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Family, money, and health: Regional differences in the determinants of life satisfaction over the life course

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Abstract

We examine how family, money, and health explain variation in life satisfaction over the life cycle across seven global regions using data from the World Values Survey. With a life domain approach, we study whether the importance of the life domains varies by region and age groups and whether the variation explained by each factor is due to the magnitude or prevalence of each factor. Globally, family, money, and health explain a substantial fraction of life satisfaction, increasing from 12 percent in young adulthood to 15 percent in mature adulthood. Health is the most important factor, and its importance increases with age. Income is unimportant above age 50. Remarkably, the contribution of family is small across ages. Across regions health is most important in the wealthier, and income in the poorer regions of the world. Family explains a substantial fraction of life satisfaction only in Western Europe and Anglophone countries. Findings highlight that the population-level importance of family, money, and health in explaining variation in life satisfaction across regions is mainly attributable to the individual-level life satisfaction differences between people of different statuses rather than differences in the distribution of various states such as poor health across regions.

Keywords

Life satisfaction; Life cycle; Subjective well-being; Cross-national; Aging

1. Introduction

Family, money, and health are important determinants of subjective well-being (SWB). Subjective well-being refers to global judgments that people make about their lives, and is captured by measures of life satisfaction or happiness (Diener & Suh, 2000). Little is known about the relative importance of family, money, and health for explaining SWB at different

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.alcr.2013.01.001>.

stages of life, or how their importance varies across regions. In particular, nothing is known about how patterns of life cycle life satisfaction may differ by region and why. Thus far, the literature has focused only on unraveling the average happiness trajectory over the life cycle. While some research has found happiness throughout the life cycle to be flat (Myers, 2000), others have found that the old are happier than the young (Argyle, 1999), still other research has found an upside down U-shape, with happiness peaking in midlife (Easterlin, 2006). One reason for the discrepancies may be measurement—some studies estimate life cycle happiness from synthetic cohorts while others use panel data. However, even panel studies do not concur on the life cycle pattern of subjective well-being (Easterlin, 2006).

One useful conceptual framework for understanding the life cycle pattern of subjective well-being is the life domain approach (Campbell, 1981; Campbell, Converse, & Rodgers, 1976). The life domain approach views responses on happiness as the net outcome of reported satisfaction with various domains of life that matter for happiness. Some of such factors are material living conditions, family life, health, and work. Proponents of the life domain approach to happiness argue that it captures both subjective and objective factors that affect happiness and classifies important aspects of everyday life that people refer to when answering about their overall subjective well-being. While there is no complete agreement on what the most important factors are, virtually all researchers agree that economic conditions, family circumstances, health, and work are important domains determining happiness (Cummins, 1996; Easterlin, 2006; Salvatore & Munoz Sastre, 2001; Saris, Veenhoven, Scherpenzeel, & Bunting, 1995; Van Praag, Frijters, & Ferrer-I-Carbonell, 2003). A good example of the life domain approach to explaining life cycle happiness is Easterlin (2006), who studies happiness in the U.S. and finds an upside down U-shaped curve over the life cycle. Easterlin concludes that the pattern is due to varying patterns of life satisfaction on each of the examined domains over the life cycle. For example, he finds that satisfaction with family life and work increase until midlife and then decrease, while satisfaction with financial situation increases with age, and satisfaction with health decreases with age.

We extend the research on life cycle life satisfaction in several ways. Although prior research has analyzed the factors explaining the level of happiness (Easterlin, 2006), no attempt has been made to analyze the factors responsible for the variation in subjective well-being. We first document population-level variation in subjective well-being and how that variation differs across regions and across ages. Second, we ask what factors explain variation in life satisfaction at different stages of life, and how the importance of these factors changes over the life cycle. The factors that we examine are family (partnership and children), money, and health.²

Analyzing the within-population variation in happiness and the factors that could explain the variation is a critically different conceptual question than the more standard quest of analyzing the factors that predict individual-level differences in happiness. Understanding the hitherto neglected population-level variation in happiness is important for several reasons. First, the variation in happiness measures the population-level inequality in

²We do not consider work separately because measures of satisfaction with work across contexts are scarce.

subjective well-being. Second, understanding the determinants of the variation in happiness is critically important for the development of policy aiming to reduce inequality in subjective well-being. There are already initiatives to measure national-level subjective well-being, with the ultimate goal of informing policymakers about what makes people happy. For example, the OECD Better Life Index³ aims to measure quality of life more comprehensively than income or life expectancy statistics. However, to date no attention has been paid to the inequality in subjective well-being, and what accounts for that inequality.

In our analysis we take a comparative approach and study regional variation in the importance of different life domains in explaining variation in life satisfaction over the life cycle. This is important because the factors that we consider may have very different meanings and importance for life satisfaction across regions. Consider, for example, health. First, we expect the importance of health in explaining life satisfaction to vary across regions, because empirically it will explain more variation in subjective well-being in regions with higher prevalence of poor health. Second, and more importantly, we expect the importance of being in poor versus good health on life satisfaction to vary across regions, partly because of cultural differences in the acceptance of different health statuses, partly because of the variation in the ability of health systems to alleviate suffering given a health condition. Regions differ also in terms of variation in income and family formation as well as in the differences in subjective well-being associated with different income levels and family statuses. Thus, for a more complete understanding of how family, money and health explain variation in life satisfaction across the life cycle, the regional approach is very important.

1.1. Regional variation in life cycle subjective well-being and life domains

Several studies attempt to explain national and regional differences in levels of subjective well-being based on economic conditions, cultural factors, and other contextual characteristics (Alesina, DiTella, & MacCulloch, 2004; Deaton, 2008; Diener & Suh, 2000; Frey & Stutzer, 2002; Kalmijn, 2009; Schyns, 1998; Soons & Kalmijn, 2009). However, no work to our knowledge has addressed regional variation in the relative importance of the determinants of life cycle subjective well-being. When studying the relative importance of various factors in explaining variation in life satisfaction over the life cycle, it is important to distinguish between the magnitude of the effect⁴ of a given factor, and the population level explanatory power of that factor. We examine variation explained by each factor with the R^2 and semi-partial correlation coefficient. These measures of variation depend essentially on two measures. The first is the variation in the factor of interest. The second is the difference in life satisfaction between those in different categories. Assume, for example, that people can be either in good or poor health. Then the population level importance of health in determining variation in life satisfaction depends on the proportion of the population in poor health (which is quadratically related to the variation in the variable of interest) and the average difference in life satisfaction between people in the two health

³<http://www.oecdbetterlifeindex.org/>.

⁴The term “effect” here means the regression coefficient describing the life satisfaction difference of persons in differing family situations, differing income groups, or differing health statuses. We do not put any causal interpretation on these regression coefficients.

states (which we call the effect size; see footnote 4). Both of these factors are expected to vary with age. The demographer's perspective, which analyzes how both compositional and individual-level differences contribute to population-level variation, is useful in examining the importance of each factor by age at the population level.

We consider the interplay between effect size and variation of a given factor in explaining variation in life satisfaction. We expect the relative importance of different life domains to vary across the life cycle and across regions. Consider first the life cycle differences. At younger ages family, income, and health might explain some proportion of the variance in life satisfaction while few are married, well-off, and in poor health. At older ages the variation in marital status and wealth increases, as does the prevalence of poor health. Simultaneously, the individual level importance, or effect size, of these factors on life satisfaction may also change. These changes over the life cycle are expected to influence the relative importance of different life domains in explaining variation in subjective well-being over the life cycle.

We also expect to find regional differences in the importance of different life domains in explaining variation in subjective well-being over the life cycle. This is because the variation in the factors that we consider, and differences in well-being between groups are both likely to vary across regions. Consider, for example, health as the variable of interest, and denote (p) as the prevalence of poor health, and (b) as the effect on life satisfaction of being in poor health. Regions differ in the prevalence of poor health (p). Regions may also differ in the ability of health systems to alleviate suffering given a condition affecting the well-being of those in poor health relative to those in good health. This would influence the effect size (b). Combined, regional variation in prevalence and effect size may influence the explanatory power of health on life satisfaction. The prevalence of poor health depends on age, as poor health is most common among older people. The individual level effect of poor health may also depend on age, though the direction of the age pattern is not a priori clear. Jointly, these factors may give rise to the changing importance of health in explaining life satisfaction over the life cycle and across regions.

The analysis to be presented is a descriptive exercise examining the variance in life satisfaction explained by the three life domains of interest. We do not suggest causal interpretations for several reasons. First, we are comparing state variables across different people. Second, there are confounding factors such as personality which influence both life satisfaction and the life domains of partnership, childbearing, health, and wealth (Billari, 2008; Kohler, Behrman, & Skytthe, 2005; Parr, 2010). Moreover, life satisfaction of respondents (in the past or present) may also influence one's health or family situation, as shown by Koivumaa-Honkanen et al. (2000). Last, the life domains that we study interact with each other as they influence life satisfaction. For example, Markides and Martin (1979) show with path analysis that the effect of income on life satisfaction goes through health and activity level. In our work, we cannot speak to confounding influences or reverse causality specifically, but we examine the portion of variance in life satisfaction explained by a combined factor of family, income, and health.

Our first hypothesis is that the importance of health for explaining life satisfaction will be greatest in countries with the worst levels of health, least developed healthcare systems, and highest level of uncertainty about health. In these regions, differences in well-being between those in good and poor health will be greatest. In addition, the prevalence of poor health will be greatest. Therefore, we hypothesize that health will explain the greatest variation in life satisfaction for Sub-Saharan Africa, of the regions. On the other hand, in regions with stronger welfare states and relatively good healthcare, such as Anglophone countries and Western Europe, we hypothesize that differences between those in good and poor health will be much smaller and that the prevalence of poor health will also be much lower, resulting in health explaining less variation these regions.

Our second hypothesis regarding health is that this domain will be an important determinant of variation in life satisfaction at both young and old ages, but less important in the middle of the life cycle. We expect health to explain much variation in life satisfaction early in the life cycle because even though few people are in poor health (*p*), the differences in well-being between those in good and poor health will be great (*b*). Since people compare their health to their peers, the differences in well-being will be large in young adulthood. Late in the life cycle, health will also explain a lot of variation in life satisfaction, but for the opposite reason—because the prevalence of poor health is great at older ages. Even though the differences in well-being between those in good and poor health may not be large for those at older ages, the prevalence of poor health will be the determining factor of this life domain's importance at older ages.

Similarly, different levels of income inequality affect the proportion of people in various strata of society (*p*). Moreover, the type of welfare state influences how income is redistributed which is expected to influence the magnitude of the life satisfaction difference between those with low and high incomes (*b*). We hypothesize that in regions with highly developed welfare states, in particular Western Europe and Anglophone countries, income will explain less variation in life satisfaction because of smaller differences in well-being between those with different income levels. In these regions, it is rare to have nothing. However, in regions with less developed welfare states, such as Sub-Saharan Africa, Latin America, and Asia, the differences in well-being between those with and without means will be greater and thus income will be a more important in explaining variation in subjective well-being.

When in the life cycle will income be the most important for explaining variation in life satisfaction? To answer this, we look to theories addressing how income impacts subjective well-being. Income increases to mid life and then decreases. Economic theory predicts that growth of income will increase life satisfaction, in that more is better (Samuelson, 1947). This predicts that when income peaks, in middle adulthood, then differences between high and low income groups will be greatest and income will explain the most variation in subjective well-being in the middle age group. However, if people's material aspirations adapt to their material circumstances, then differences in subjective well-being between those with low and high incomes will be stable and the importance of income for life satisfaction will be flat across the life cycle (Easterlin, 2001). Our analysis will help understand which of the two mechanisms dominates the overall effect.

The importance of family factors might also vary by region. We conceptualize two aspects of family—partnership and children. There are large regional differences in the proportion of those in different marital status groups and also in the well-being of those in various unmarried categories relative to the married (Kalmijn, 2009; Stack & Eshleman, 1998). Similarly, regional differences in fertility schedules affect the proportion of those in different parity groups over age and there are contextual differences in the well-being of those with and without children by region and welfare regime (Margolis & Myrskylä, 2011).

We hypothesize that partnership will be most important for explaining life satisfaction in places where there is the most variation in partnership status, and the quality of the match is the most important driver of determining partnership status. Therefore we expect that in Western Europe and Anglophone countries, partnership status will be an important determinant of subjective well-being. However, in regions such as the Middle East and Sub-Saharan Africa, where fewer people are unmarried and gender roles are more traditional, these demographic states will be a less important determinant of life satisfaction. We hypothesize that in these regions, it will be more important to measure relationship quality, an aspect of family that we could not study with these data.

Why might partnership and children be more important for explaining life satisfaction at some phases of the life cycle than others? We hypothesize that family will be the most important in middle adulthood, which contains the prime childrearing years and the most normative time to be partnered and be raising a family. We hypothesize that during this period of the life cycle, differences in well-being between the partnered and un-partnered will be greater than in young adulthood when it is more normative to be single and in mature adulthood when it is common to be divorced or widowed.

2. Research questions

In this paper, we explore the following questions:

1. How much of the variation in life satisfaction can be explained by family circumstances (partnership and children), money, and health?
2. Do these core factors explain more of life satisfaction in some parts of the life cycle rather than others?
3. Are there regional differences in the importance of these life domains in explaining variation in life satisfaction over the life cycle?

This analysis is a descriptive exercise which compares the correlations between three life domains and life satisfaction across persons with differing state variables. The results are not to be interpreted causally, but help understand the variation in life satisfaction and the determinants of the variation. Answering these questions adds to prior research in three main ways. First, we contribute by defining a focus which complements existing research on life cycle life satisfaction with its focus on explaining variation in life cycle life satisfaction rather than the level of well-being (Easterlin, 2006). Second, we take a comparative approach and explore to what extent family, money, and health explain variation in life cycle life satisfaction in different regions of the world. Lastly, we apply simple methods to

describe the variation explained by each life domain, as the variation of any given factor and the individual level impact of that factor on life satisfaction vary across regions and life stage.

3. Data

We use the World Values Survey (WVS) to examine the determinants of life satisfaction throughout the life cycle in different regions of the world. The WVS assesses the state of socio-cultural, moral, and political values through a series of questionnaires implemented with face-to-face interviews (Inglehart et al., 2000). We use these data because it is the largest international survey that includes questions on life satisfaction as well as other major life domains.

In this analysis, we use survey waves conducted between 1981 and 2008 for respondents aged 20 and above at the time of the interview. Of the 308,738 respondents aged 20 or above, we exclude 54,569 because questions about health or income were not asked for that country and year, and we exclude 46,153 respondents because of missing data on the variables in our analysis. Thus, our analytic sample is comprised of 208,016 respondents from 90 countries. We organize these countries into seven regions. The samples in developed countries are often close to representative, however samples from developing countries are not random (Inglehart et al., 2000).⁵ We discuss how the sampling strategy in developing countries affects our results at the end of the paper. We weight each country in the data set so that their weight in the final analyses are equal, no matter the number of waves conducted or sample size in each country. Thus, each individual's responses are weighted inversely to the number of respondents per country and countries with multiple surveys (see Table 1) do not count more than those with only one survey.

3.1. Dependent variable

The dependent variable is the respondent's reported level of life satisfaction. Respondents were asked, "All things considered, how satisfied are you with your life as a whole these days? Please use this card to help with your answer." Possible responses ranged from 1, "dissatisfied" to 10 "satisfied". We treat life satisfaction as a continuous variable with observed range from 1 to 10. Prior research has found that assumption of ordinality or cardinality of happiness and life satisfaction scores make little difference (Ferrer-i-Carbonell and Frijters, 2004).

3.2. Explanatory variables

To explore the age patterns of subjective well-being and its determinants, we stratify our analysis by age. We use three age groups: 20–34, 35–49, and 50 and above, which correspond to young adults, middle-aged adults, and mature adults. Our four main explanatory variables are health, relative income, partnership status, and children. Health is the individuals' subjective state of health. Respondents were asked, "All in all, how would you describe your state of health these days? Would you say it is: very good, good, fair,

⁵For more information on sampling and response rates, see: <http://www.wvsevsdb.com/wvs/WVSTechnical.jsp?Idioma=I>.

poor, or very poor?’’ We code responses as a continuous variable in order to maximize the degree of variation explained by health.

We measure income relative to the context in which one lives, which has shown to be a more important predictor of life satisfaction than an absolute measure of income and because our hypothesis is that relative income will matter more for life satisfaction in regions with less developed welfare states (Easterlin, 1995). Respondents were shown a card representing a scale of incomes ranging from 1 ‘‘lowest income decile’’ to 10, the ‘‘highest income decile’’. Respondents were asked in which group their household was, ‘‘including all wages, salaries, pensions and other incomes that come in.’’ We code relative income as a continuous variable.

We examine two aspects of family—partnership status and children, both of which have been found to be associated with life satisfaction (Kalmijn, 2009; Margolis & Myrskylä, 2011; Soons & Kalmijn, 2009; Stack & Eshleman, 1998). Partnership status is measured as either partnered (married or living together as married), or un-partnered (separated, divorced, widowed, single). We measure number of children as: none, one, two, or three or more.

To examine variation by region of the relative importance of the above factors to life satisfaction, we examine seven world regions. Our categories are: Western Europe, Eastern Europe (Former Socialist States), Anglophone countries, Middle East and North Africa, Sub-Saharan Africa, Latin America, and Asia. In making the categories, we wanted to group countries based on similar levels of development, level of welfare regime available, and level of healthcare available. We also wanted to avoid having small groups of countries to keep sample sizes large, which led to the Anglophone group of countries rather than analyzing the United States and Canada in their own group. We tested various ways of grouping countries, such as analyzing more and less developed Asian countries separately, and found that defining regions in other ways did not change the main results of the paper.

This paper takes a broad approach to examining the relative importance of life domains in explaining variation in life cycle life satisfaction across large regions of the world. The benefit of such a large-scale analysis is the ability to test hypotheses about why some domains are more important than others in regions with certain characteristics such as level of welfare, health, and development. However, in taking a broad approach, we cannot be as nuanced regarding the ways in which each of the life domains is related to well-being. For example, we do not have data across many countries on quality of family time, family interactions, and relationship quality. Although these factors are important, we focus on the demographic categories of partnership status and children because they are easily comparable across contexts with the data available. Similarly, relative income is a rough measure, but it is comparable, as it refers to all household money coming in which may include pensions for the elderly. Similarly, self-rated health is a rough measure of health with less nuance than functional limitations or chronic conditions, but it is the only measure of health that we have which allows us to compare across surveys. There is certainly interplay between the various factors, which our methods take into account and which we discuss below.

4. Empirical approach

First, we present the total percentage of the variation in life satisfaction at different phases of the life cycle explained by each of these factors combined. For each age group and region, we regress health, income, family (partnership and children), and a dummy variable for gender on life satisfaction. Eq. (1) presents a linear regression model with life satisfaction as the dependent variable (y) and health (H), income (I), partnership (P), children (C), and gender (G) as independent variables:

$$y = \beta_0 + \beta_1 H + \beta_2 I + \beta_3 P + \beta_4 C + \beta_5 G + e \quad (1)$$

We graph the R^2 for this regression for each age group and region in our analysis. All of the analysis is weighted, such that each region is equally comprised of respondents from each country. Next, we examine the relative contribution of each of these factors to explaining variation in life satisfaction, net of the other examined factors. We calculate the semi-partial correlation coefficient for each of these factors, which represents the proportion of the variation in life satisfaction explained by each factor, net of the other examined factors, and a combined factor. The combined factor is the proportion of the variation jointly explained by the intersection of the examined factors. This is important because the examined factors affect each other. For example, one of the ways in which partnership may affect well-being is through income and health. We chart the semi-partial correlation coefficients by age and region to examine the relative contribution of each factor to variation in life satisfaction.

In Appendices, we present summary measures of the statistical relationships between each life domain factor and life satisfaction. We graph the R^2 , or percentage of variation explained by each factor in total with measures of (b) the difference in life satisfaction between the groups, and (p) the prevalence or variation in each factor.

To test the robustness of our results, we conducted several sensitivity tests as reported at the end of the Results section.

5. Results

Table 1 presents the 90 countries in the analytic sample by region. We examine seven regions in this paper: Western Europe, Eastern Europe, Anglophone countries, Middle East and North Africa, Sub-Saharan Africa, Latin America, and Asia. Although there is certainly variation within these country groups, in this paper we examine variation between these large regions. Stratifying the analysis further would not be feasible because of diminishing sample size.

Fig. 1 presents the variance in life satisfaction by region and age group, the starting point for the analysis. The variance is between 3 and 8 and increases over the life cycle for most regions. Variance is highest for least developed regions, SSA and the Middle East/North Africa and lowest for the most developed regions, Western Europe and Anglophone countries. As shown in Appendix Table A1, Western Europe and Anglophone countries also tend to have higher average levels of subjective well-being. Thus the least developed regions

have both high inequality and low average levels of subjective well-being. Part of this results may be attributable to a ceiling effect in which at very high levels of average life satisfaction the variation is artificially truncated by measurement; however this is less likely with our 10 point measurement scale than it would be with most other commonly used subjective well-being scales that are based on 4 or 7 point measurement.

Next, we examine the relative importance of family, money, and health across regions in explaining the variation in happiness. Fig. 2 presents the proportion of variation in life satisfaction explained by each of these three life domains.⁶ Health is the most important and it matters for explaining life satisfaction in all regions. It explains between four and nine percent of variation in life satisfaction for the regions shown, net of other factors. It matters most in Western Europe, but is important in all regions.

Income is also important for explaining variation in life satisfaction, but is most important in poor regions and is least important in regions with high GDP/capita. Household resources explain less than one percent of variation in life satisfaction in Western Europe and Anglophone countries, but six to seven percent in Asia and Sub-Saharan Africa. It may be that the welfare state guarantees a lower bound on income and a level of basic needs in the richest regions and that income is most important for life satisfaction in areas where absolute poverty is most common.

Family explains a small amount of variation in life satisfaction in Western Europe and Anglophone countries, and a negligible amount in other regions. Globally, children matter next to nothing for explaining variation in life satisfaction (results not shown). In Western Europe and Anglophone countries the explanatory power is attributable to partnership, not children (results not shown separately for these two family variables). In particular, the small amount of variation that is explained by family is due to large differences in the beta, in the well-being of those partnered compared to those un-partnered.

Fig. 2 highlights different patterns in the relative importance of the three life domains for the regions in our analysis. In the two most developed regions, Western Europe and Anglophone countries, health is the most important factor, with family a far second, and income explaining hardly any variation in life satisfaction. In Latin America, health is also the dominant factor. However here, as in all regions other than Western Europe and Anglophone countries, income explains more of the variation than family. Eastern Europe has the median pattern, with health the most important, followed by income which explains about half as much variation as health, and family mattering hardly at all. The last three regions, the Middle East and North Africa, Asia, and Sub-Saharan Africa, are the regions with the lowest GDP/capita. Income and health both matter a lot in these regions. The only two regions in which income matters more than health are the poorest regions Asia and Sub-Saharan Africa.

Next, we examine whether family, money, and health are more important for explaining variation in life satisfaction in some periods of the life cycle than others. Fig. 3 charts the

⁶This figure charted with R^2 has the same pattern.

proportion of life satisfaction explained by each of the life domains and their total for the global sample by age group. The total for all life domains is the R^2 and the variation explained by each factor is the semi-partial correlation coefficient for each of these factors, which represents the proportion of the variation in life satisfaction explained by each factor, net of the other examined factors, and a combined factor. Family, money, and health together explain a substantial amount of variation in life satisfaction, 12 percent in young adulthood, 15 percent in middle adulthood, and 14 percent in mature adulthood. The increase in variation explained in the middle years is due to an increase in the importance of health and income for life satisfaction. In mature adulthood, health becomes even more important, yet income declines in importance, relative to younger ages.⁷

In Fig. 4, we turn to regional variation in life satisfaction explained by family, money, and health jointly, across the life cycle. This figure charts the total proportion of the variation in life satisfaction explained by family, money, and health at each period of the life cycle for the regions of our analysis. We find that these factors explain the most in Sub-Saharan Africa. The life domains explain around ten percent of variation in young adulthood and slightly more in middle and mature adulthood for Asia, Eastern Europe, and Western Europe, and slightly less over age for Anglophone countries, Middle East, and Latin America.

To understand why these three life domains explain more variation in life satisfaction over the life cycle in Sub-Saharan Africa and approximately the same amount over the life cycle in other regions, we turn to Figs. 5–7 which examine this for each life domain. These figures chart the proportion of variation explained by each life domain by region and age group. We chart the R^2 in these tables rather than the semi-partial correlation coefficient,⁸ because we want to examine the importance of health overall. The semi-partial correlation coefficient shows a more flat pattern over age, because it omits the variation explained by the combination, or overlap, of other factors with the target variable. At older ages, health becomes more correlated with the other factors we measure—income and family. The equivalent of Figs. 5–7 calculated with the semi-partial correlation coefficient are found in Appendix Tables A1–A3.

Fig. 5 shows that health explains increasingly more variation in life satisfaction over the life cycle for four of the seven regions—Western Europe, Sub-Saharan Africa, Eastern Europe, and Asia. These are the regions with the highest and lowest life expectancy. To examine whether the increase in variation explained by health over age is due to differences in well-being between those in good and poor health (b) or the prevalence of poor health (p), we turn to Figures A4 and A5, which chart (b) and (p). The variation explained by health (R^2) is much more correlated with (b) than (p),⁹ which leads us to conclude that the increase in

⁷Our global sample is weighted such that each respondent has a weight proportional to the number of respondents from that country, with every country weighted as 1. This scheme weights countries equally. We estimated an alternate weighting system which takes the means of regions, so as not to be influenced by the number of countries in each region and we find the same overall pattern, but a less sharp increase in the importance of health over age and a sharper decrease for income over age.

⁸The semi-partial correlation coefficient measures the relative contribution of each of these factors to explaining variation in life satisfaction, net of the other examined factors.

⁹We can use correlation between R^2 and prevalence p to study whether the variation in R^2 is attributable to prevalence even though the association between prevalence and variance is quadratic (increasing up to prevalence 0.5, then decreasing). This is because the observed prevalence levels are mostly between 0 and 0.5, the region in which increasing prevalence increases variance.

variation explained over age is due to increases in the relative well-being of those in good versus poor health (*b*). The proportion of respondents in poor health increases over age for all regions (Table A1). In the Middle East/North Africa, Latin America, and Anglophone countries, health does not explain more variation in well-being over age. In these regions, the differences in life satisfaction between those in good and poor health are smaller (betas are flat over age). We conclude that beta, or the differences in life satisfaction for those at different levels of health, is the driving factor of the age pattern in the variation explained. This is because the other contributing factor, the prevalence of poor health, is similar across the life cycle for different regions (Table A1).

Next, we examine the variation explained by income over the life cycle for the seven regions. Fig. 6 shows that income explains very little variation in life satisfaction in Western Europe, Anglophone countries, and Latin America. In these regions, the differences in life satisfaction by income are small. However, income explains much more variation in the other regions. It explains the most in Sub-Saharan Africa, where differences in life satisfaction between the rich and the poor are large. Moreover, income explains between four and eight percent of variation in life satisfaction in Asia, Middle East/North Africa, and Eastern Europe. For these regions, income has the most importance in middle adulthood, when respondents are raising children and perhaps caring for the older generation as well. Appendix Figure A6 shows that the variation explained by income is very strongly correlated with the differences in well-being between those with different incomes. This is expected since income is defined with respect to one's peers, and the variation in income is approximately the same across all regions and ages.

Fig. 7 charts the variation explained by family over the life cycle. Surprisingly, family explains little variation in life satisfaction over the life cycle, and the least of the three examined factors. Partnership and children combined explain almost no variation over age in life satisfaction for most regions. However, it explains between 2 and 5 percent of variation in life satisfaction for Western Europe and Anglophone countries. Why does family only explain some of the variation in life satisfaction in these regions and in young and middle adulthood, but not the other regions? As shown in Table A1, Western European and Anglophone countries have similar proportions partnered to other regions in the analysis, but much larger differences in well-being between those partnered and un-partnered.¹⁰ This may be due to higher levels of uncertainty about partnering during singlehood or it may be due to a higher rate of dissolution of bad partnerships leading to larger differences between those remaining partnered and those un-partnered.

5.1. Sensitivity analysis

To test the robustness of our results, we conducted several sensitivity checks. First, we replicated our analysis including country fixed effects, in order to control for country level differences in the levels of reported subjective well-being. As expected, the analysis with country fixed effects explains a greater proportion of the variation in life satisfaction for all

¹⁰Figures A7 and A8 also show that the little variance that is explained is mostly attributable to subjective well-being differences between partnered and not partnered, rather than differences in the prevalence of partnered. This was the case also with health—the effect size, rather than variation, was more important.

regions, however we see similar patterns as presented in this paper. We excluded these results because we wanted to be able to explicitly compare partial correlation coefficients and R^2 in our figures and the former cannot be estimated with country fixed effects.

Second, we conducted our analysis using alternate coding schemes for health, income, and children. We analyzed health coding in various ways (dichotomous, relative health per age group, and relative health per age and country) and found similar results and therefore chose the simplest coding. We conducted our analysis coding household income differently, for example with income quantiles and tertiles, but found similar results. Therefore in this manuscript we choose the simplest coding scheme. The results were also similar when coding children with different categories.

We also conducted our analysis with different categories of countries and found a similar pattern of results. For example, we examined the results when analyzing more and less developed East Asian countries separately and found similar results. This concurs with our argument that regions capture the type of welfare and healthcare available, which are similar within regions even if there is some variation in the level of development within in the region. We tested how the results for India and China, the two most populous countries, differed from the Asia pattern. The results for the two Asian giants were similar to each other, but differed from the Asia pattern in that for India and China, health was the most important, followed by income, but in the Asia region as a whole income dominated health. We also ran the analysis with Ireland and Britain in Western Europe rather than Anglophone, similar to Goesling and Firebaugh (2004) and found very similar results.

We also conducted the analysis with different weighting schema. Rather than weighting each country in a region equally, we weighted each country by their population in 1994, the midpoint of the surveys in the analysis, and found similar results. We also found similar results with an unweighted sample. The results also show a similar pattern when controlling for time period or survey year. We find the same pattern of results when we examine variation in happiness (measured with the question, ‘‘Taken all things together, would you say you are very happy, quite happy, somewhat happy, or not at all happy?’’), rather than life satisfaction. We used life satisfaction in the analysis because it is measured on a ten point scale, rather than a four point scale, and therefore captures more variation. Last, we ran our analysis separately for men and women and found similar patterns of results.

6. Discussion

In this analysis, we extend prior research on subjective well-being throughout the life cycle by taking a life domain approach to examining the relative importance of family, money, and health in determining variation in life cycle life satisfaction (Cummins, 1996; Easterlin, 2006; Salvatore & Munoz Sastre, 2001; Saris et al., 1995; Van Praag et al., 2003). The question is new, as is the method. We examine whether the importance of the life domains varies by region and age group. Further, we study whether the importance of each life domain varies mainly because of the magnitude of the association between the domain and life satisfaction or because of the prevalence of the domain in the population. We use this method to explore regional differences in the age pattern of variation in subjective well-

being and its determinants. The three domains that we examine are health, income, and family (partnership and children). Globally, these factors together explain a substantial amount of variation, and an increasing amount over age—between 12 and 15 percent of variation in life satisfaction.

Additionally, we study regional variation in the importance of different life domains in explaining variation in life satisfaction over the life cycle. Health matters most for life satisfaction of these factors, and it matters more as age increases for most regions. Health is most important for Sub-Saharan Africa, where health is the worst of any region. Income matters about half as much as health, in explaining variation in life satisfaction. Partnership explains much less than health and income, and only in Anglophone countries and Western Europe in young and middle adulthood. Number of children explains next to nothing compared to these other variables.

Why does family matter so little? The technical explanation is that we can explain much of the variance in life satisfaction when there is a lot of variation and differences in well-being by partnership status or children are large. In middle adulthood when there are large differences in well-being by partnership status, there is little variation. Most people are partnered during this time. However, in young and mature adulthood, when there is more variation in family status, there are smaller differences in well-being. Conceptually, these simple demographic measures only capture the structure of family, but not important qualifiers like the age of children or the quality of relationships. Richer measures would likely explain more variation in life satisfaction and better capture the concept of family.

Breaking down the variation explained by each factor due to differences in life satisfaction by that dimension (b) and the prevalence in each factor (p) shows that (b) was much more important for explaining variation in life cycle life satisfaction. Health is most important for life satisfaction in countries with the best and worst health measures (Sub-Saharan Africa, Anglophone, and Western European countries) because these places have the largest differences in life satisfaction between those in good and poor health. In regions with the most developed healthcare system and lowest mortality, the large differences in well-being between those in good and poor health may be due to high expectations about health/social comparisons to other people (Salomon, Tandon, & Murray, 2004). In the least developed region, SSA, the large differences in well-being by health status is likely due to high levels of uncertainty about health and the least developed healthcare systems.

Similarly, (b) is also important for income. Resources are most important in explaining variation in life satisfaction in Sub-Saharan Africa and Asia, the regions where differences in life satisfaction between those with high and low resources are greatest. These are regions without well developed welfare states. Income is most important for life satisfaction in places without social programs which guarantee a lower bound on income and a level of basic needs. Moreover, as income increases, the marginal utility of income decreases. Therefore, although most income in poor regions is used for critical basic needs, in more developed contexts income is also used for less critically important needs.

Lastly, partnership is most important for explaining life satisfaction in Western Europe and Anglophone countries, the regions where differences between those partnered and unpartnered are greatest. In other regions, the state variables of partnership status and number of children explain little variation in life satisfaction. In places where fewer people are unmarried and childless, there is less variation in these statuses and these categories are much less strongly related to subjective well-being. In these regions, understanding variation in life satisfaction would be better explained by more nuanced measures of family interactions such as relationship quality and family interactions.

In summary, our analysis shows that family, money and health are important factors explaining variation in subjective well-being across the life cycle. However, there are large differences in the importance of these factors across the life cycle and across regions. The majority of the differences in the explanatory power of family, money and health over the life cycle and across regions is attributable to the individual-level life satisfaction differences between people of different statuses rather than differences in prevalence. Prior research has found that satisfaction with health decreases at older ages, while satisfaction with financial situation increases with age (Easterlin, 2006). Our results contribute to these findings in an important way. First, as satisfaction with financial situation increases with age, income also becomes a more important determinant of the variation in life satisfaction. However, the importance of health in explaining population-level variation in life satisfaction also increases with age, despite people on average becoming less and less satisfied with their health status. These contrasts illustrate the usefulness of the population-level approach put forward in this paper which focuses on explaining variance, rather than on the magnitude of the coefficients.

This analysis has several limitations. First, the data available during our lifetimes do not allow us to examine life satisfaction throughout the life cycle for many cohorts as they age. Therefore, we base our analysis on a synthetic cohort from successive cross-sections, analyzing the determinants of life satisfaction for different age groups. The weakness of this method is that we are comparing persons of different birth cohorts with different life histories and do not know how different successive cohorts will be until they age. Similarly, the data include surveys from multiple years. Future work should examine to what extent the importance of life domains change over time for different regions. A second limitation of our analysis is that we deal with only three life domains: family, money, and health. We chose these because they have been well-studied and are thought to contribute to differences in well-being. However, future work can explore other domains such as work. Also, we focus on regional differences, rather than country-level differences. However, country differences can be explored in future work.

Despite limitations, this paper adds to the literature on subjective well-being and the life cycle in several important ways. First, while much literature has addressed the importance of economic and cultural factors in explaining regional and national differences in the levels of subjective well-being (Cummins, 1996; Easterlin, 2006; Salvatore & Munoz Sastre, 2001; Saris et al., 1995; Van Praag et al., 2003), none has addressed the importance of life domains in explaining variation in life satisfaction. Our results on the determinants of the variation are important for understanding what contributes to the variation, and may help develop

polices aiming to reduce population-level inequality in well-being, and how these policies may differ across contexts. For example, our results imply that addressing income inequality would be most important in the less developed countries, whereas in the developed world inequalities in health matter more for the variation in subjective well-being. Second, our method of breaking down variation into the prevalence (p) and difference in well-being between factor groups (b) provides a way to examine what drives the importance of a factor at a given age and in a given region. Future work can extend this approach to explain national differences in variation in subjective well-being. Last, the importance of health found in this paper exemplifies another link between demographic behavior and self-reported well-being. By applying a life domain approach to explaining variation in life satisfaction across regions, as well as age, we have demonstrated how the approach is more widely applicable than originally formulated. Our results indicate that the effect of each life domain at the population level varies depending on region and age. Future research would benefit from taking these factors into account.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Fig. 1.
Variance of life satisfaction by region and age group.

Fig. 2.

Proportion of variation in life satisfaction explained by each life domain, net of the others, by region. *Notes:* Charts semi-partial correlation coefficient calculated also controlling for sex. Family is sum of partnership status and number of children. All ages combined.

Fig. 3.

Proportion of variation in life satisfaction explained by all life domains together, and each net of the others, for the global sample by age group. *Note:* Global sample is weighted such that each country weighted equally.

Fig. 4.

Total variation of life satisfaction explained by family, money, and health, by region and age group. *Note:* Charts R^2 calculated from regressions by age group and region.

Fig. 5.

Proportion of variation explained by health, by region and age group. *Notes:* Charts R^2 calculated from regressions by age group and region. Similar figure calculated with semi-partial correlation coefficient is available in Appendix Figure A1.

Fig. 6.

Proportion of variation explained by income, by region and age group. *Notes:* Charts R^2 calculated from regressions by age group and region. Similar figure calculated with semi-partial correlation coefficient is available in Appendix Figure A2.

Fig. 7.

Proportion of variation explained by family, by region and age group. Notes: Charts R^2 calculated from regressions by age group and region. Similar figure calculated with semi-partial correlation coefficient is available in Appendix Figure A3.

Table 1
Countries in the analytic sample by region and years of survey, World Values Surveys (1981–2008).

Western Europe		Eastern Europe	Anglophone		Middle East and North Africa		Sub-Saharan Africa	Latin America	Asia				
Andorra	2005	Albania	1998	Australia	1981	Algeria	2002	Burkina Faso	2007	Argentina	1991	Bangladesh	1996
Austria	1990		2003		1995	Egypt	2000	Ethiopia	2007		1995		2002
Belgium	1981	Azerbaijan	1997		2005		2008	Ghana			1999	China	1990
	1990	Armenia	1997	Canada	1982	Iran	2000	Mali	2007	Brazil	1991		1995
Cyprus	2006	Bulgaria	1990		1990	Iraq	2004	Nigeria	1990		1997		2001
Denmark	1981		1997		2000	Jordan	2001	Nigeria	1995		2006		2007
	1990		2006	Gr. Britain	1981	Morocco	2001		2000	Chile	1990	India	1990
Finland	1990	Belarus	1996		1990		2007	Rwanda	2007		1996		1995
	1996	Bosnian Fed.	1998	Ireland	1981	Saudi Arabia	2003	S. Africa	1990		2000		2001
	2005		2001		1990	Turkey	1990		1996		2005		2006
France	1981	Serbia	1998	USA	1982		1996		2001	Colombia	1998	Indonesia	2001
	1990		2001		1990		2001		2007	Dominican	1996		2006
W. Germany	1981	Croatia	1996		1995		2007	Tanzania	2001	Republic		Japan	1981
	1990	Czech Repub.	1990		1999			Uganda	2001	El Salvador	1999		1990
	1997		1991					Zambia	2007	Mexico	1990		1995
Germany	2006		1998					Zimbabwe	2001		1996		2000
Iceland	1984	E. Germany	1990								2000		2005
	1990		1997								2005	Malaysia	2006
Italy	1981	Estonia	1990							Peru	1996	Pakistan	2001
	1990		1996								2001	Philippines	2001
	2005	Georgia	1996								2006	S. Korea	2001
Malta	1983	Hungary	1991							Puerto Rico	1995		2005
Netherlands	1981	Kyrgyzstan	1993								2001	Taiwan	1994
	1990	Latvia	1990							Trinidad and Tobago	2006		2006
Norway	1982		1996							Uruguay		Thailand	2007
	1990	Lithuania	1990							Venezuela	1996	Vietnam	2001
	1996		1997								1996		2006
Portugal	1990	Macedonia	1998										

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