Happiness and Age – Resolving the Debate

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Abstract

This article is a response to a piece in this journal by David Bartram, which questions the validity of a vast literature which establishes a U-shaped relationship between age and happiness. As contributors to this literature and to that on well-being in economics in general, we feel obligated to highlight some false premises in that article. There are 570 studies published in respected journals that find U-shapes in that relationship in 145 countries. Of the thirty countries that Bartram examines, he finds U-shapes in eighteen. We show, with new analysis, that there is compelling evidence of U-shapes in all of the remaining dozen countries. We disagree with his methods which, among other things, suffer from major collinearity problems. This is not only supported by the long list of published studies but by several meaningful and consequential empirical trends – such as deaths of despair, depression, stress, and reported pain – which are the worst in the mid-life low in well-being.

In this article we respond to a paper recently published in this journal (Bartram 2022), which primarily critiques the finding of a U-shape in age in well-being and happiness in 145 countries reported in Blanchflower (2022). Bartram (2022) concludes, based on examining one data file that "*we do not see u-shapes 'everywhere' in Europe*." In fact, he finds them *nearly everywhere* even using his methods and data. In the thirty countries he examines he admits he finds U-shapes in eighteen.[1] Indeed, he does not question the finding in 133/145 countries for which U-shapes have been reported, including 16 others in Europe.[2] Strikingly, Bartram, in earlier papers, found U-shapes himself (Bartram, 2013, 2021b, Hendricks and Bartram, 2016). We identify the following flaws in his arguments: selective use of the literature; lack of generalizability; and the complete dismissal of what is considered best established practice in econometrics.

We have published, jointly and individually, numerous papers estimating U-shapes in age using various types of wellbeing variables and data files and countries around the world. These include Bell and Blanchflower (2021); Blanchflower (2021, 2020a, 2020b); Blanchflower and Bryson, (2021, 2022a, 2022b); Blanchflower and Clark, (2021); Blanchflower and Feir (2022); Blanchflower and Graham (2021, 2022a, 2022b); Blanchflower and Oswald (2004, 2008, 2009, 2019); Gondek, Lacey, Blanchflower and Patalay (2021), Graham (2009): Graham and Pozuelo (2017); Piper (2022, 2021, 2015a, 2015b) and Blanchflower and Piper (2022). The evidence of U-shapes goes well beyond happiness and life satisfaction. There are U-shapes in positive affect variables and hump shapes in negative affect ones, as well as U-shapes in a variety of wellbeing variables, for example, standards of living, and views on the situation in the country; the national economy; the respondent's own job if working; the respondent's own financial situation; the employment situation in the country; and the presence of public services in their country and more. In every case, the age term is significant and negative, and the square term is positive in a well-being equation. Often results are also reported using single year of age variables as a flexible functional form instead of imposing a quadratic and the results are the same. (Blanchflower, 2021).

1. Bartram's Empirical Evidence

[1] It is hard to know exactly what is going on as there is even inconsistency in which countries Bartram thinks have U-shapes. He starts with eighteen. *"In subjective terms, then, u-shapes are reasonably evident for Austria (but happiness initially rises), Switzerland, Denmark, Germany, Greece, Spain, Cyprus, Great Britain, France, Iceland (with however a notable decline after75), Israel, Netherlands, Norway, Poland, Russia, Slovenia, Sweden and Ukraine (really more of a W). It is particularly difficult to discern u-shapes for Bulgaria, Czech Republic, Estonia, Finland, Hungary, Ireland, Italy, Portugal, Slovakia and Turkey. For Belgium, Hungary and Lithuania, I am only willing to say: perhaps."* Bartram (2022, p.10). However later on page 14 without explanation he then switches to sixteen and drops Greece and Cyprus from that list claiming as follows. *"A reasonable summary of the findings presented above tells us that there is reasonably consistent evidence for a u-shape in 16 countries: Austria, Switzerland, Germany, Denmark, Spain, France, Britain, Israel, Iceland, Netherlands, Norway, Poland, Russia, Sweden, Slovenia and Ukraine. (Again, however, a longitudinal analysis might undermine that conclusion for at least some of these countries.) For 9 of the 30, the evidence weighs against a u-shape (Bulgaria, Czech Republic, Ireland, Italy, Portugal, Slovakia and Turkey). For the remaining five, the various methods used here do not lead to a consistent finding,"* Bartram (2022, p.14).

[2] There are 51 countries in Europe; Bartram analyzes data for only 30 of them as he excludes 21 countries - Albania; Andorra; Armenia; Azerbaijan; Belarus; Bosnia and Herzegovina; Croatia; Georgia; Iceland; Kazakhstan; Kosovo; Liechtenstein; Luxembourg; Malta; Moldova; Monaco; Montenegro; North Macedonia; San Marino; Serbia; Vatican City (Holy See). Blanchflower (2021) finds U-shapes in 46/51 – the only exceptions are five small ones – Andorra, Liechtenstein, Monaco, San Marino and Vatican City.

Bartram (2022) estimates happiness equations in 30 European countries from sweeps 1-8 of the European Social Survey, one of several data files on European countries used in Blanchflower (2021) and argues that he shows there are not U-shapes everywhere but admits "*although U-shapes are relevant for some countries.*" We attempt to clarify what he did and what he found. We believe his findings are flawed, the methods used are inappropriate and the conclusions drawn are at best arbitrary. A vast literature suggests that there are U-shapes in age in wellbeing data, *everywhere*.[3]

Bartram's (2022) main findings are as follows.
1) Bartram (2022) first examines happiness data for Germany in his Table 1 but fails to report sample sizes, which is a pattern throughout the paper. Bartram replicates what was found by Blanchflower (2021) – U-shapes with and without controls which weaken when you add ages >70. This is found as both age and age squared terms are significant with the former coefficient positive and the squared term positive implying a U-shape. He finds nothing new here.

2) Bartram's Table 2 estimates happiness equations for thirty countries without controls and cohort dummies and found U-shapes for 21 countries, based on the appropriate signs on the coefficients on the two age terms with both have t-statistics>2. He did not find U-shapes for Austria, Cyprus, Denmark, Finland, Iceland, Israel, Italy, Sweden, and Ukraine. As in his Table 1, as we note below, no sample sizes are reported; presumably as many are small for these countries.

3) Bartram's Table 3 estimates happiness equations without controls using eight ten-year age bands, year dummies and cohort dummies (5-year), again with no sample sizes. He has so few years of data in many of these country surveys that the cohort variables by construction are inevitably highly correlated with the age dummies. He then estimates the difference between the largest and smallest and then *guesses* which country has a U-shape and which does not based on the size of the difference. Yet the countries that have the largest differences – Turkey, Slovakia, Portugal and the Czech Republic – for which he guesses "*most obviously do not have U-shapes"*, despite the data showing that all four do in Table 2.

It is hard to see, for example, from the data from his Table 3, why Portugal doesn't have a U-shape, but Spain, its neighbor on the Iberian Peninsula, for some unexplained reason does. Portugal goes from a high of 7.32 for ages 25-34 which is the same as for 85+ with a low of 6.33 at age 55-64. Spain goes from 7.60 to 7.64, respectively, with a low of 7.36 at age 55-64. They look equivalent to us.

Age	25-34	35-44	45-54	55-64	65-74	75-84	85+	Difference
Portugal	7.32	6.93	6.58	6.33	6.40	6.49	7.32	2.43
Spain	7.60	7.38	7.40	7.36	7.40	7.59	7.64	1.70

[3] There are several questionable/unusual statements in the paper (our italics).
a) "Blanchflower and Oswald (2008) on this point, say that a model with no controls is (merely?) a 'descriptive' analysis. They argue for use of controls to achieve a 'ceteris paribus analytical' finding. This *rhetoric* leads us astray."
b) "With cross-sectional data, it is of course *impossible* to correct for bias rooted in these patterns."
c) "It is *impossible* to see U-shapes as a universal pattern."
d) "*Statistical significance is overrated anyway.*"

Then Bartram claims U-shapes do not appear either in Bulgaria, Estonia, Finland, Italy, and Ireland. He says "perhaps" for Belgium, Hungary and Lithuania. This seems arbitrary to us.

In a single cross-section survey the age and cohort dummies, by construction, are perfectly correlated. Of the twelve countries Bartram guessed had no U-shapes only Belgium; Finland, Hungary, Ireland and Portugal were present in all eight sweeps examined (Appendix 1). The other seven were in only a few sweeps, with sweep numbers in parentheses – Bulgaria. n=8,324 (#2-5); Czechia n=15,216 (#3-6); Estonia n=13,410 (#2-8); Italy n=6,322 (#1,2,6,8) Lithuania n=8,158 (#5-8). Slovakia n=8,791 (#2-6) and Turkey n=4,272 (#2 and 4).

Bartam cites work by Ekstam (2021) who makes clear the need to have sufficient observations and years to include age, period and cohort effects. Ekstam estimates attitudinal equations with 26 waves of the General Social Survey for people ages 18-89, for the period (1973-2016) and cohorts (1892-1995). The problem with including year, age and cohort variables together is they are collinear, and the effect is that they bias the results to zero. In the case of Turkey, which only had data on 4272 respondents from two waves – in 2004 and 2008 - anyone age 60 was either born in 1944 or 1948. The more years of data the fewer problems and the fewer the years of data the more the problem.

Blanchflower (2021) builds on Blanchflower and Oswald (2008)[4] and included cohort dummies in life satisfaction equations both with and without controls using eleven years of data using the Eurobarometer surveys, 2009-2019 across 37 countries and found the inclusion of the cohort dummies had little impact on the size of either the age or age squared coefficients or on the calculated minimum (Tables 3 and 4). Cheng et al (2017) examine longitudinal data from the four main longitudinal files and find U-shapes noting that "*claims that the U is an artefact – one perhaps caused by influences such as omitted cohort effects – thus appear to be incorrect*." Clark (2019) examined eighteen waves of the British Household "*to try to distinguish between two potential explanations of this shape: a pure lifecycle or aging effect, and a fixed cohort effect depending on year of birth. Panel analysis controlling for fixed effects continues to produce a U-shaped relationship between well-being and age*" (2019, p. 387).[5]

Trying to control for period, age and cohort indeed is not without its critics. Bell and Jones (2018) for example argue as follows: "*the ability of the model to produce meaningful statistics has also been disputed. This is because it is, apparently, attempting to do the impossible … separating age, period and birth cohort effects, including linear effects if they are present. Many, including us, have argued that it doesn't work,"* (p. 784). Bell and Jones (2018) later warn that *"dangerously misleading results can be found",* (p. 797). As here.

We do agree with this though in relation to happiness equations. *"Age is typically significant, with many researchers finding a U-shaped relationship indicating declining happiness in early adulthood, followed by an increase after middle age; this age (stage in life) effect is robust even when disentangled from period and cohort effect..."* Bartram, 2012, p. 648).

[4] This paper has 2093 Google cites.

[5] Hellevik (2017) who Bartram notes argues including controls "induces bias" asked the question "*is there a U-shaped relationship between age and subjective well-being? Based on the analysis of a Norwegian survey the answer is yes if we look at how satisfied people are with their lives*" (p.192)

2. Supporting evidence of a mid-life low from 'deaths of despair'

At the outset we should make clear that there is consistent evidence from mortality and morbidity data consistent with a mid-life low in well-being. This makes it hard to sustain claims such as those by Bartram who assert there is no such thing as a midlife low in wellbeing, when the evidence of their existence is overwhelming. Indeed, as noted by Blanchflower and Graham (2022) "*the evidence of the existence of a midlife low in well-being is among the most striking, persistent and consistent patterns in social sciences*" (p. 317).

Case and Deaton, (2015, 2020) recently have noted the increase in the U.S. of 'deaths of despair' due to drugs, alcohol, and suicide and have noted these occur predominantly in the middle-aged years. The trends in these deaths have a robust association with the same ill-being markers - unhappiness and stress - that increase in mid-life and are responsible for driving up the overall mortality rate (Graham and Pinto, 2019). There is even a rising tide of deaths among the homeless concentrated among prime age men.[6] Wolf and Schoomaker (2019) found significant increases in deaths among white men and women in the US their midlife years from 35 other causes of death. These include infectious, neurological, and organ system diseases, mental and behavioral disorders, obesity, and injuries. Pain peaks in midlife (Blanchflower and Bryson, 2022 and Case, Deaton and Stone, 2020).

Drug overdose deaths topped 100,000 during the 12-month period ending in April 2021.[7] Deaths per 100,000, in 2019 were the highest among the age group 35-44.[8] Two new statistical releases in October 2020 showed drug poisoning deaths peaking in midlife. In England and Wales, the two groups with the highest rates are 30-39 and 40-49. Chart 1 illustrates. The older of the two groups showed the biggest rise in deaths from drug use over these years, taking over from the 30-39 age group in 2016. The ONS has reported that suicide rates for both men and women are highest in the age range 45-64.[9]

	10 to 24 years	25 to 44 years	45 to 64 years	65 to 74 years	75 years and over
2007	1.4	4.4	5.6	4.1	4.5
2020	2.5	5.7	6.4	3.6	4.0
2007	5.9	18.9	17.2	11.7	15.1
2020	7.0	18.0	20.0	12.0	12.7

Walsh et al. (2021) note that alcohol mortality rates in Scotland, England and Wales peak at age 60-64 while deaths from drug-related poisonings peak in the age 40-44 age range.

In the US, the CDC published new data in October 2020 on poisoning deaths from cocaine use. These rates were stable between 2009 and 2013 and then nearly tripled from 2013 through 2018 (Hedegaard, Spencer and Garnett, 2020). In 2018, the rate of drug overdose deaths involving cocaine was highest for adults aged 35–44 (8.6 per 100,000). Age group 35-44 overtook the

[6] Thomas Fuller, 'A rising tide of lonely deaths on the streets. More than ever, it has become deadly to be homeless in America, especially for men in their 50s and 60s,' New York Times, April 18th, 2022.
[7] 'Drug overdose deaths in the U.S. top 100,000 annually,' CDC, November 17th, 2021.
[8] https://www.cdc.gov/nchs/data/databriefs/db394-tables-508.pdf#page=2
[9] Suicides in England and Wales: 2020 registrations, ONS, September 7th, 2021.

previously highest age range of 45-54 in 2018. Of note is the death rate for African Americans from cocaine is more than double that of whites (9.0/100,000 versus 4.6 in 2018), while the death rate from opioid overdose and suicides is much higher for whites. There is also recent evidence on overall trends in drug poisoning deaths by age, which have risen over time but also peak in midlife.

Hedgaard, Miniño and Warner (2020) reported on the age adjusted drug overdose death rate in the US in 2019 and estimated that it was highest for adults ages 35-44.10 The maximum has moved around over the last twenty years between ages 35-44 and ages 45-54. The peak has been in the age range 35-44 since 2016, which is where it also was in 1990-1993. The peak was 45-54 in the intervening years. As can be seen below rates have more than trebled for all age groups: 40.5/100000 for ages 35-44 is the highest percentage of any group over the last twenty years.

Ages	15-24	35-44	45-54	55-64	65+
1999	3.2	14.0	11.1	4.2	2.7
2005	6.9	19.3	21.1	9.0	3.3
2008	8.0	21.1	25.2	12.9	4.1
2015	9.7	28.3	30.0	21.8	5.8
2017	12.6	39.0	37.7	28.0	6.9
2019	11.2	40.5	36.9	30.0	8.3

https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsrelatedtodrugpoisoninginenglandandwales/2019registrations

There is also supporting evidence from other objective criteria such as anti-depressant prescriptions, which peak in midlife (Blanchflower and Oswald, 2016 and Blanchflower and Bryson (2021). Psychiatric admissions also peak in midlife (Le Bon and Le Bon, 2014). There is even evidence of midlife lows among great apes (Weiss et al, 2012). Clearly, the objective data demonstrates that there is much human suffering experienced in midlife.

3. Prior evidence of a wellbeing U-shape in age

Bartram says that "*the u-shape is a matter of significant dispute*." It isn't. This claim misrepresents what an accurate reading of the literature finds; the vast majority of studies find a U-shape. In fact, it is difficult to find even a handful of studies that do not – and even Bartram finds U-shapes in the majority of countries he examines. Not one study from the vast literature that actually find U-shapes is cited by Bartram (2022). That this claim is found wanting can be seen by an inspection of the few highly unrepresentative studies Bartram (2022) uses in support of this notion of a 'significant' debate. The debate in our view is over.

One example is Galambos et al. (2020) cited by Bartram (2022). Interestingly he does not cite the published response to that paper by Blanchflower and Graham (2021) – henceforth BG21 - in the same journal which shows there is zero foundation for their claim that "*support for the purported U shape is not as robust and generalizable as is often assumed*" and "*we believe the conclusion*

[10] Drug overdose death rates per 100000 in 2019 were as follows ages 15-24=11.2; ages 25-34=35.6: ages 35-44=40.5; ages 45-54=36.9; ages 55-64=30.4 and 65+=8.3.
https://www.cdc.gov/nchs/data/databriefs/db394-tables-508.pdf#page=2

that happiness declines from late adolescence to midlife (the first half of the U shape) is premature, and possibly wrong." BG21 show the u-shape is not "purported."

BG21, as well as offering a strong point by point rebuttal of the claims of Galambos et al. (2020), also show that the authors' main evidence is based on summaries of 33 articles; they find 12 to have U-shapes, seven to have none, and 14 to be mixed. BG21 found that most of these articles are misclassified: Four of them are ineligible for inclusion (based on Galambos et al.'s own criteria), 25 find a U, and four are mixed. This means that Galambos and co-authors, despite their claims, are left with not a single paper that does not find a U-shape. Not one.

BG21 then identified several hundred articles that met the criteria for selection into their paper – published in peer reviewed journals between 2013 and 2019 that all found U shapes that were not identified in their literature review. This BG21 argue "*is a major omission*". We updated this list in Appendix 6 to **600** studies, with 570 in peer reviewed journals that find U-shapes.

Bartram also ignored evidence presented in Blanchflower and Graham (2022) – henceforth BG22 countering a response by Galambos et al (2022) that ignored the fact that none of the papers cited actually found evidence of U-shapes. The authors did not dispute any of the additional papers cited by BG1. Their main argument was that if you redraw the scale to be much larger you could pretend the u-shape went away (see their Figure 3). Galambos et al. (2022) also criticized studies as not being representative of dead people.

Bartram also cites Kassenboehmer and Haisken-DeNew, (2012) – henceforth KH - as showing that the relationship is flat, which turns out to be incorrect. Their results rely on a special period in modern German history, the early post-reunification years, and are based on the variation from a small percentage of the sample. As Blanchflower and Piper (2022) find, using the methodology of KH, and more years of data from the German Socio-Economic Panel, the relationship between age and well-being has the familiar U-shape pattern. This matters because papers like Bartram (2022) wrongly cite KH as important evidence against the common U-shape finding, leading to a mistaken impression that the U-shape is a matter of significant debate. Again, the vast majority of papers investigating the age and well-being relationship find a U-shape or midlife low, despite their many differences.

Bartram also cites Galambos et al. (2015) as demonstrating significant debate because it shows rising well-being in early adulthood; an *extremely* unusual result in the literature. The study is based on very small samples and is biased by significant sample attrition. It looked at two samples, a high school sample with 1000 observations, and less than 600 in a university graduates' sample. Substantial panel attrition follows in subsequent waves, with only a half of the high school sample responding to all waves and in the university sample, just 281 people were in all waves. There was nobody in the sample after the midlife low.

4. The U-shape is not about old age

Bartram argues that we should not restrict age to a maximum of 70 "*given that life expectancy in Europe is generally rather higher than that*". This makes no sense given life expectancy by country varies considerably even among the thirty countries examined by Bartram, ranging from a high of

84.3 in Switzerland which ranks fourth in the world after Hong Kong, Japan and Macao and Ukraine at 72.5, which ranks 119th.[11]

The U-shape in happiness is about a midlife low in wellbeing that occurred in the middle years of someone's working life, from ages 15-69. It has nothing whatever to do with what happens in subsequent years of life, in old age. Bartram claims it does but fails to understand that there are many good reasons to restrict analysis to age under seventy, not least due to differential life expectancies across countries and declining sample sizes.

Work by Hudomiet et al. (2021) is instructive. They show that in cross section, using the US Health and Retirement Survey, life satisfaction rises steadily from age fifty through age 69, consistent with the upward sloping RHS of the U-shape. In the cross-section data happiness continues to rise after age seventy. There is a mortality selection bias problem however because happy people live longer. Once account is taken of that Hudomiet et al. (2021) show that the function then slopes downwards. Happiness falls in particular because of ill-health in the last three years of life and because of a death of a spouse. Bartram (2022) does not make such a correction: the fix to the problem is to exclude older people over the age of seventy. Not surprisingly in Bartram (2021) he claims that "*it is perhaps remarkable that life satisfaction does not generally decline as people become old*". That is clearly incorrect. He seems unaware that happy people live longer.

Some studies such as Biermann et al. (2022) and Kritz and Brüderl (2021) use data for persons over the age of seventy and then fit higher power terms in age and argue there is no midlife low. It is unclear why they think that the wellbeing of octogenarians has any relevance whatever to estimating a midlife low which occurs at around age fifty. Despite this claim both papers clearly find one in midlife with the function minimizing around age fifty. Fitting a cubic term to capture a turn in the data at age 93 helps not much. The midterm low occurs no matter what happens in old age. We simply do not buy Bartram's argument that people age 97, 98, 99 and 100 should be included in the sample, not least, as we show below their numbers in the sample, and in the population decline rapidly as people age. We know from Hudomiet et al (2021) that ill-health at the end of life and deaths of spouses are major determinants of lower levels of life satisfaction as death approaches among the old. At the very least their importance should be appropriately weighted, which would amount essentially to limiting the sample to those of working age.

4. Control or not to control?

Following Glenn (2008), Bartram (2022) argues that controls should not be included in wellbeing equations. He asks "*what are the antecedents of age. The only sensible answer is none*." This makes no sense. Arguments against this have been presented and dismissed in Blanchflower and Oswald (2009) and Blanchflower and Graham (2022).

[11] Austria=82.1; Belgium=82.2; Bulgaria=75.5; Cyprus=81.5; Czech Republic=79.9; Denmark=81.4; Estonia=79.2; Finland=82.5; France=83.1; Germany=81.9; Great Britain=81.8; Greece=82.8; Hungary=77.3; Iceland=83.5; Ireland=82.8; Israel=83.5; Italy=84.0; Lithuania=76.4; Netherlands=82.8; Norway=82.9; Poland=79.3; Portugal=82.7; Russia=73.0; Slovakia=78.0; Slovenia=81.9; Spain=83.9; Sweden=83.3; Switzerland=84.3; Turkey=78.5 and Ukraine=72.5. https://www.worldometers.info/demographics/life-expectancy/

Based on his claims about control variables, economists will be surprised to learn that Bartram thinks the only variables belonging in a Mincerian earnings equation are age and age squared. There is no place for education, experience, training, location, industry, union membership or firm size. No place either for race, gender, being a twin or a triplet, birthweight, social class of parent at your birth? *Everything is endogenous.* He does not seem to understand that if you omit relevant variables the regression suffers from missing variable bias. Of course, there can be a potential for bias to exist, but it may not, and even if it does the scale of the bias may be small.

Bartram (2021) argues that there should be no controls at all such as education as these aspects of people's lives "*cannot determine age*". This seems truly extreme. Regardless of the merits, or lack thereof, of this argument it turns out there are U-shapes with and without controls.

Bartram's incomplete study of the literature

Bartram criticizes the Blanchflower (2021) study that found U-shapes in well-being in 145 countries.[12] In that paper six data files were analyzed and reported separate estimates by European country –World Values Surveys sweeps 2-6; European Quality of Life Surveys, 2003-2016; Eurobarometer Surveys, 2009-2019; the Eurobarometer Mannheim Trends file, 1973-2002; the European Social Surveys, sweeps 1-8; the International Social Survey Programme Survey of 2012 and 2017. Also, data for the UK were reported separately from the Annual Population Survey.

Data was also examined from the General Social Survey and the Behavioral Risk Factor Surveillance System surveys for the US as well as the Afrobarometer, Asiabarometer and Latinobarometer Surveys and the Gallup World Poll. Overall evidence was found of U-shapes in age, for respondents of working age from 15-69, using a variety of well-being measures. In most instances this was found including controls, but a number of tables provided results without them such as Table 3 for Europe using the Eurobarometers, 2009-2019 including all 30 of the countries examined by Bartram. Using these data files Blanchflower concluded "*No ifs no buts, well-being is U-shaped in age*."(p. 618).

Our starting point is Bartram (2021b) where he found statistically significant U-shapes using an 11-step happiness variable for Great Britain using data from rounds 5 through 8 of the European Social Surveys, for the years 2010, 2012, 2014 and 2016. He found this when he included an unemployment variable and then in turn a) education b) gender and education c) education and income d) education and religiosity and e) whether the respondent had a partner. Varying the

[12] The 145 countries that Blanchflower (2021) found U-shapes for are Albania; Algeria; Argentina; Armenia; Australia; Austria; Azerbaijan; Bahrain; Bangladesh; Belarus; Belgium; Benin; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Bulgaria; Burkina Faso; Burundi; Cambodia; Cameroon; Canada; Cape Verde; Chile; China; Colombia; Congo (Brazzaville); Costa Rica; Cote d'Ivoire; Croatia; Cyprus; Czech Republic; Denmark; Dominican Republic; Ecuador; Egypt; El Salvador; Estonia; eSwatini; Finland; France; Gabon; Gambia; Georgia; Germany; Ghana; Greece; Guatemala; Haiti; Honduras; Hong Kong; Hungary; Iceland; India; Indonesia; Iran; Iraq; Ireland; Israel; Italy; Jamaica; Japan; Jordan; Kazakhstan; Kenya; Kosovo; Kuwait; Kyrgyzstan; Laos; Latvia; Lebanon; Lesotho; Liberia; Libya; Lithuania; Luxembourg; Macedonia; Madagascar; Malawi; Malaysia; Maldives; Mali; Malta; Mauritius; Mexico; Moldova; Mongolia; Montenegro; Morocco; Mozambique; Myanmar; Namibia; Nepal; Netherlands; New Zealand; Niger; Nigeria; Norway; Palestine; Panama; Paraguay; Peru; Philippines; Poland; Portugal; Puerto Rico; Romania; Russia; São Tomé; Saudi Arabia; Senegal; Serbia; Singapore; Slovakia; Slovenia; Somaliland; South Africa; South Korea; Spain; Sri Lanka; Surinam; Swaziland; Sweden; Switzerland; Syria; Taiwan; Tajikistan; Tanzania; Thailand; Togo; Trinidad; Tunisia; Turkey; Turkish Cyprus; Uganda; UK; Ukraine; Uruguay; USA; Uzbekistan; Venezuela; Vietnam; Yemen; Zambia and Zimbabwe.

controls had no effect on the sign, size, or significance on the age variables except when a marital status variable was added, but the U-shape remained. It is puzzling then that in the most recent paper in this journal he would argue it is '*impossible* to include controls correlated with age, which presumably must include, education, unemployment, income religiosity and marital status" even though he did just that in his earlier papers.

Bartram (2022) proceeded to examine thirty European countries using just one of these data files – the European Social Surveys, sweeps 1-8 – to determine whether there were U-shapes 'everywhere'. He did not examine data from 115 of the 145 countries in that paper that U-shapes were found for. Of the 30 countries he did examine he admitted that he found U-shapes in eighteen - Austria, Switzerland, Denmark, Germany, Greece, Spain, Cyprus, Great Britain, France, Iceland, Israel, Netherlands, Norway, Poland, Russia, Slovenia, Sweden and Ukraine. So, the overwhelming evidence of U-shapes in 133/145 countries examined in Blanchflower (2021) is uncontested by Bartram. U-shapes in wellbeing are everywhere.[13]

That leaves us with only 12 out of 145 countries that are contested - Belgium; Bulgaria; Czech Republic; Estonia; Finland; Hungary; Ireland; Italy; Lithuania; Portugal; Slovakia and Turkey. Below we conduct our own analyses on these twelve countries and report U-shapes for all.[14]

Bartram draws conclusions that there are no wellbeing U-shapes in age in the single data file he examines. He does not seem to be aware that there is a large literature out there finding U-shapes even for his twelve contested countries. This includes two more of his own papers.

Thus, there is considerable evidence in the literature that there are U-shapes in these twelve countries including in two papers by Bartram. For example, Bartram (2013) uses data from sweeps 4 and 5 of the ESS and estimates a happiness equation and finds U-shapes in age *including controls* for gender, education, health, income, and marital status. The sample includes eleven of the magic twelve - Belgium, Bulgaria, Czech Republic, Estonia, Finland, Ireland, Hungary, Portugal, Slovakia and Turkey. Similarly in Hendricks and Bartram (2016), he estimates happiness equations using data from sweeps 3-6 of ESS 2006-2012 with controls again and finds a significant U-shape in age. Their analysis includes 9/12 countries that Bartram (2022) argues don't have U-shapes - Belgium, Czech Republic, Estonia, Finland, Hungary, Ireland, Italy, Portugal and Slovakia.

In a further bizarre paper Bartram (2021a) estimates 10-step life satisfaction equations scored from the World Values Survey, waves 1-6 for 69 countries (that question was also used in Blanchflower, 2021). He concludes is that there is at best a negligible post-middle age rise in life satisfaction – and claims, that "*the important implication is that there cannot then be a U-shaped relationship between age and life satisfaction*", despite the fact that hundreds of papers he fails to cite show there is and that it is apparent in the raw data. Once again, he uses only years, cohort and country as controls.

[13] Laaksonen (2018) who Bartram (2022) claims "*finds that the pattern is typically more complex than a u-shape*" uses the first 3 sweeps of the ESS and finds "the U-shape curve (in) over thirty countries" (Table 2).

[14] We should note that in Bartram (2022) Table 2, he found significant U-shapes for all of the twelve except Finland and Italy, without controls!

Bartram estimates a life satisfaction equation in his Table 2 that he claims does not provide evidence for the notion that life satisfaction rises after age 45 because the age coefficient is positive and tiny. This of course occurs because he includes very old people through 100. It tells us nothing of the sort, as it seems likely that the function may rise through age 70 and then turn over late in life (as has been found by others). The choice of age 45 is arbitrary and of course if the relationship between happiness and wellbeing is hump shape from age 45, sloping up and then say turning over at 80 and turning down to 100, the best fit line will be linear and not upward sloping. For this reason of the more than 500 published papers that have produced U-shapes none has taken this unusual approach.

In addition, all these estimates are subject to the mortality selection bias noted above, so they are not interpretable. Bartram then proceeds to estimate separate equations for those age 15-45 and those age 45-108 by country and for the same reason that tells us exactly nothing either. These equations are subject to major problems of collinearity- between the age and cohort variables not least because not every country appears in every wave of the survey. And, once again, he provides no sample sizes.

For the 69 countries he examines he also concludes that "*in a key contribution to this debate Blanchflower and Oswald (2008) ask (in their title) 'is well-being U-shaped over the life cycle? At least for the countries analyzed here that question has a straight answer: no*." The answer is actually yes, based on studies that are not flawed, as Bartram (2021a) is.

There are also several papers for Belgium, Bulgaria, Italy, Portugal, and Turkey that are obviously instructive and ignored by Bartram, several of them even using the same data source.

In the case of Italy three papers have found U-shapes using data from the Survey on Household Income and Wealth (SHIW) conducted by the Bank of Italy. Scoppa and Ponzo (2008) examined life satisfaction using the 2004 and 2006 waves. They concluded "*we note that an increase in Age reduces happiness levels (significant at 1 percent level), but the marginal impact is decreasing, since Age Squared is positive and significant. The relationship between happiness and age is therefore U-shaped.*" Lubian (2020) finds a U-shape in happiness using the 2004 wave of the SHIW. Ferrante (2017) examined the 2008 SHIW and concluded, "*I detect a U-shaped age-happiness relationship, confirming previous empirical evidence*."

There are five for Turkey. Birdal, Acun and Onak (2018) found U-shapes for Turkey using data from the 2015 Turkstat Life Satisfaction Survey. They conclude. "*Our findings confirm that well-being is U-shaped over the life cycle, for both men and women. As indicated by earlier findings, happiness decreases until a certain age and then starts to increase as the individual gets older. In our general sample, the turning point appears to be around the age of forty-six (forty-nine for males and forty-seven for females).*" Eren. and Aşıcı (2017), found "*age has a U-shaped relation with happiness while minimum happiness is located around at middle-ages*." Dumludag, Gokdemir and Giray (2016), found "*the results showed a U-shaped relationship between age and happiness*" while Caner (2015) argued similarly that "*age has a U-shaped relationship with happiness*.". Susanlı (2018) found that "*the estimated coefficients indicate that age follows the u-shaped relationship with life satisfaction reported in other studies*."

Sekulova & van den Bergh, (2016), examined data on life satisfaction in Bulgaria and reported "*We find the typical U-shape for age, implying that subjective well-being gradually declines with time until it reaches a critical minimum. This seems to be at the age of 65*". Želinsky´ (2021), reports U-shapes in age in life satisfaction for Slovakia. Hooghe and Vanhoutte (2011) examined date for Belgium from the 2006 ESS and the 2009 Social Cohesion Indicators in Flanders survey and find U-shapes in age in both surveys and concluded that "*Both age and age-squared are significant, and the quadratic term is positive, therefore the U-shaped relation between age and well-being found in the literature is confirmed with our data*. Tavares (2022) examined well-being in Portugal and found "*there is a general trend for life satisfaction to decrease as people age, but after controlling for determinants, the relationship tends to have a U-shape.*"

Of note also is that various other authors have used the European Social Survey and found U-shapes also. These studies don't report results for individual countries but report the results of pooled samples. Piper (2015) looked at data from sweeps 1-4 from 2002-2008 for fifteen countries – including Belgium, Bulgaria, Czechia, Finland and Ireland, Portugal - and finds "*age follows the common U-shape pattern too, bottoming out (in terms of 'ceteris paribus' happiness) at about 44*." Georgellis, Tsitsianis and Yin (2009) found using the first two rounds of the ESS "*there is a U-shaped relationship between life satisfaction and age*." Venetoklis (2019) examined life satisfaction and happiness data for sixteen countries from seven rounds of the ESS from 2002-2014 – including seven of the twelve - Belgium, Estonia, Finland, Hungary Ireland, Portugal, and Slovakia - and concludes "*age and its quadratic term (age-squared) retained their statistical significance and signs in all three models. Since the coefficient was negative for age but positive for age-squared, happiness declines as one ages up to a certain point, after which it starts increasing again. Thus, the relationship was U-shaped*."

Glatz and Ede (2020) examined the same years as Bartram, 2002-2016 and selected only those countries that were included in at least seven sweeps, "*since the trends would be distorted otherwise*,"[15] The authors concluded as follows. "*Age on the other hand is negatively related to Social Well Being (SWB) whereas age square is positively related, indicating a U-shaped relation*." Even though Bartram (2022) says he did not find U-shapes in these twelve countries it is relevant that many other authors in peer-reviewed journals, that Bartram failed to cite, in fact did. There is a consensus that Bartram is wrong.

Table 1 shows that in our previous work we found U-shapes for all twelve of these countries using various data sets. We report ten different columns and show that we have found U-shapes for all these twelve countries at least six times. In the case of Bulgaria, Finland, Hungary, and Slovakia we have reported ten separate estimates from various datasets, with and without controls. We found U-shapes everywhere then for the twelve countries Bartram claims he didn't find them for.

We decided not to leave it there and went back to two data sources including the ESS that Bartram used that we updated by adding in the ninth sweep.

[15] They examined 19 countries -Austria, Belgium, Switzerland, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Great Britain, Hungary, Ireland, Netherlands, Norway, Poland, Portugal, Sweden, and Slovenia. Hence, they omitted Bulgaria, Italy, Lithuania, Slovakia and Turkey because they were included in only a few waves as noted in Appendix 1.

The best data source on well-being in Europe is the Eurobarometer survey series. Using a new Eurobarometer file, updated through 2021, we estimated life satisfaction for those 12 European countries with only controls for gender and year and then in Table 3, with controls added for education and labor force status. We repeated the exercise in Tables 4 and 5, varying controls, using sweeps 1-9 of the European Social Survey.[16]

In both Tables 2 and 3 there are U-shapes for all twelve using Eurobarometers. We don't buy the argument that controls shouldn't be used, but here the point is moot as it makes no difference. U-shapes are everywhere. With the smaller samples in Table 4 without controls eight countries have U-shapes and four do not (Estonia, Finland, Italy, and Lithuania). All twelve have U-shapes in Table 5, when controls are added. This illustrates that the much smaller sample in the ESS makes it harder to find a U-shape and produces a high minimum of 86, (134,000 in Table 4) than is the case in Table 2 using the Eurobarometers for the same countries which produces a minimum of 63 (511,000 in Table 2). Of note is the greater similarity in both surveys in the minima when controls are included – 56 in Table 3 from Eurobarometers versus age 49 in Table 5 using the ESS. Bigger samples are preferred. There are midlife lows in wellbeing in these twelve countries.

We should note that on the top row of Tables 2 and 3 we estimated an overall equation for all 12, with and without controls respectively and both showed U-shapes. To illustrate the fit of the quadratic in Chart 2 we plot the raw data for the twelve countries using the Eurobarometer, 1991-2021 across all ages 15-99. There are 592,000 observations in all. The scatter plot shows a midlife low than an uptick followed by a turndown in the seventies and another upturn. There is a lot of noise at higher ages, the reason for which is illustrated in Chart 3 which plots the number of observations by year of age. This averages around 10,000 a year through age 65 and then drops sharply. There are 9,205 observations at age 70, 3,788 at age 80 and 377 at age 90. Chart 4 then restricts age to under seventy and displays a clear, well-fitting, quadratic. It is appropriate in our view to restrict analysis of the U-shape in age to those of working age.

Conclusion

The predominant feature of the relationship between age and well-being all around the world, in multiple datasets, is a midlife low, or U-shape. Critics of this finding, using one dataset at a particular point of time for a small number of countries, do not address the wider literature that overwhelmingly finds thus midlife low. This evidence indicates the midlife low is a substantial and important issue for many people. In the 'substantial' debate claimed by Bartram (2022), there is no reference to objective findings at all. And the literature based on survey data that he marshals in support of the argument of significant debate is, in different ways, itself flawed.

Critiques, like those of Bartram (2022), if they are to adequately challenge the notion of a midlife low, must do more than they are currently doing. Given that a remarkable 570 published journal papers find a U-shape that disagree with Bartram and only a handful that do not and agree with him, it is not enough to generalize from the findings, often via methodological contortions. The support he claims is from a highly partial (ignoring responses challenging cited work) and selective (ignoring the majority of papers) literature survey, from one particular dataset, study or time frame.

[16] The full sets of results across all 37 European countries are reported in Appendix Tables 2 and 3 using the Eurobarometers, and in Appendices 4 and 5 using the ESS, sweeps 1-9.

Such arguments also ignore the objective data, such as deaths of despair including suicide, antidepressant use and pain all being at their height in the midlife low. Future research will no doubt attempt to challenge the midlife low finding and we hope that it engages more appropriately with the existing evidence and literature than it has done recently. We also hope that future research will investigate the midlife low in more detail, such as what groups suffer more, and why, and how its consequences can be mitigated. Such a research agenda is more useful, certainly of more marginal benefit than another study using a flawed model to push data beyond its limitations in pursuit of insignificant age coefficients, and arguably more interesting too. We see U-shapes everywhere.

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Table 1. Findings for the lost twelve

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
#1 Belgium	*	*	*	*	*	*	*	n/a	*	*
#2 Bulgaria	*	*	*	*	*	*	*	*	*	*
#3 Czech Republic	*	*	*	*	*	*	*	n/a	*	*
#4 Estonia	*	*	*	*	*	*	n/a	*	*	*
#5 Finland	*	*	*	*	*	*	*	*	*	*
#6 Hungary	*	*	*	*	*	*	*	*	*	*
#7 Ireland	*	*	*	*	*	*	n/a	n/a	*	*
#8 Italy	*	*	*	*	*	*	n/a	n/a	*	*
#9 Lithuania	*	*	*	*	*	*	*	n/a	*	*
#10 Portugal	*	*	*	*	*	*	n/a	n/a	*	*
#11 Slovakia	*	*	*	*	*	*	*	*	*	*
#12 Turkey	*	*	n/a	n/a	*	*	*	n/a	*	n/a

Notes: * means present n/a means not in survey.

1=Blanchflower and Oswald (2008) with controls
2= Blanchflower (2021) Table 3 EB no controls
3= Blanchflower (2021) Table 4 EB with controls
4= Blanchflower (2021) Table 6 ESS with controls
5= Blanchflower (2021) Table 7 EQLS life with controls
6= Blanchflower (2021) Table 8 EQLS happy with controls
7= Blanchflower (2021) Table 11 ISSP 2012 happiness with controls
8= Blanchflower (2021) Table 12 WVS life satisfaction
9= Blanchflower & Graham (2022) Table 3 Gallup World Poll with and without controls
10=Graham and Pozuelo (2017) Table 2. Gallup World Poll Cantril ladder life satisfaction with controls

Table 2. 4-step life satisfaction in 12 European countries (EU27+10), 1991-2021, with controls for year and gender, age<70 - Eurobarometers

Country	Age*10	T	Age^2*1000	T	Minimum	N
All 12	-0.22	54	0.19	51	63	511.846
Belgium	-0.20	17	0.21	16	46	54,846
Bulgaria	-0.23	14	0.13	7	88	35,732
Czechia	-0.19	14	0.16	11	60	38,782
Estonia	-0.26	18	0.20	12	65	32,707
Finland	-0.15	13	0.14	16	54	43,650
Hungary	-0.32	19	0.28	15	57	35,417
Ireland	-0.15	13	0.19	14	40	56,902
Italy	-0.10	6	0.08	6	66	56,931
Lithuania	-0.52	33	0.47	26	56	33,794
Portugal	-0.23	20	0.17	13	67	53,831
Slovakia	-0.26	16	0.23	13	58	38,001
Turkey	-0.20	9	0.20	7	50	32,209

Source: Eurobarometers, 1991-2021. Controls are year dummies and gender and country dummies in the 'all' equations

Table 3. 4-step Life satisfaction in 12 European countries 1991-2021, with controls for year and gender, education and labor force status, age<70 - Eurobarometers

Country	Age*10	T	Age^2*1000	T	Minimum	N
All 12	-0.25	47	0.26	42	49	478,604
Belgium	-0.24	15	0.29	16	41	51,173
Bulgaria	-0.27	11	0.22	8	61	34,048
Czechia	-0.17	9	0.17	8	51	36,897
Estonia	-0.33	18	0.33	16	51	31,003
Finland	-0.24	15	0.26	15	47	39,836
Hungary	-0.34	15	0.35	14	50	34,271
Ireland	-0.15	11	0.22	14	35	53,346
Italy	-0.09	6	0.08	4	62	52,788
Lithuania	-0.48	21	0.46	18	53	31,657
Portugal	-0.16	11	0.14	8	58	49,690
Slovakia	-0.27	13	0.26	11	52	36,343
Turkey*	-0.30	10	0.31	8	48	28,492

Source: Eurobarometers, 1991-2021, *=Non EU-27, including UK from 2021. Controls are year dummies and gender and country dummies in the 'all' equation

Table 4. 11-step happiness for 12 European countries, Sweeps 1-9 European Social Surveys with year and gender controls, age<70

Country	Age*10	T	Age^2*1000	T	Minimum	N
All 12	0.35	17	0.21	9	86	134828
Belgium	-0.24	5	0.24	4	48	13,900
Bulgaria	-1.00	9	0.61	5	82	8,291
Czechia	-0.51	8	0.36	5	71	15,217
Estonia	-0.13	2	-0.18	2	n/a	12,563
Finland	-0.02	0	-0.03	1	n/a	15,167
Hungary	-0.66	8	0.40	4	83	12,422
Ireland	-0.52	9	0.64	9	41	17,217
Italy	-0.22	3	0.09	1	n/a	7,473
Lithuania	-0.44	5	0.08	1	n/a	7,912
Portugal	-0.45	7	0.23	3	99	12,456
Slovakia	-0.49	6	0.30	3	83	8,318
Turkey	-0.81	5	0.96	5	42	3,892

Source: European Social Surveys sweeps 1-9. Controls are year dummies and gender and country dummies in the 'all' equations

Table 5. 11-step happiness, sweeps 1-9 European Social Surveys for 39 European countries with year, gender, education and labor force status controls, age<70

Country	Age*10	T	Age^2*1000	T	Minimum	N
All 12	-0.55	19	0.49	15	56	133,949
Belgium	-0.42	6	0.48	6	44	13,846
Bulgaria	-1.11	7	0.82	5	68	8,282
Czechia	-0.56	6	0.48	4	58	14,988
Estonia	-0.46	5	0.29	3	79	12,545
Finland	-0.35	6	0.38	5	46	15,158
Hungary	-0.81	7	0.67	5	61	12,299
Ireland	-0.63	9	0.80	10	39	17,063
Italy	-0.36	3	0.26	2	70	7,405
Lithuania	-0.55	4	0.34	2	81	7,874
Portugal	-0.49	5	0.33	3	74	12,422
Slovakia	-0.53	4	0.42	3	63	8,188
Turkey	-0.79	4	0.90	4	44	3,879

Source: European Social Surveys sweeps 1-9. Controls are year dummies and gender and country dummies in the 'all' equations

Chart 1. Age-specific mortality rates for deaths related to drug misuse, England and Wales, registered between 1993 and 2019. Source: Office for National Statistics, Deaths Related to drug poisoning in England and Wales: 2019 registrations, October 2020

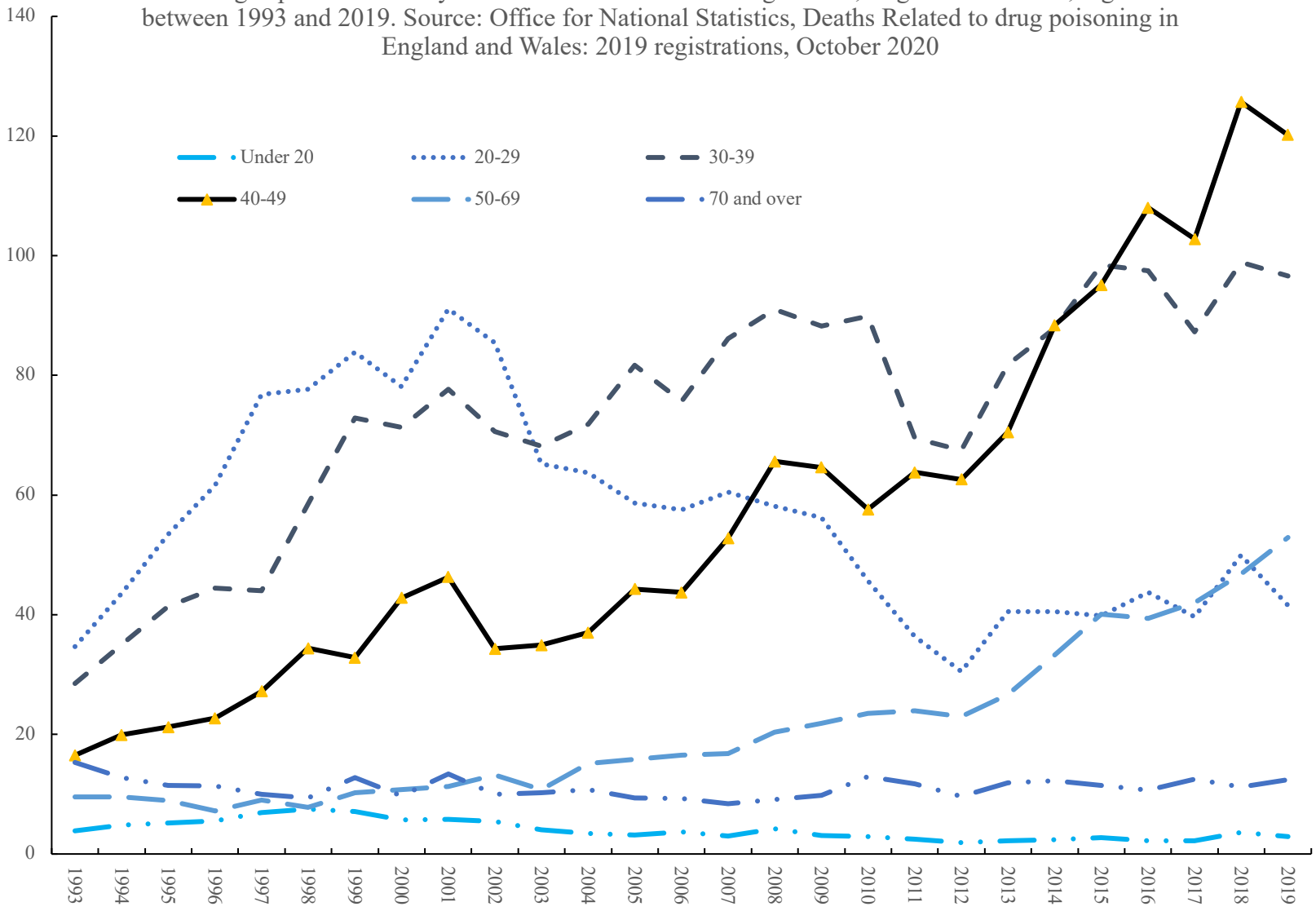


Chart 2. Single year of age life satisfaction, Eurobarometers, 1991-2021, for Bartram 12 ages 15-99

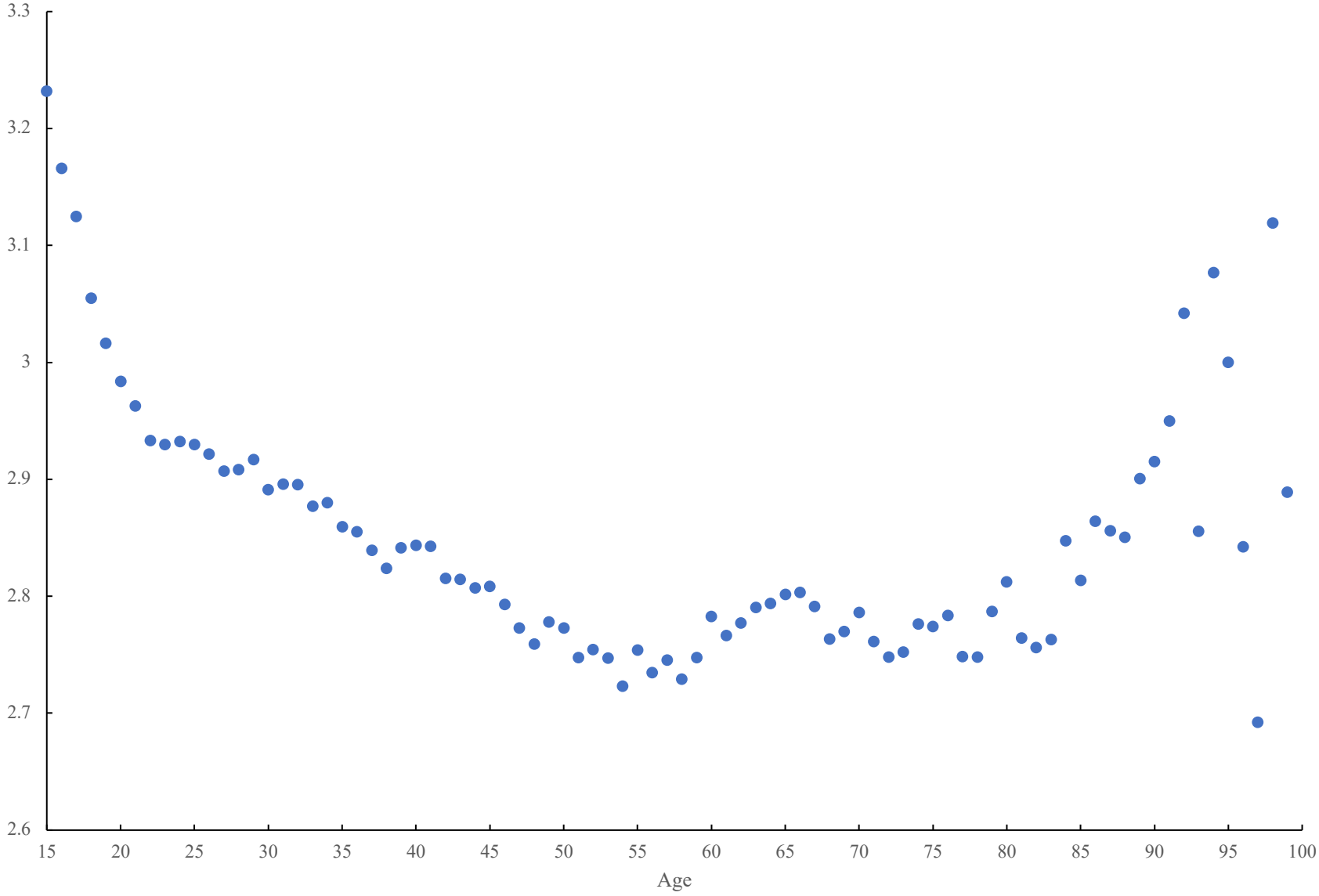


Chart 3. Sample size, Eurobarometer, 1991-2021, Bartram 12

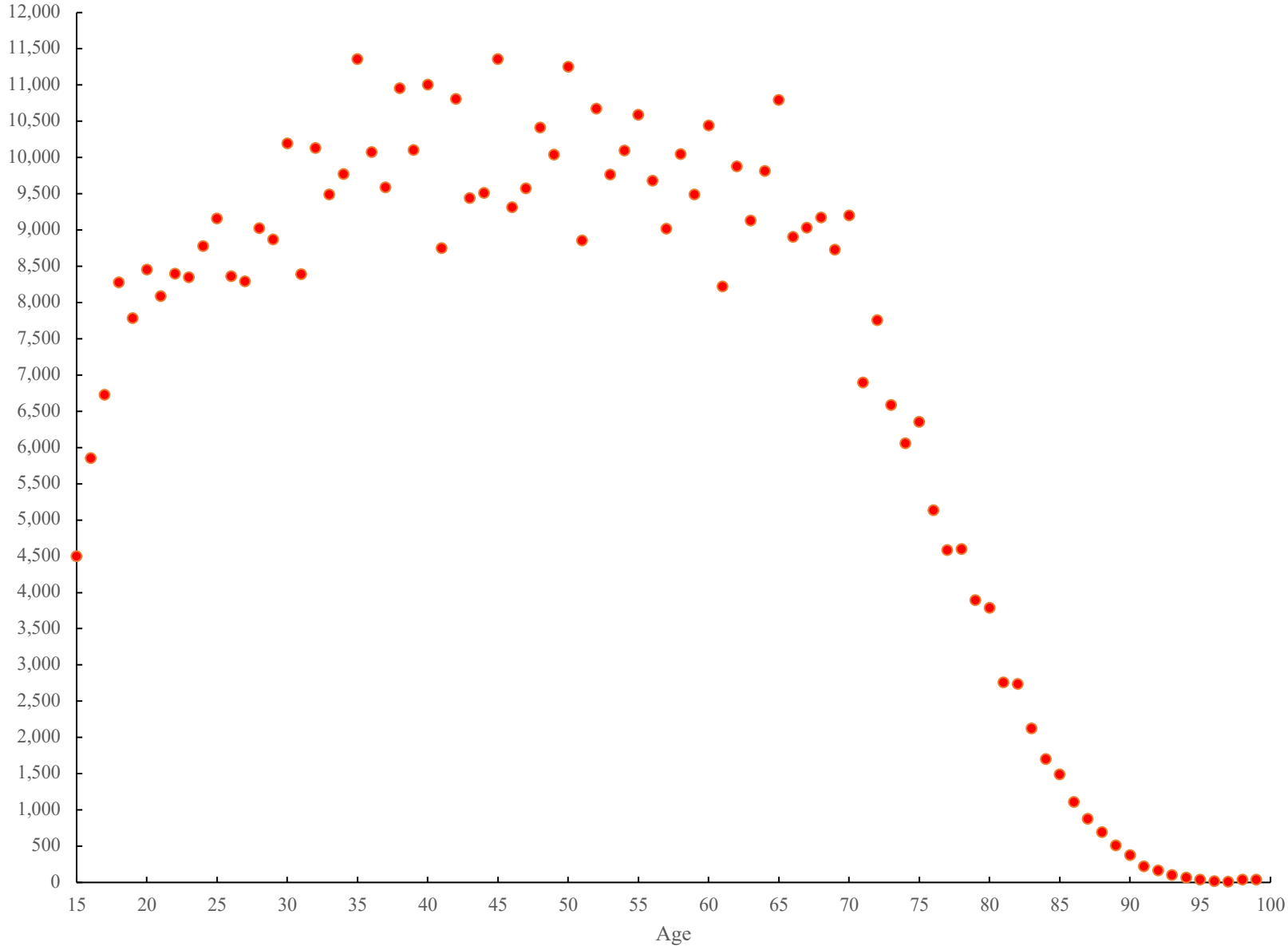
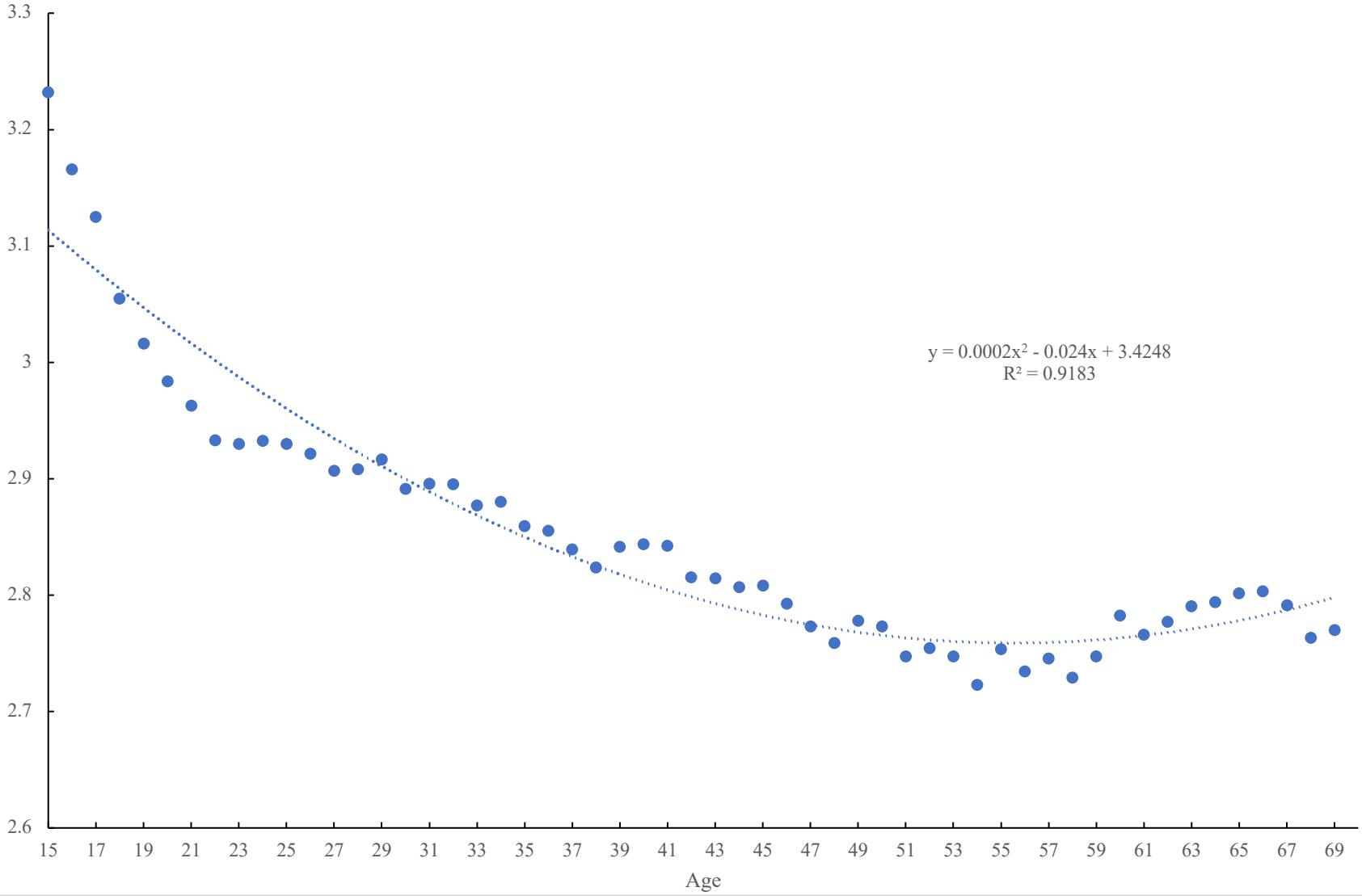


Chart 4. U-shape quadratic Eurobarometers 1991-2021, Bartram 12, age<70



Appendix Table 1. Distribution of happiness responses by country and wave, ESS Waves 1-9

Country	2002	2004	2006	2008	2010	2012	2014	2016	2018	Total
Albania	0	0	0	0	0	1,201	0	0	0	1,201
Austria	2,257	2,256	2,405	0	0	0	1,795	2,010	2,499	13,222
Belgium	1,899	1,778	1,798	1,760	1,704	1,869	1,769	1,766	1,767	16,110
Bulgaria	0	0	1,400	2,230	2,434	2,260	0	0	2,198	10,522
Swiss	2,040	2,141	1,804	1,819	1,506	1,493	1,532	1,525	1,542	15,402
Cyprus	0	0	995	1,215	1,083	1,116	0	0	781	5,190
Czechia	1,360	3,026	0	2,018	2,386	2,009	2,148	2,269	2,398	17,614
Germany	2,919	2,870	2,916	2,751	3,031	2,958	3,045	2,852	2,358	25,700
Denmark	1,506	1,487	1,505	1,610	1,576	1,650	1,502	0	0	10,836
Estonia	0	1,989	1,517	1,661	1,793	2,380	2,051	2,019	1,904	15,314
Spain	1,729	1,663	1,876	2,576	1,885	1,889	1,925	1,958	1,668	17,169
Finland	2,000	2,022	1,896	2,195	1,878	2,197	2,087	1,925	1,755	17,955
France	1,503	1,806	1,986	2,073	1,728	1,968	1,917	2,070	2,010	17,061
GB	2,052	1,897	2,394	2,352	2,422	2,286	2,264	1,959	2,204	19,830
Greece	2,566	2,406	0	2,072	2,715	0	0	0	0	9,759
Croatia	0	0	0	1,484	1,649	0	0	0	1,810	4,943
Hungary	1,685	1,498	1,518	1,544	1,561	2,014	1,698	1,614	1,661	14,793
Ireland	2,046	2,286	1,800	1,764	2,576	2,628	2,390	2,757	2,216	20,463
Israel	2,499	0	0	2,490	2,294	2,508	2,562	2,557	0	14,910
Iceland	0	579	0	0	0	752	0	880	0	2,211
Italy	1,207	1,529	0	0	0	960	0	2,626	2,745	9,067
Lithuania	0	0	0	0	1,677	2,109	2,250	2,122	1,835	9,993
Luxembourg	1,552	1,635	0	0	0	0	0	0	0	3,187
Latvia	0	0	1,960	1,980	0	0	0	0	918	4,858
Montenegro	0	0	0	0	0	0	0	0	1,200	1,200
Netherlands	2,364	1,881	1,889	1,778	1,829	1,845	1,919	1,681	1,673	16,859
Norway	2,036	1,760	1,750	1,549	1,548	1,624	1,436	1,545	1,406	14,654
Poland	2,110	1,716	1,721	1,619	1,751	1,898	1,615	1,694	1,500	15,624
Portugal	1,511	2,052	2,222	2,367	2,150	2,151	1,265	1,270	1,055	16,043
Romania	0	0	2,139	2,146	0	0	0	0	0	4,285
Serbia	0	0	0	0	0	0	0	0	2,043	2,043
Russia	0	0	2,437	2,512	2,595	2,484	0	2,430	0	12,458
Sweden	1,999	1,948	1,927	1,830	1,497	1,847	1,791	1,551	1,539	15,929
Slovenia	1,519	1,442	1,476	1,286	1,403	1,257	1,224	1,307	1,318	12,232
Slovakia	0	1,512	1,766	1,810	1,856	1,847	0	0	1,083	9,874
Turkey	0	1,856	0	2,416	0	0	0	0	0	4,272
Ukraine	0	2,031	2,002	1,845	1,931	2,178	0	0	0	9,987
Kosovo	0	0	0	0	0	1,295	0	0	0	1,295
Total	42,359	49,066	47,099	56,752	52,458	54,673	40,185	44,387	47,086	434,065

Appendix Table 2. Life satisfaction in 37 European countries (EU27+10), 1991-2021, with controls for year and gender age<70

Country	Age*10	T	Age^2*1000	T	Minimum	N
All	-0.23	94	0.21	75	54	1,381,122
Albania*	-0.14	5	0.04	1	n/a	14,432
Austria	-0.10	8	0.09	6	57	49,217
Belgium	-0.20	17	0.21	16	46	54,846
Bulgaria	-0.23	14	0.13	7	88	35,732
Croatia	-0.27	16	0.21	10	66	33,910
Cyprus	-0.32	14	0.28	11	57	17,577
Czechia	-0.19	14	0.16	11	60	38,782
Denmark	-0.09	9	0.11	10	40	51,746
Eire	-0.15	13	0.19	14	40	56,902
Estonia	-0.26	18	0.20	12	65	32,707
Finland	-0.15	13	0.14	16	54	43,650
France	-0.32	26	0.32	29	50	54,042
Germany	-0.20	21	0.22	20	45	91,217
Greece	-0.31	22	0.24	15	66	54,932
Hungary	-0.32	19	0.28	15	57	35,417
Iceland*	-0.08	3	0.07	2	59	4,991
Italy	-0.10	6	0.08	6	66	56,931
Kosovo*	-0.36	6	0.39	5	46	1,981
Latvia	-0.45	32	0.40	25	56	37,290
Lithuania	-0.52	33	0.47	26	56	33,794
Luxembourg	-0.07	5	0.10	6	36	29,147
Macedonia*	-0.41	17	0.41	15	49	24,118
Malta	-0.18	8	0.15	6	60	16,450
Montenegro*	-0.14	4	0.08	2	96	11,518
Netherlands	-0.16	16	0.17	14	48	55,322
Norway*	-0.07	3	0.08	3	43	9,932
Poland	-0.21	15	0.15	9	71	35,421
Portugal	-0.23	20	0.17	13	67	53,831
Romania	-0.16	10	0.07	4	112	37,789
Serbia*	-0.33	12	0.27	9	60	16,124
Slovakia	-0.26	16	0.23	13	58	38,001
Slovenia	-0.22	16	0.17	11	64	34,577
Spain	-0.25	21	0.25	18	51	54,162
Sweden	-0.13	11	0.15	11	43	45,016
Turkey*	-0.20	9	0.20	7	50	32,209
Turkish Cyprus*	-0.33	12	0.35	10	48	18,034
UK*	-0.23	21	0.27	22	42	65,563

Source: Eurobarometers, 1991-2021, *=Non EU-27, including UK from 2021. Controls are year dummies and gender and country dummies in the 'all' equation

Appendix Table 3. Life satisfaction in 37 European countries 1991-2021, with controls for year and gender, education and labor force status, age<70

Country	Age*10	T	Age^2*1000	T	Minimum	N
All 37	-0.26	81	0.28	74	47	1,293,421
Albania*	-0.24	6	0.19	4	62	13,876
Austria	-0.11	7	0.12	6	48	45,231
Belgium	-0.24	15	0.29	16	41	51,173
Bulgaria	-0.27	11	0.22	8	61	34,048
Croatia	-0.26	11	0.22	8	59	32,280
Cyprus	-0.31	9	0.33	9	46	16,964
Czechia	-0.17	9	0.17	8	51	36,897
Denmark	-0.23	17	0.29	20	39	47,321
Eire	-0.15	11	0.22	14	35	53,346
Estonia	-0.33	18	0.33	16	51	31,003
Finland	-0.24	15	0.26	15	47	39,836
France	-0.30	18	0.32	16	48	50,997
Germany	-0.18	16	0.23	17	40	85,872
Greece	-0.25	13	0.19	9	64	51,814
Hungary	-0.34	15	0.35	14	50	34,271
Iceland*	-0.24	6	0.25	6	48	4,409
Italy	-0.09	6	0.08	4	62	52,788
Kosovo*	-0.31	4	0.35	3	44	1,757
Latvia	-0.50	26	0.50	22	51	35,698
Lithuania	-0.48	21	0.46	18	53	31,657
Luxembourg	-0.07	3	0.10	4	32	26,910
Macedonia*	-0.32	10	0.33	9	49	22,458
Malta	-0.19	7	0.21	7	45	15,849
Montenegro*	-0.19	4	0.13	2	72	32,280
Netherlands	-0.26	17	0.31	18	42	52,166
Norway*	-0.20	6	0.27	7	38	8,722
Poland	-0.27	14	0.25	11	54	33,546
Portugal	-0.16	11	0.14	8	58	49,690
Romania	-0.16	7	0.12	5	67	35,976
Serbia*	-0.27	7	0.23	5	60	15,082
Slovakia	-0.27	13	0.26	11	52	36,343
Slovenia	-0.21	11	0.18	8	58	32,926
Spain	-0.22	15	0.24	13	47	50,599
Sweden	-0.26	17	0.30	18	42	41,790
Turkey*	-0.30	10	0.31	8	48	28,492
Turkish Cyprus*	-0.26	7	0.28	6	47	16,796
UK*	-0.28	22	0.37	24	38	61,354

Source: Eurobarometers, 1991-2021, *=Non EU-27, including UK from 2021. Controls are year dummies and gender and country dummies in the 'all' equation

Appendix Table 4. 11-step happiness for 39 European countries, Sweeps 1-9 European Social Surveys with year and gender controls, age<70

Country	Age*10	T	Age^2*1000	T	Minimum	N
All 39	-0.38	31	0.28	19	67	364480
Albania	-0.93	3	0.91	2	51	1062
Austria	-0.28	4	0.25	3	56	11,328
Belgium	-0.24	5	0.24	4	48	13,900
Bulgaria	-1.00	9	0.61	5	82	8,291
Swiss	-0.18	3	0.20	3	45	13,142
Cyprus	-0.29	3	0.21	2	71	4,348
Czechia	-0.51	8	0.36	5	71	15,217
Germany	-0.44	9	0.46	8	48	21,842
Denmark	-0.77	1	0.14	2	n/a	9,340
Estonia	-0.13	2	-0.18	2	n/a	12,563
Spain	-0.42	8	0.33	5	64	14,483
Finland	-0.02	0	-0.03	1	n/a	15,167
France	-0.52	8	0.41	6	63	14,122
GB	-0.69	12	0.83	11	42	16,036
Greece	-0.57	6	0.40	4	71	8,074
Croatia	-0.47	3	0.21	1	n/a	3,981
Hungary	-0.66	8	0.40	4	83	12,422
Ireland	-0.52	9	0.64	9	41	17,217
Israel	-0.29	4	0.18	2	77	12,609
Iceland	-0.15	1	0.25	2	n/a	1,916
Italy	-0.22	3	0.09	1	n/a	7,473
Kosovo	-1.13	4	0.92	3	61	1,168
Lithuania	-0.44	5	0.08	1	n/a	7,912
Luxembourg	-0.52	4	0.67	4	39	2,837
Latvia	-0.45	4	0.12	1	n/a	4,033
Montenegro	-0.40	2	0.27	1	n/a	1,054
Netherlands	-0.26	5	0.27	5	48	14,219
Norway	-0.28	5	0.34	6	41	12,932
Poland	-0.34	5	0.11	1	n/a	13,603
Portugal	-0.45	7	0.23	3	99	12,456
Romania	-0.54	4	0.31	2	86	3,598
Serbia	-0.71	3	0.42	2	85	1,610
Russia	-0.60	7	0.38	4	80	10,545
Sweden	-0.22	4	0.28	5	39	1,333
Slovenia	-0.23	3	-0.07	1	n/a	10,383
Slovakia	-0.49	6	0.30	3	83	8,318
Turkey	-0.81	5	0.96	5	42	3,892

Appendix Table 5. 11-step happiness, sweeps 1-9 European Social Surveys for 39 European countries with year, gender, education and labor force status controls, age<70

Country	Age*10	T	Age^2*1000	T	Minimum	N
All 39	-0.60	36	0.58	30	52	361,825
Albania	-0.66	1	0.47	1	n/a	1,050
Austria	-0.37	4	0.32	3	59	11,291
Belgium	-0.42	6	0.48	6	44	13,846
Bulgaria	-1.11	7	0.82	5	68	8,282
Swiss	-0.34	5	0.38	5	44	13,046
Cyprus	-0.36	2	0.31	2	58	4,307
Czechia	-0.56	6	0.48	4	58	14,988
Germany	-0.75	11	0.84	11	45	21,699
Denmark	-0.37	5	0.49	6	37	9,187
Estonia	-0.46	5	0.29	3	79	12,545
Spain	-0.50	6	0.44	5	57	14,390
Finland	-0.35	6	0.38	5	46	15,158
France	-0.65	7	0.56	5	59	14,105
GB	-0.58	7	0.73	8	40	15,977
Greece	-0.69	6	0.53	4	65	8,071
Croatia	-0.75	4	0.62	3	61	3,951
Hungary	-0.81	7	0.67	5	61	12,299
Ireland	-0.63	9	0.80	10	39	17,063
Israel	-0.39	5	0.34	4	58	12,382
Iceland	-0.36	2	0.49	3	37	1,838
Italy	-0.36	3	0.26	2	70	7,405
Kosovo	-1.06	3	0.93	2	57	1,153
Lithuania	-0.55	4	0.34	2	81	7,874
Luxembourg	-0.63	3	0.85	4	37	2,716
Latvia	-0.60	4	0.36	2	83	4,015
Montenegro	-0.61	2	0.50	2	61	1,044
Netherlands	-0.37	6	0.42	6	44	14,142
Norway	-0.43	6	0.50	6	43	12,873
Poland	-0.56	6	0.44	4	63	13,547
Portugal	-0.49	5	0.33	3	74	12,422
Romania	-0.78	4	0.65	3	60	3,544
Serbia	-0.54	2	0.25	1	n/a	1,604
Russia	-0.67	6	0.50	4	67	10,532
Sweden	-0.35	5	0.40	5	44	13,301
Slovenia	-0.50	5	0.32	3	79	10,110
Slovakia	-0.53	4	0.42	3	63	8,188
Turkey	-0.79	4	0.90	4	44	3,879

Appendix 6. 600 papers finding U-shapes in age in well-being

A) 570 papers in journals

1). Abokyi, E, Strijker, D, Asiedu, K.F. et al. (2021), Buffer stock operations and well-being: the case of smallholder farmers in Ghana, *Journal of Happiness Studies*, 23: 125–148

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3). Ahmed Lahsen, A, Piper, A.T. (2019), Property rights and intellectual property protection, GDP growth and individual well-being in Latin America, *Latin American Economic Review*, 28, 12.

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7). Akay, A, A. Constant, C. Giulietti and·Guzi, M. (2017), 'Ethnic diversity and well-being,' *Journal of Population Economics*, 30: 265-306.

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16). Antoni, D., G., Franco, C. (2022) The effect of technological behaviour and beliefs on subjective well-being: the role of technological infrastructure. *Journal of Evolutionary Econo*mics**, 32;** 553–590.

17). Appleton, S, and Song, L. (2008), Life satisfaction in urban China: components and determinants, *World Development*, 36: 2325–2340.

18). Arrondo, R, Cárcaba, A. and González, E. (2020), Drivers of subjective well-being in Spain: are there gender differences? *Applied Research in Quality of Life*.

19). Arrosa, M.L, Gandelman, N. (2016), Happiness decomposition: female optimism, *Journal of Happiness Studies*, 17: 731–756.

20). Artés, J, Salinas-Jiménez, and M.M. Salinas-Jiménez, J. (2014), Small fish in a big pond or big fish in a small pond? The effects of educational mismatch on subjective wellbeing, *Social Indicators Research*, 119: 771–789.

21). Asadullah, M. N, Xiao, S, and Yeoh, E. (2018), Subjective well-being in China, 2005–2010: The role of relative income, gender, and location, *China Economic Review*, 48: 83–101.

22). Ateca-Amestoy, V, Aguilar, A.C. and Moro-Egido, A.I, (2014), Social interactions and life satisfaction: evidence from Latin America, *Journal of Happiness Studie*s, 15: 527–554.

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