Moyes (2000) and Bossert and D’Ambrosio (2006). According to Stark & Taylor (1989), given an income distribution shown by the cumulative distribution function $F(y)$, the *RD* of an individual with income y is measured as the percentage of persons richer than the individual, multiplied by their mean excess income—that is, $RD(y) = [1 - F(y)] E(z - y | z > y)$, where z is the income of the richer persons. In this definition, *RD* depends both on the share of those who are richer than the person and on the expected value of excess income earned by those who are richer. The concept of *RG* can be symmetrically defined as the percentage

3 The “modified OECD scale” assigns a weight of 0.67 to the head of the household, 0.33 to subsequent adults, 0.33 to each child aged 14–18, and 0.20 to each child aged 0–13. We needed to slightly modify the weighting, since in the Eurobarometer survey data we know only the number of children younger than 15.

of persons poorer than the individual, multiplied by their mean missing income—that is, $RG(y) = [F(y)] E(y - p \mid p < y)$, where p is the income of the poorer persons (as used by, for example, Eksi and Kaya [2017]). As defined above, RD considers the reference group as comprising higher-income individuals, whereas RG considers the reference group as comprising lower-income individuals.

Empirical Strategy

In our empirical analyses, we study RD and RG at both the within-country and global levels. Within-country and global indices have similar structures, but different reference groups. The reference group in the within-country indices comprises all other residents in the same country. The reference group in the global indices comprises the residents of all countries elsewhere in the world. Hence, we ask in particular whether life satisfaction in European countries is affected by RD or RG in comparison to the rest of the world.

In the empirical implementation of the indices of global deprivation and global gratification in year t , first, countries are sorted in terms of per capita GDP. With N countries, $GDP_{1,t} < GDP_{2,t} < \dots < GDP_{N,t}$. In a given year, the global RD index (*Global Deprivation*) of an individual in country j is the share of the world population living in countries that have a higher per capita income, multiplied by the population-weighted mean excess income in the richer countries. Then, with $w_{j,t}$ denoting the population in country j at time t , *Global Deprivation* in country j at time t is defined as:

$$Global\ Deprivation_{j,t} = \frac{\sum_{k=j+1}^N w_{k,t} \sum_{k=j+1}^N w_{k,t} (GDP_{k,t} - GDP_{j,t})}{\sum_{l=1}^N w_{l,t} \sum_{k=j+1}^N w_{k,t}}, \quad j = 1, \dots, N-1,$$

and

$$Global\ Deprivation_{N,t} = 0. \quad (1)$$

Global Gratification is defined similarly, but takes countries with lower per capita income into account. Hence, in a given year, the *Global Gratification* index is the share of the world population living in countries with a lower per capita income, multiplied by the population-weighted mean shortage of income in the poorer parts of the world.

$$Global\ Gratification_{j,t} = \frac{\sum_{k=1}^{j-1} w_{k,t} \sum_{k=1}^{j-1} w_{k,t} (GDP_{j,t} - GDP_{k,t})}{\sum_{l=1}^N w_{l,t} \sum_{k=1}^{j-1} w_{k,t}}, \quad j = 2, \dots, N,$$

and

$$Global\ Gratification_{1,t} = 0. \quad (2)$$

Notice that despite the similarities in the definitions, RD is not the reverse of RG as they capture different income asymmetries in the society. For example, if the incomes of the countries richer than a particular country increase, *ceteris paribus*, that country's RD measure will increase but its RG measure will not change. Notice, further, that in the

constructions of global *RD* and *RG* indices, we rely on per capita incomes. As a result, we test whether people feel gratified or deprived when they compare the income level in their countries with that of other countries.

The reference group in the within-country indices comprises people living in the same country. For individual i in country j at time t , the within-country *RD* index (*Within Deprivation*) is calculated as the share of people in country j who are richer than individual i at time t , multiplied by the mean excess income of this wealthier part of the population compared to individual i . The within-country *RG* index (*Within Gratification*) is defined similarly, but considers lower incomes. In the microdata, household income data are available in income brackets, so the calculated index value is constant for all individuals in the same income bracket. To enrich our analyses, we use in our regressions two alternative measures of within-country comparisons: the *Share of Richer People in Society* and the *Share of Poorer People in Society*. These two measures disregard the income gap between the individual and others; they consider only the within-country income rank of an individual. We use them to test whether the rank in society influences life satisfaction. Finally, in the calculation of all within-country indices, we use individual weights that are provided in the survey data.

Our data were collected via a number of independent cross-sectional and cross-national surveys. We pool all data to estimate several models that explain how LS_{ijt} (life satisfaction of individual i in country j in year t) relates to *RD*, *RG*, and a full set of characteristics measured at the individual and household levels. The most comprehensive specification is as follows:

$$LS_{ijt} = \beta_0 + \beta_1 Global_{jt} + \beta_2 Within_{ijt} + \gamma X_{ijt} + c_j + \delta_t + \epsilon_{ijt}, \quad (3)$$

where $Global_{jt}$ is the comparison variable defined at the international (global) level for the residents of country j ; $Within_{ijt}$ is the comparison variable defined at the domestic level; and X_{ijt} is the matrix that contains individual and household-level control variables (i.e., age, gender, income, education, marital status, labor market status, and household size^[4]) for individual i in country j at time t . The more parsimonious versions of the model include only one of the global and within-country indices. We are mainly interested in the estimates of β_1 and β_2 . The identification of β_1 relies on the comparison of life satisfaction of individuals who have similar characteristics but who live in different countries and therefore have different *Global Deprivation* and *Global Gratification* indices. On the other hand, the identification of β_2 relies on variation in the within-country indices across i , j , and t .^[5]

4 To be included in the dataset, a question must have been asked for at least five of the years that the survey was conducted. The individual's health status, which is used in many studies of life satisfaction, is not included in the dataset, since it does not satisfy the criterion.

5 Equation (3) assumes that individuals observe how their country is doing relative to other countries in real time. Even though this is a standard assumption in the literature (see Clark et al., (2008), Bechetti et al. (2013), and Grimes and Reinhardt (2015)), one could argue the validity of such an assumption. Hence, as a robustness check, we also use the lag of the global comparison index as an independent variable. The empirical results do not favor this alternative model.

Appendix Table A1 presents the descriptive statistics of the main variables for the 23 countries in our dataset. On a scale of 1 to 4, the within-country average life satisfaction value ranges from a low of 2.05 in Bulgaria to a high of 3.55 in Denmark. The lowest average value of *Global Deprivation* is 62 for Luxembourg (the country in the sample with the highest per capita GDP) and the highest is 7,882 for Bulgaria (the country in the sample with the lowest per capita GDP). *Global Gratification* ranges from 664 (Bulgaria) to 53,686 (Luxembourg). Since our sample consists of the world's relatively wealthier countries, it is natural for the average *Global Gratification* value in the sample to be much larger than the average *Global Deprivation* value. We also checked for the outliers in the data, and found none. The same information can also be attained from Table A1, which shows that the standard deviations of *RD* and *RG* measures are comparable with the mean values of the variables. Even though Luxemburg, Ireland, and the UK seem to be exceptions, for these countries the data do not have outliers but display a trend over time (which indicates that these countries did fairly well in the 1973-2003 period compared to the average of the rest of the countries in the world).

In our regressions, we control for country-specific and year-specific unobserved effects. It is necessary to control for country-specific effects, since cultural or other reasons may cause the residents of some countries to have higher average life satisfaction than the residents of other countries, *ceteris paribus*.⁶ Moreover, some time-specific factors may shift life satisfaction in all countries in a particular year. To control for such country-specific and year-specific effects in our regressions, we include in equation (3) country dummies (C_j is equal to 1 if the individual is in country J , and 0 otherwise) and year dummies (δ_t is equal to 1 if the observation is from time t , and 0 otherwise). ϵ_{ijt} is the random error term. The error terms may not be independent across the observations; hence, an assumption of independence may lead to an underestimation of standard errors. Therefore, we cluster standard errors at the country and year levels.

Finally, since life satisfaction is an ordinal qualitative variable (which takes values from 1 to 4, where 4 is "very satisfied" and 1 is "not at all satisfied") we use the ordered logit model as an appropriate ordered limited dependent variable model.

Results

Global Comparisons

The main question in this study is whether life satisfaction is influenced by the average income in other countries. We answer the question by using a representative sample of individuals from European countries.

Table 1 presents the ordered logit estimates of the coefficients of the global *RD* and global *RG* indices in equation (3). The columns in the table report estimates from separate regressions run on two different samples of country groups. In part (a), the sample includes Mannheim countries; and in part (b), the sample includes candidate countries. (For the Mannheim countries, the availability of information on the number of adults

6 For example, Denmark usually tops the worldwide rankings of average happiness (Helliwell, et al., 2016).

and children in the households allows us to calculate equivalent household income and replicate our regressions while controlling for equivalent income. The results, which are not shown here for brevity, show that adjusting for household composition does not qualitatively change the estimates.)

The main result from Table 1 is that *Global Deprivation* reduces the life satisfaction and *Global Gratification* increases the life satisfaction of Europeans, as expected. After controlling for all the micro-level control variables in our regression model, *Global Deprivation* has a negative and statistically significant effect on life satisfaction in both samples. *Global Gratification* has a positive and statistically significant effect in the Mannheim sample and a positive but insignificant effect in the Candidate countries sample. Yet, note that the number of country-year units for the Candidate countries is only 26. That is, the statistical (in)significance of the global deprivation/gratification variable is obtained based on 26 changes in the data.

Our study focuses on the residents of European countries, who, on average, are richer than people in the rest of the world. Hence, we would expect that Europeans would feel gratified for having better material conditions and that the effect of *RG* on life satisfaction would be high. However, our findings reveal quite the contrary. The effect of *RD* on life satisfaction is stronger than the effect of *RG*. The positive association between global *RD* and life satisfaction is also reported by Eksi and Kaya (2017). However, unlike the current study, they find no evidence of a relationship between global *RG* and life satisfaction. The difference between these sets of results can be explained by the differences between the samples used. Eksi and Kaya (2017) use a larger sample of countries that includes many low-*RG* countries. Note that in our study, we do not find a statistically significant effect of global *RG* for candidate countries, which tend to have low global *RG*. The effect of *RG* on life satisfaction becomes meaningful at high *RG* levels. Furthermore, even for the Mannheim countries, the statistical significance of the global *RG* index falls to 10% when we control for a country's own per capita GDP (in logarithms) in regressions (as shown in table 2), which is the practice in Eksi and Kaya (2017).

Table 1
**The Effects of Global Relative Deprivation and Relative Gratification on Life Satisfaction
(Ordered logit estimates)**

	(a) Mannheim Countries		(b) Candidate Countries	
Global Deprivation	-0.000300		-0.001740	
	(-2.28)**		(-4.32)***	
Global Gratification		0.0000103		0.000253
		(2.89)***		(1,37)
Microeconomic controls	Yes	Yes	Yes	Yes
Observations	345544	345544	18647	18647
# of Country-Year Units	238	238	26	26
Log pseudolikelihood	-333762.2	-333762.3	-20475.4	-20509
Pseudo R2	0.0937	0.0937	0.113	0.112

Source: Authors' calculations.

Notes: Z-test statistics are shown in parentheses. All models include the full set of microeconomic characteristics reported in appendix Table A2. Statistical significance: *** 1%, ** 5%, * 10%.

Appendix Table A2 presents a more comprehensive picture of the results of the ordered logit regressions for the whole Mannheim+Candidate countries. The estimates reported in column (1) derive from a model that contains only the microeconomic control variables of the life satisfaction regression. They are the standard variables used in the literature, and the results (i.e., signs and statistical significance of the coefficient estimates) are generally in line with the previous findings in the literature (e.g., Clark, Frijters, and Shields, 2008; Frey and Stutzer, 2002). In particular, being female, having a higher income, and being married relate positively to life satisfaction; there is a U-shaped relationship between age and life satisfaction; and the unemployed have lower life satisfaction. Being in a larger household negatively correlates with life satisfaction. However, when we run the regression of Table A2 using the sample of Mannheim countries, where we are able to control for equivalent income, we find that household size positively correlates with life satisfaction.⁷ Hence, we conclude that, given the total income of the household, a larger household negatively correlates with life satisfaction. Yet, once we adjust for the household income, a larger household increases life satisfaction. Columns (2) and (3) of the table show that the estimates for the microeconomic control variables remain almost unchanged when *Global Deprivation* and *Global Gratification* are included in the regressions.

7 The results of this regression, which are not shown for brevity, can be provided upon request.

An Alternative Channel?

Our main result, so far, is that *Global Deprivation* reduces and *Global Gratification* increases the life satisfaction of Europeans. Given the way in which they are defined, these two measures contain information on the GDP of the home country; therefore, an alternative explanation for our findings could be that the life satisfaction of individuals is influenced by the average income in their country. People may regard the average income in their country as an indicator of overall economic performance, for which they may take credit. Could it be that the two comparison variables are statistically significant in the regressions solely because they contain information on per capita income in the home country? If this were the case, the two comparison variables (*Global Deprivation* and *Global Gratification*) should lose their significance in the regressions once we control for average income in the home country.

To test the validity of this explanation, we add per capita income to our baseline regressions. The estimates reported in Table 2 show us that people indeed care about living conditions in foreign countries. Global *RD* is still statistically significant in all regressions. However, the statistical significance of global *RG* is reduced. The negative sign of the coefficient estimate of Log (per capita GDP) deserves an explanation. When *RD* is not controlled for, this variable is in fact positively associated with life satisfaction. However, when *RD* is controlled for, the sign of Log (per capita GDP) turns negative, and the coefficient of *RD* becomes larger in absolute terms. The reason is that per capita GDP is included in the algebraic definition of *RD* with a negative sign; hence, a negative coefficient estimate for *Global Deprivation* means that Log (per capita GDP) enters the life satisfaction regression with an inflated positive coefficient. The negative coefficient estimate of Log (per capita GDP) corrects for the inflated estimate for income. The important finding here is that global *RD* and per capita GDP are jointly significant in the regressions (The *p*-values of the chi-square tests for joint significance are reported in the last row of Table 2; all are less than 5%). In other words, individuals care about how their countries perform compared to richer countries in terms of average income. Another important finding here is that Log (per capita GDP) is statistically significant only at 1% for Candidate countries. As we mention before, the number of country-year units for these countries is only 26. For Mannheim countries, which uses 238 country-year units, the same variable is significant at most 10%. Moreover, the variable has a negative sign. These findings are largely consistent with Eksi and Kaya (2017), which finds that—in a sample of developed and developing countries—the per capita income of a country only matters as far as it affects its relative position in the global income distribution.

Table 2
**The Effects of Global Relative Deprivation and Relative Gratification on Life Satisfaction
(Ordered logit estimates) -Controlling for Log (per capita GDP)-**

	(a) Mannheim Countries		(b) Candidate Countries	
	(1)	(2)	(3)	(4)
Global Deprivation	-0.000868 (-2.34)**		-0.00417 (-6.60)***	
Global Gratification		0.0000121 (1.89)*		0.000241 (1.57)
Log (per capita GDP)	-1.061 (-1.67)*	-0.136 (-0.38)	-7.403 (-5.47)***	1.592 (0.87)
Microeconomic controls	Yes	Yes	Yes	Yes
Observations	345544	345544	18647	18647
# of Country-Year Units	238	238	26	26
Log pseudo likelihood	-333740.3	-333761.2	-20443.6	-20504.3
Pseudo R2	0.0938	0.0938	0.115	0.112
p-value of the test for joint significance of log(per capita GDP) and the comparison index	0.0259	0.0175	0.0000	0.2768

Source: Authors' calculations.

Notes: Z-test statistics are shown in parentheses. All models include the full set of microeconomic characteristics reported in appendix Table A2. Statistical significance: *** 1%, ** 5%, * 10%.

Within-Country Comparisons:

In our next set of regressions (presented in Table 3), we test the role of within-country comparisons in the determination of life satisfaction; here, we use comparison measures that include people who reside in the home country. Using *RD* and *RG* within-country measures, in all samples, being relatively better off elates individuals, whereas being relatively worse off dismays them. (The results obtained with other within-country deprivation/gratification indices, the share of richer/poorer people in a society, are qualitatively identical; for brevity, they are not shown in the table. Therefore, we confirm that people do indeed care about the income of other individuals in their home country.)

The detailed results of the regressions for the whole sample of Mannheim+Candidate countries can be seen in columns (4) and (5) of Appendix Table A2. Clearly, the estimates of the microeconomic control variables remain virtually unchanged when the *Within Deprivation* and *Within Gratification* variables are included in the regressions. An unexpected finding is the negative sign of the estimates for household income brackets, in column (4); this is similar to the negative coefficient estimate for Log (per capita GDP) in the global comparison regressions. By construction, household income

is incorporated into *Within Deprivation* with a negative sign. A negative coefficient estimate for *Within Deprivation* means that income enters the life satisfaction regression with an inflated positive coefficient, which in turn needs to be corrected by a negative coefficient estimate for income. Moreover, for this variable the cut-off values are determined with regard to national income distributions, varying across time and countries. Hence, the income bracket variable is not entirely absolute but a relative one. As in the case of global comparisons, the important finding here is that household income and within-country comparison measures are jointly significant in all regressions, as indicated by the *p*-values reported in the last row of Table 3. The finding that relative income matters in the determination of well-being is not new to the literature (e.g., Caporale, Georgellis, Tsitsianis, & Yin, 2009; Clark, Frijters, & Shields, 2008). Nonetheless, the use of the *RD* and *RG* indices is a novelty, as we are not aware of any studies that use these measures in this context. By definition, the *RD* and *RG* indices depend on the income distance from those in the reference group, and also on the share of those in the reference group. As such, these are much more comprehensive measures than one's own income and relative income. Imagine a scenario in which those who are richer than a person are cloned and everything else remains unchanged; certainly, that person will feel worse off than before. The *RD* measure is sensitive to such a change, whereas the relative income measure is not.

Table 3
The Effects of Within-Country Relative Deprivation and Relative Gratification on Life Satisfaction (Ordered logit estimates)

	(a) Mannheim Countries		(b) Candidate Countries	
Within Deprivation	-0.281 (-7.93)***		-0.184 (-2.06)**	
Within Gratification		0.214 (7.50)***		0.434 (5.91)***
Microeconomic controls	Yes	Yes	Yes	Yes
Observations	370560	370487	38386	38386
Log pseudo likelihood	-357018	-357559	-40890	-40865
Pseudo R2	0.091	0.092	0.100	0.104
p-value of the test for joint significance of household income and the comparison index	0.0000	0.0000	0.0000	0.0000

Source: Authors' calculations.

Notes: Z-test statistics are shown in parentheses. All models include the full set of microeconomic characteristics reported in appendix Table A2. Statistical significance: *** 1%, ** 5%, * 10%.

Global and Within-Country Comparisons

In the final set of regressions, we test whether international comparisons still remain important upon taking into account within-country comparisons. The estimates reported in Table 4 reveal that the effects of *Global Deprivation* and *Global Gratification* remain almost unchanged after within-country comparison variables are included in the regressions. For example, in the Mannheim countries sample, when *Within Deprivation* is included in the regression model, the estimates for *Global Deprivation* change to (from reported in Table 1) and the estimates for *Global Gratification* change to (from in Table 1). These findings show that both global and within-country comparison variables are valid and important to determining life satisfaction. Evidently, these two variables represent different dimensions of comparisons, and they impact life satisfaction through separate channels.

As mentioned before, for the Mannheim countries, the availability of information on the number of adults and children in a household allows us to calculate equivalent household income and replicate our regressions while controlling for equivalent income. The results in Table 4 shows that adjusting for household composition does not sizably change the quantitative results and does not change the qualitative results at all.

Next, we compare the relative effects of global and within-country comparison variables. The global and within-country comparison variables have different scales. Within-country variables are calculated based on the income categories of households; therefore, they vary within a much smaller range than the global variables, which are

based on per capita GDP values. To compare the relative effects of the global and within-country comparison variables, we estimate our models using standardized variables (i.e., variables transformed so that they have standard normal distributions). The standardized coefficient estimates reported in Table 5 show the effect of a one-standard-deviation change in a comparison variable on life satisfaction. For example, for the Mannheim countries, we see in the first column of panel (a) that a one-standard-deviation increase in *Global Deprivation* is associated with a 0.0857-standard-deviation decrease in life satisfaction, and a one-standard-deviation increase in *Within Deprivation* is associated with a 0.2197-standard-deviation decrease in life satisfaction. (This result is consistent with the studies by Delhey and Kohler (2006) and Whelan and Maitre (2009), both of which report that while Europeans predominantly care about within-country income differences, the effect of between-country income differences is still important to individual well-being).

Table 4
The Effects of Global Relative Deprivation and Relative Gratification on Life Satisfaction
(Ordered logit estimates)
(Controlling for Within-Country Relative Deprivation and Within-Country Relative Gratification)

	(a) Mannheim Countries		(b) Candidate Countries		(c) Mannheim Countries (equivalent income)	
Global Deprivation	-0.00032 (-2.48)**		-0.0017 (-4.61)***		-0.000311 (-2.50)**	
Global Gratification		0.00001 (2.80)***		0.000292 (1.67)*		0.00000884 (2.50)**
Within Deprivation	-0.288 (-8.22)***		-0.0942 (-2.10)**		-0.191 (-7.13)***	
Within Gratification		0.219 (7.98)***		0.405 (4.27)***		0.224 (6.50)***
Microeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	345544	345544	18647	18647	333583	333583
# of Country-Year Units	238	238	26	26	226	226
Log pseudo likelihood	-333521.3	-333574.2	-20471.7	-20491	-321997.7	-322007
Pseudo R2	0.0944	0.0943	0.114	0.113	0.0938	0.0938

Source: Authors' calculations.

Notes: See Notes to Table 3.

Table 5
The Relative Effects of Global and Within-Country Comparisons on Life Satisfaction
(Ordered logit estimates)

(Standardized coefficient estimates are reported)

	(a) Mannheim Countries		(b) Candidate Countries		(c) Mannheim Countries (equivalent income)	
Global Deprivation	-0.0857		-1.7760		-0.0832	
Global Gratification		0.0514		0.8236		0.0456
Within Deprivation	-0.2197		-0.0680		-0.1439	
Within Gratification		0.1710		0.2823		0.1700
Microeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	345544	345544	18647	18647	333583	333583
# of Country-Year Units	238	238	26	26	226	226
Log pseudo likelihood	-333521.3	-333574.2	-20471.7	-20491	-321997.7	-322007
Pseudo R2	0.0944	0.0943	0.114	0.113	0.0938	0.0938

Source: Authors' calculations.

Notes: See Notes to Table 3.

In contrast to the results in Panels (a) and (c), estimates for Candidate countries in panel (b) show that global comparisons are stronger than within-country comparisons. Note that this result could follow the small sample size for these countries (the country-year units that matters for the estimate of Global Deprivation is only 26).

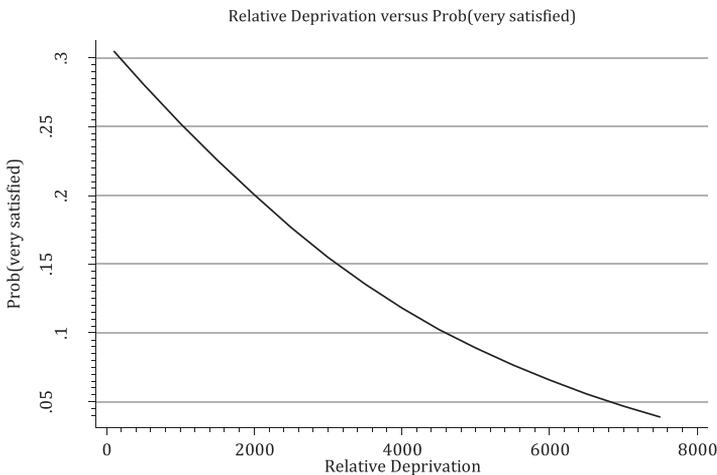
One interpretation of the observed differences in results across samples is that the Mannheim countries have reached a certain stable level of economic development. They are the leaders of the world in development; therefore, they have few countries to admire. They care more about within-country income differences. The candidate countries, on the other hand, include emerging economies that are still in the process of “catching up” with richer economies. Hence, it is reasonable that for people in candidate countries, global comparisons overcome within-country comparisons.

In the final set of analyses, we compare the life satisfaction effects of the changes in RD , RG , and household income. We use our ordered logit model and generate the predicted values of the probability of being very satisfied for different values of deprivation, gratification, and income category. To estimate predicted values, only the variable of interest is changed and all other variables are held at their sample means.

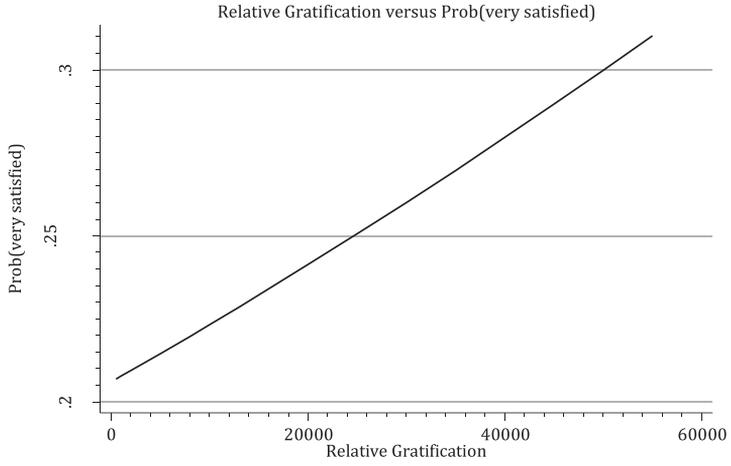
Figure 1

Graphs that show how the probability of being very satisfied changes with RD , RG , and income category (Sample: Mannheim+Candidate countries)

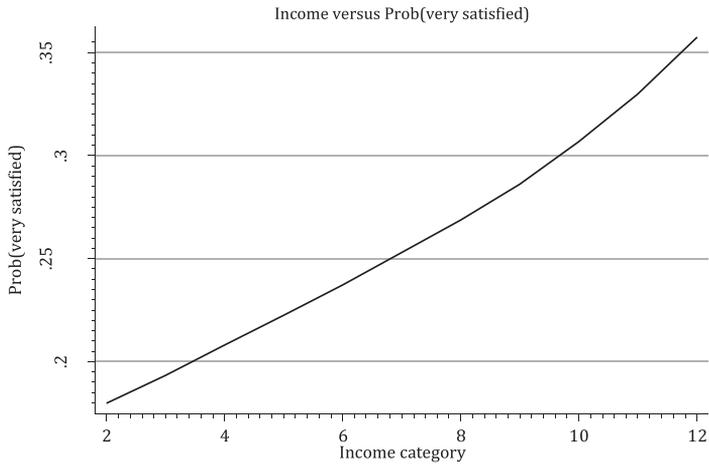
(a) The Effect of Global RD (income category and within-country RD are controlled for)

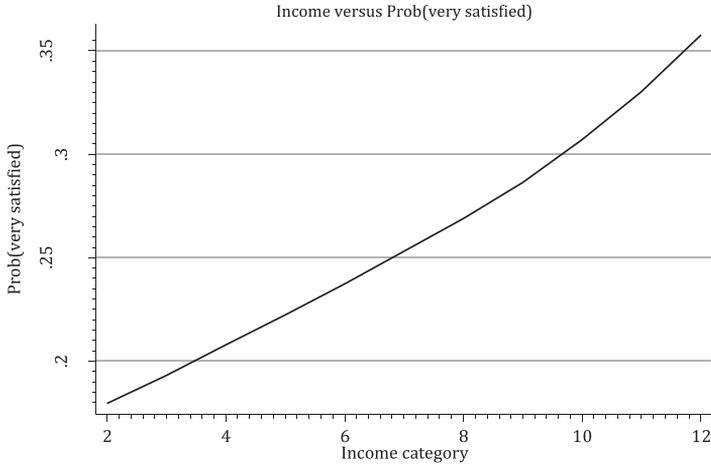


(b) The Effect of Global *RG* (income category and within-country *RG* are controlled for)



(c) The Effect of Income Category (Global *RD* is controlled for)



(d) The Effect of Income Category (Global RG is controlled for)

Source: Authors' calculations.

Notes: The graphs show lowess estimates.

The graphs in Figure 1 show how β changes with global RD , global RG , and income. They show the lowess estimates obtained using the predicted values of β for a large set of in-sample values of deprivation, gratification, and income. The negative slope in the first graph and the positive slopes in the other three graphs are clearly visible (Note that the graphs have different scales). Our estimations reveal that when RD is low, a 1,000-unit increase in RD reduces β by about 0.05-0.06 points (not shown in the figure), a sizable decline given that country averages of life satisfaction vary from 2 to 3.5. From Table A1, we see that such a difference in global RD s exists, for instance, between the residents of Denmark and Ireland favoring Denmark, or the residents of Italy and Cyprus favoring Italy. Compared to a person with the same characteristics living in Cyprus, someone living in Italy has higher life satisfaction by about 0.05-0.06 points. Further increases in RD yield gradually smaller declines in life satisfaction; in Figure 1, we can see that the slope of the lowess curve in the first graph approaches zero.

The second graph shows how the predicted values of β change with RG . A 1,000-unit increase in RG increases β by only about 0.0017 when RG is low. Further increases in RG by 1,000 units yield gradually larger increases in life satisfaction, but only in the order of 0.010–0.011. Therefore, the effect of global RD on life satisfaction is much larger in terms of absolute value than the effect of global RG . The effect on life satisfaction of a 1,000-unit change in RD can be up to 30 times greater than the effect of a 1,000-unit change in RG . (We should keep in mind that the mean of RG is much larger than that of RD . See Table 5 for standardized coefficient estimates).

In the last two graphs, we study the sensitivity of β to changes in income category. Our estimates in panels (c) and (d) show that moving up to a higher income category increases β by about 0.01–0.02; this is comparable in magnitude to the effect of reducing

RD from 7,000 (which is almost the highest in-sample value of *RD*) to 6,000. When *RD* is in the medium range of 3,000 to 5,000, the corresponding increase in β is about 0.025–0.035, corresponding to about twice the effect of moving up to a higher income category. Based on these estimates, we can say that the effect of *RD* is large indeed: in comparison, the effect of *RG* is much smaller, in absolute terms.

Conclusions

The determinants of life satisfaction have stirred interest among researchers for many years. Although income has been acknowledged as a major determinant, it is still unclear how the effect of income varies across time and countries. Easterlin (1974) reports that average happiness in a country remains mostly unchanged despite growth in per capita income; furthermore, countries with higher per capita income are not necessarily happier on average. Yet, as discussed in recent studies—such as in Stevenson and Wolfers (2008), Deaton (2008), and Eksi and Kaya (2017)—people in richer countries have higher subjective well-being (in the sense of both happiness and life satisfaction).⁸ This is a paradox showing that even though there is a weak correlation between the per capita income of a country and its average life satisfaction in the time series data, there is a strong correlation between the two variables in the cross-country data. This study solves this paradox by referring to the role of international reference groups, which was first noted by Eksi and Kaya (2017) as follows: “increases in per capita income of a country may not increase its average subjective well-being if the country’s location in the world income distribution more or less stays the same. However, in the cross-section we would still observe that richer countries are happier than poorer ones” (p. 3). In other words, cross-country income differentials may well explain the cross-country gaps in average life satisfaction scores, just as interpersonal income differentials explain interpersonal gaps in life satisfaction.

Using data from the 1970–2003 waves of the Eurobarometer surveys, we found evidence that the life satisfaction of Europeans is associated with both global *RD* and global *RG*. We also documented that the effect of a given magnitude of global *RD* is stronger (in absolute value) than the effect of global *RG* in the same magnitude. Therefore, comparisons are asymmetrical (i.e., the pain of a loss is greater than the pleasure from an equivalent gain).

We also compared the effect of global comparisons to the effect of within-country comparisons. We found that while global comparisons have a stronger effect in the candidate countries (though this result is obtained from a small sample), within-country comparisons have a stronger effect in the 16 EU member states. Further research with data from a larger group of countries is required to identify how the dominant effect varies across countries and the circumstances under which the dominant effect is determined.

8 The World Happiness Report in Year 2016 found that a country’s per-capita GDP is the largest single contributor to the happiness of its people, and that on average it accounts for around 31% of happiness overall (Helliwell, et al., 2016).

Our empirical analysis assumes that individuals observe how their country is doing relative to other countries in real time. To check the validity of this assumption, we also use the lag of the global comparison index as an independent variable. Such a model assumes that individuals learn about their country's performance relative to others with a lag. However, the results do not favor this alternative model.

Our findings have important policy implications, as they suggest that in a world where the use of technology is rapidly expanding, there is no room to fall behind. Countries with a lower economic growth rate will be relatively more deprived. This, in turn, can have important social consequences, such as reduced happiness, social unrest, and instability.

This feeling of being relatively deprived might also explain the "catching up effect," which pushes lagging countries to perform better. With increased globalization, we expect this motive to be greater. One testable hypothesis is whether there has been an increase in the rate of convergence following globalization—and, if there has been an increase in convergence, how much of it could be attributed to the global comparison motive.

In the future, we expect policy makers to focus more on subjective well-being and related concepts such as life satisfaction and happiness. This trend is visible in the World Happiness Report, a landmark survey of the state of global happiness, which says that "A rapidly increasing number of national and local governments are using happiness data and research in their search for policies that could enable people to live better lives" (Helliwell, et al., 2016, p. 1). This new direction will require a better understanding of the formation of reference groups. Our findings suggest that more research is required to determine the optimal balance between income, global inequality, and life satisfaction.

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Appendix Table A1
Descriptive Statistics for Life Satisfaction, Gross Domestic Product (GDP) per capita, Global Relative Deprivation (RD) and Relative Gratification (RG)

Country	Time Period	Life Satisfaction	Per capita GDP	Global RD		Global RG	
		Mean	Mean	Mean	Std. Dev.	Mean	Std. Dev.
Austria	1997-2003	3.14	23572	856	12	37188	1439
Belgium	1975-2003	3.09	17594	809	135	26118	5350
Bulgaria	2000-2003	2.05	1732	7882	85	664	54
Cyprus	2000-2003	2.95	13780	2135	17	19010	60
Denmark	1975-2003	3.55	23981	348	96	38003	7362
Finland	1997-2003	3.14	23182	892	41	36451	2157
France	1975-2003	2.82	17680	820	176	26273	4748
Germany	1975-2003	2.94	19497	846	89	33609	2095
Greece	2003-2003	2.66	12888	2308	0	17046	0
Ireland	1975-2003	3.16	13415	1390	274	18776	9242
Italy	1975-2003	2.74	15097	1114	122	21631	4750
Luxembourg	1975-2003	3.3	32093	62	69	53686	19529
Malta	2000-2003	3.02	10117	2697	20	11899	133
Netherlands	1975-2003	3.36	18424	765	142	27664	5900
Norway	1990-1994	3.37	29174	152	30	48589	2115
Poland	2000-2003	2.68	4594	4319	69	2774	64
Portugal	1985-2003	2.66	9193	2324	69	11012	2513
Romania	2000-2003	2.26	1825	7763	98	724	60
Slovenia	2000-2003	3.03	10498	2616	30	12793	604
Spain	1985-2003	2.95	11904	1929	52	15918	2946
Sweden	1997-2003	3.34	27361	564	41	44423	2416
Turkey	2000-2003	2.48	4098	4912	137	2385	94
United Kingdom	1975-2003	3.15	18952	682	104	28629	6539
Overall mean		3.01	17592	1135		27076	
Overall median		3	17418	859		27467	

Notes: For each country the table shows the time period for which data are available, the sample mean of life satisfaction, the sample means and standard deviations of global relative deprivation (RD), the global relative gratification (RG) indices, and the sample mean of Gross Domestic Product (GDP) per capita. Overall mean and median value are also reported.

Appendix Table A2

Detailed results of regressions. Columns (1)-(3) show detailed results for Table 1. Columns (4)-(5) show detailed results for Table 3 (Ordered logit estimates) (Mannheim+Candidate Sample).

		(1)	(2)	(3)	(4)	(5)
Relative Concerns	Global Deprivation		-0.000363 (-2.57)**			
	Global Gratification			0.0000104 (2.93)***		
	Within Deprivation				-0.233 (-6.74)***	
	Within Gratification					0.242 (9.11)***
Gender	Male	-0.0923 (-8.51)***	-0.109 (-8.89)***	-0.109 (-8.87)***	-0.1 (-8.90)***	-0.0994 (-8.82)***
Age	Age	-0.0545 (-25.40)***	-0.0528 (-23.92)***	-0.0528 (-23.94)***	-0.0556 (-24.61)***	-0.0545 (-24.34)***
	Age Squared	0.0006 (27.32)***	0.000587 (25.91)***	0.000587 (25.93)***	0.000617 (26.79)***	0.000601 (26.50)***
Marital Status	Single	-0.273 (-16.06)***	-0.262 (-13.91)***	-0.262 (-13.91)***	-0.274 (-15.34)***	-0.278 (-15.61)***
	Living as Married	-0.232 (-12.15)***	-0.23 (-10.98)***	-0.232 (-11.06)***	-0.236 (-11.96)***	-0.239 (-12.12)***
	Divorced	-0.662 (-28.54)***	-0.664 (-25.74)***	-0.666 (-25.85)***	-0.664 (-27.79)***	-0.67 (-27.86)***
	Separated	-0.812 (-20.16)***	-0.814 (-18.59)***	-0.811 (-18.55)***	-0.812 (-19.57)***	-0.819 (-19.71)***
	Widowed	-0.488 (-25.85)***	-0.497 (-22.92)***	-0.496 (-22.86)***	-0.481 (-24.01)***	-0.494 (-24.79)***
Education	Up To 14 Years Old	-0.26 (-6.10)***	-0.248 (-5.29)***	-0.247 (-5.26)***	-0.255 (-5.88)***	-0.246 (-5.70)***
	15 Years Old	-0.257 (-5.77)***	-0.247 (-4.99)***	-0.246 (-4.98)***	-0.268 (-5.88)***	-0.254 (-5.61)***
	16 Years Old	-0.239 (-5.51)***	-0.216 (-4.53)***	-0.214 (-4.52)***	-0.255 (-5.81)***	-0.241 (-5.51)***

	17 Years Old	-0.156 (-3.58)***	-0.133 (-2.83)***	-0.132 (-2.81)***	-0.171 (-3.87)***	-0.159 (-3.63)***
	18 Years Old	-0.103 (-2.38)**	-0.105 (-2.22)**	-0.104 (-2.20)**	-0.132 (-3.02)***	-0.122 (-2.80)***
	19 Years Old	-0.0743 (-1.69)*	-0.0657 (-1.37)	-0.0653 (-1.36)	-0.0926 (-2.08)**	-0.089 (-2.00)**
	20 Years Old	-0.0443 (-1.02)	-0.0474 (-0.99)	-0.0481 (-1.01)	-0.0722 (-1.64)	-0.067 (-1.52)
	21 Years Old	-0.0311 (-0.70)	-0.0269 (-0.55)	-0.028 (-0.57)	-0.0523 (-1.14)	-0.0524 (-1.15)
	22 Years or Older	-0.000243 (-0.01)	-0.0154 (-0.33)	-0.0166 (-0.35)	-0.0239 (-0.55)	-0.0312 (-0.72)
Income Category	2	0.178 (6.80)***	0.16 (5.37)***	0.161 (5.36)***	-0.0383 (-0.92)	0.152 (5.71)***
	3	0.282 (10.02)***	0.241 (7.83)***	0.241 (7.80)***	-0.0963 (-1.49)	0.227 (8.03)***
	4	0.371 (13.70)***	0.321 (11.05)***	0.322 (11.04)***	-0.181 (-2.03)**	0.271 (9.99)***
	5	0.481 (16.72)***	0.433 (13.80)***	0.435 (13.78)***	-0.221 (-1.99)**	0.31 (9.77)***
	6	0.593 (18.86)***	0.529 (15.38)***	0.533 (15.40)***	-0.233 (-1.79)*	0.329 (8.04)***
	7	0.632 (21.30)***	0.581 (18.28)***	0.582 (18.26)***	-0.288 (-1.96)*	0.282 (5.90)***
	8	0.722 (23.93)***	0.673 (20.08)***	0.675 (20.14)***	-0.285 (-1.77)*	0.253 (4.15)***
	9	0.81 (26.11)***	0.769 (22.55)***	0.772 (22.69)***	-0.267 (-1.55)	0.203 (2.70)***
	10	0.895 (28.15)***	0.844 (24.51)***	0.847 (24.62)***	-0.233 (-1.29)	0.116 -1.25
	11	0.974 (29.43)***	0.931 (25.79)***	0.934 (25.85)***	-0.181 (-0.98)	0.0212 -0.19
	12	1.151 (34.69)***	1.117 (29.77)***	1.119 (29.76)***	-0.0174 (-0.09)	0.00972 -0.07
Labor market status	Voluntarily Unemployed	0.0842 (5.59)***	0.0747 (4.46)***	0.0754 (4.50)***	0.0847 (5.52)***	0.0858 (5.47)***
	Student or Military	0.177 (4.10)***	0.176 (3.69)***	0.177 (3.71)***	0.17 (3.85)***	0.171 (3.87)***

	Retired	0.00852 (0.4)	0.026 (1.12)	0.0264 (1.14)	0.00477 (0.21)	0.0111 (0.5)
	Unemployed	-0.802 (-25.96)***	-0.845 (-24.10)***	-0.844 (-24.09)***	-0.814 (-26.05)***	-0.814 (-25.34)***
Size of the Household	2 persons	-0.0401 (-2.15)**	-0.0131 (-0.63)	-0.0129 (-0.62)	-0.0473 (-2.42)**	-0.0409 (-2.10)**
	3 persons	-0.168 (-7.32)***	-0.15 (-5.86)***	-0.15 (-5.87)***	-0.183 (-7.69)***	-0.178 (-7.50)***
	4 persons	-0.15 (-6.69)***	-0.134 (-5.41)***	-0.134 (-5.43)***	-0.171 (-7.49)***	-0.167 (-7.25)***
	5 persons	-0.203 (-7.99)***	-0.196 (-6.90)***	-0.196 (-6.94)***	-0.231 (-8.92)***	-0.231 (-8.85)***
	6 or more persons	-0.25	-0.243	-0.246	-0.289	-0.284
	Observations	(-8.04)*** 434516	(-7.13)*** 364191	(-7.22)*** 364191	(-8.99)*** 408946	(-8.86)*** 408873
# of Country-Year Units	321	264	264	319	321	
Log pseudolikelihood	-431237.5	-354620.6	-354634.1	-398705.7	-399137.1	
Pseudo R-squared	0.105	0.103	0.103	0.107	0.109	

Source: Authors' calculations.

Notes: "Male" is a dummy variable that is equal to 1 for males and 0 otherwise. The "Education" question in the survey asks the age at which the individual completed or left formal education; the base category is younger than age 14. The base categories for marital status, income, labor market status and household size are married, lowest income category, employed, and 1-person household, respectively.