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THE MID-LIFE DIP IN WELL-BEING: ECONOMISTS (WHO FIND IT) VERSUS PSYCHOLOGISTS (WHO DON'T)!

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ABSTRACT

A number of studies – including our own – find a mid-life dip in well-being. We review a psychology literature that claims that the evidence of a U-shape is "overblown" and if there is such a decline it is "trivial". We find remarkably strong and consistent evidence across countries and US states that statistically significant U-shapes exist with and without socio-economic controls. The US is somewhat of an outlier with evidence of an early uptick in the raw data with some variables – but not in others – that disappears when controls are included. We show that two of the studies cited by psychologists suggesting there are no U-shapes are in error; we use their data and find the opposite. The effects of the mid-life dip are comparable to major life events like losing a spouse, losing a job or getting cancer. They are clearly not inconsequential.

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Several economic studies, including our own[1], have recently found evidence of a significant and empirically large downturn in human well-being during the mid-life years – so-called "happiness curves" (Rauch, 2018). Early work was based on life satisfaction and happiness data; the research now extends to trends in unhappiness, stress, lack of sleep, depression, and even suicide (Daly et al, 2011) and across multiple data sets (Blanchflower, 2020a, 2020b). There is within-person evidence of a U-shape from longitudinal surveys which focuses on changes in life satisfaction as a linear function of individual age (Cheng, Powdthavee and Oswald, 2017). Controlling for cohort effects has little or no impact on the U-shape (Clark, 2019 and Blanchflower, 2020b). There is a hill-shape in anti-depressant use which maximizes in the mid-40s in European countries (Blanchflower and Oswald, 2016). The U-shape pattern in mid-life even extends beyond humans to apes (Weiss et al., 2012).

Blanchflower (2020c), based on the U.S. Behavioral Risk Factor Surveillance System surveys (2013- 2018), finds a hill-shape in lack of sleep that maximizes in mid-life and a U-shape in sleep duration that minimizes in mid-life which tracks closely with trends in reported depression. While this is based on cross section data, making it difficult to tease out the direction of causality, several studies have shown that not getting enough sleep at night is generally associated with daytime sleepiness and fatigue, depressed mood, poor daytime functioning, and other health and safety problems (see for example, Roehrs et al., 1983).

Most recently, the increases in the U.S. deaths of despair due to drugs, alcohol, and suicide occur precisely in the middle-aged, 35-64 years (Case and Deaton, 2015, 2020). 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). A recent analysis by the OECD in How's Life, 2020 shows that deaths of despair, by suicide, alcohol abuse or drug overdoses are higher in ten OECD countries – Slovenia; Lithuania; Latvia; Korea; Denmark; Belgium; Hungary; Austria; Finland and Poland - than they are in the United States.[2] Chronic depression and suicide occur disproportionately at mid-life in Europe also (Blanchflower, 2020b).

[1] We have published papers on the U-shape in well-being for over a period of nearly two decades including Blanchflower (2020a, 2020b, 2020c); Blanchflower and Oswald (2019; 2016; 2009; 2008; 2004a and 2004b; Blanchflower, Oswald and Stewart-Brown, (2013) and Graham, C., (2017, 2009); Graham, Eggers and Sukhtankar (2004); Graham, Laffan and Pinto (2018); Graham and Pettinato (2002) and Graham and Ruiz-Pozuelo (2017).

[2] Rates from their Figure 5.5 are as follows per 100,000 population, 2016 (%)

	Suicide	Acute alcohol abuse.	Drug overdose	All
SVN	18.1	10.7	0.2	29.0
LTU	26.7	0.8	0.1	27.6
LVA	18.1	8	0.2	26.3
KOR	24.6	1.5	0	26.1
DNK	9.4	10.5	0.5	20.4
BEL	15.9	3	0.5	19.4
HUN	16.2	3.2	0	19.4
AUT	12.2	4.8	1.1	18.1
FIN	13.9	3.3	0.9	18.1
POL	11.6	6.2	0	17.8
USA	13.9	2.8	0.9	17.6

Yet a few prominent papers in psychology and economics dismiss the mid-life downturn as an illusion. A recent review by Ulloa et al. (2013) goes as far as to draw the conclusion that "*extant studies … show either a U-shaped, inverted U-shaped or linear relation between ageing and subjective well-being.*" Myers (2000, p. 58) argued that "*Although many people believe there are unhappy times of life– times of adolescent stress, midlife crisis, or old age decline – repeated surveys across the industrialized world reveal that no time in life is notably happiest and most satisfying*". In contrast, Michael Argyle, concluded that studies of life satisfaction found happiness increased with age (Argyle, 1999, 2001). Palmore and Luikhart (1972) argue that age has little or no relationship with life satisfaction.

Many of the earlier studies cited in the psychology literature though were based on very small samples such as Prenda and Lachman (2001) (n=2974), Charles et al (n=2804); Mroczek and Kolarz (n=2727); Mroczek and Spiro (n=1927), Hamarat et al (with 95 observations); Carstensen et al (2011) (n=184 in one sample and n=194 in another). Helson and Lohnen (1998) (n=80) and Gross et al (1997) with four studies (study 1; n=127; study 2; n=49; study 3; n=82 and study 4; n=1080) and Freund and Baltes (1998) (n=206). Palmore and Luikhart (1972) (n=502 for ages 45-69). It is hard to say much of anything about statistical differences in well-being by age with sample sizes this small. Assuming the samples looked at are from age 20 to 70 with a sample size of 200 that averages about four people per age cell.

Easterlin (2003) claims "*happiness is greatest at midlife but not by a great deal. On average it rises somewhat as people progress from age 18 to 51 and declines thereafter*" (2006, p.471). A survey by Diener et al (1999, p. 291) concluded that "although a small decline in life satisfaction in age is often found the relation is eliminated when other variables such as income are controlled. More important to note is that other recent studies converge to show that life satisfaction often increases, or at least does not drop, with age." Diener and Su (1998) examined World Values Survey 2 data for 1994 and argued that the raw data on life satisfaction "*trended up slightly through ag*e." Deaton (2008) concluded that the U-shaped relation is present solely in rich, English-speaking countries in which the elderly is relatively satisfied with their lives. In his words, "*for most of the world, life satisfaction declines with age; the exceptions being among the very highest-income countries—including the United States, Canada, United Kingdom, Australia, and New Zealand—where life satisfaction is U-shaped with age, falling at first and rising after middle ag*e" (ibid., p. 8).

Even when U-shapes were found they were frequently dismissed as largely irrelevant and the scale of the effects were frequently classified as trivial. For example, Cantril (1965) is often cited as finding no evidence of a U-shape in well-being although his study in fact shows them. When asked to indicate their thoughts about their current life 24.2% of those age<29; 22.3% of those 30-49 and 29.3% of those 50+ responded in the high range! On the other hand, 27.5%, 29.1% and 25.2% responded in the low range of the ladder scale.[3] These look like U-shapes.

In order to illustrate orders of magnitude of such changes, Blanchflower and Oswald (2004b) assess their relative size in money terms. The relative size of any two coefficients from happiness equations provides information about how one variable would have to change to maintain well-being constant when the other changes. To 'compensate' for a major event such as being widowed

[3] As reported in Diener and Suh (1998), p. 307.

or separated, an individual would need an additional $100,000 per annum. To 'compensate' men for unemployment would take a rise in income at the mean of $60,000. In comparison, the fall in well-being from youth to mid-life is also substantial.

Diener et al (1999) citing Ingelhardt (1990) went on to argue that "*international studies based on representative samples from multiple countries also show that life satisfaction does not decline with age*." Myers (1992), for example, had also argued that Ingelhardt showed that "*age differences in well-being were trivial. Does happiness then align itself more with any particular age? Do young adults have more fun? Surprisingly, and definitely, not*" (p.69). Ingelhardt (1990) examined well-being across sixteen nations using data from Eurobarometers #13-#26 (April 1980-November 1986) and the World Values Survey on the United States, Canada, Hungary and Japan for 1981-1982 and argued that there was "little variation by age" in well-being (p.224). He did, however, note that "*we do find a slight curvilinear tendency with both indicators, such that satisfaction and happiness decline slightly from the youngest to the middle-aged groups and then rise again among the oldest group*."

It turns out though that in the raw data Ingelhardt reported on page 225, there were obvious U-shapes in age for nine of the sixteen countries as well as overall in happiness.[4] Using happiness from Eurobarometers #18 and #19 and modelling who said very happy and controlling for income, occupation, education, nationality and marital status he found the following pattern by age: 15-24=21%; 25-34=21%; 35-44=19%; 45-54=21% and 65+=29%. More on this below where we use the same data and conclude there are indeed substantive U-shapes in age using the same data contrary to the claims of what appears to be a generation of psychologists.

It does appear that the US looks different in the raw data than other countries. There is some evidence in the raw data, especially using the happiness data from the General Social Survey, that there is an uptick in well-being initially to around age thirty before it drops and the picks up again (Blanchflower and Oswald, 2019).[5] There is a similar finding in the life satisfaction data available in the BRFSS from 2006-2010 and as we show with the Gallup Daily Tracker. We find something quite different in the Gallup US Daily Tracker Poll when we look at other (bivariate) well-being measures including happiness; enjoyment; smiling and laughing; sadness; depression and pain.

Given the reach of this phenomenon across a large proportion of the world's population, and its association with other behaviors that are indicative of poor psychological and physical health, we believe it is important to resolve this debate, or at the least present significant evidence from our most recent work, as well as that of earlier studies, that makes it difficult to refute that the mid-life dip is significant in terms of statistics and in human experience.

To control or not to control?

[4] From Table 7.4 there are U-shapes in age for the following with % very happy at 15-24 and 45-54 and 65+ in parentheses overall (24, 21, 23); Netherlands (47, 38, 45); Denmark (39, 32*, 34); Canada (39, 26, 36); Ireland (32, 29, 39); Belgium (29, 23, 26); Spain (25, 19, 22); France (19, 10, 14); Italy (12, 8, 10) Greece (12, 10, 13) *=age 55-64

[5] In the raw data in the GSS if we score happiness on a 1-3 scale, happiness by age is as follows 18=2.09; 19=2.10; 20=2.12; 21=2.12; 23=2.14; 25=2.17; 26= 2.16; 27=2.18; 28=2.21; 29=2.21; 30=2.18; 31=2.17 32=2.21; 33=2.22; 34=2.22; 39=2.19; 43=21.7 etc.

In a recently published paper in *Psychological Science* by Jebb, Morrison, Tay and Diener (2020) henceforth JMTD, examined age and three measures of well-being, using data from the 2005-2016 Gallup World Poll (GWP). JMTD look at unadjusted, raw patterns in the data, yet compare those to general patterns from regressions with a battery of socio-economic controls in papers such as Blanchflower and Oswald (2008) and Graham and Ruiz- Pozuelo (2017). As such, they are not comparing like with like. Each of these specifications captures different things. Specifications *with* controls capture the pure effects of aging, controlling for the confounding well-being effects of things that may change as people age. The specification without controls captures the effects of aging *and* these confounding factors. Neither specification is right or wrong, rather they are addressing different questions, something we will explore in greater detail below on whether to include controls or not.

Several authors, in addition to JMTD, such as Glenn (2009), have argued against the inclusion of control variables. Easterlin (2011) has also made the case that the well-being effects of aging should be analyzed without controlling for confounding factors. Deaton (2018) critiqued the use of controls: "*A weightier argument is that many possible and potentially important controls are age dependent, including income and the presence of children but especially health, disability and marital status. If we adjust for these and find, for example, relatively high SWB among the elderly, we have uncovered the not very interesting fact that people in their 70s would rate their lives highly if they were in prime health, and if their lost friends and spouses were returned to them.*"

We disagree that adding controls is simply equivalent to finding that those in their 70s would be happier if they were healthier or had not lost friends. The findings with controls show that the old are happier *despite* these other things that may have happened as they age. Yet whether we include controls or not, we still find significant evidence of U-shapes in well-being and hill-shapes in stress. Despite Deaton's (2018) critique, Stone, Schwarz, Deaton and Steptoe (2010) reported U-shape relations, using the 2008 GWP with *and* without controls – for employment, having a partner and/or a child at home - in happiness and enjoyment, with a nadir around 50, a peak in worry at around 50, and in life satisfaction at the same age for men and women.

There is a separate issue, though, which is what question each specification (with and without controls) is addressing. As noted above there are two broad ways to analyze the paper's scientific issue within this cross-section tradition. Blanchflower and Oswald (2019) noted that "*it is not natural to see either approach as the 'right' or 'wrong' one*". The reason is that they measure different things. In this paper we present results both ways. One set of writings has attempted to study raw numbers on well-being and age – a descriptive approach. A second, including Blanchflower and Oswald (2008), has examined the patterns in regression equations for well-being – a ceteris-paribus analytical approach. The latter kind of methods are standard in epidemiology and economics, where the tradition has been to try to understand the consequences of an independent variable (smoking, income, etc.) after adjusting for other influences on the dependent variable.

The descriptive approach measures the 'total', or reduced-form, effect of age. In contrast, the ceteris-paribus analytical approach measures the marginal effect of age after controlling for other socio-economic influences. For example, as people move from their 20s to their 50s, they typically become richer. Say, for illustrative purposes, they also become happier. The descriptive approach

would then ascribe the possible rise in their happiness over that period as due to age. The analytical approach would divide the possible rise in happiness into two components – that coming from income per se and any residual effect from ageing per se.

Blanchflower and Oswald (2009) gave the example of the relation between smoking and the probability of lung cancer. One set of estimates would look at the raw relation between smoking and disease probability, while the second adjusted for smoking plus diet, education, income and exercise. Compared to non-smokers, smokers tend to have worse diets and less education, income, and exercise. Thus "*if the aim is to describe the data, it is reasonable to leave out most or all control variables. ''Smokers die at rate Z'' is an acceptable statement to make. But that is not the same as ''smoking changes your risk by Z''. It would be an error to use the unadjusted equation to tell the public what smoking does to their health*."

There is a comparable issue in wage analysis. Assume a comparison of whether public sector workers are paid more than comparable private sector workers. We used 2018 Merged Outgoing Rotation Group Current Population Survey data, which is used to calculate a host of U.S. labor market variables (https://data.nber.org/cps/), and regressed weekly earnings on a public sector variable for a sample of 159,000 workers. The public sector coefficient is significant and *positive* (t-statistic = 23). Yet public sector workers are more qualified than private sector workers and work in different places, so it is appropriate to control for highest grade of education completed and state. Including a set of highest education variables and state dummies as controls, the public sector variable becomes *negative (*t-statistic = 14).[6] The higher pay of public sector workers in the raw data is attributable to their education and location, revealed by including controls, not to specifically working in the public sector.

In what follows we report estimates with and without controls to determine to what extent they make a difference on approximately 8 million people. We look at evidence on six different measures of happiness – 4-step life satisfaction; Cantril's 11-step ladder; 3-step happiness as well as binary variables indicating happiness; enjoyment and laughing and smiling yesterday using four major surveys – across countries in the Eurobarometers (1980-2019) and the Gallup World Poll (2005-2019) and across states Gallup's US Daily Tracker (2009-2017) as well as in the US Behavioral Risk Factor Surveillance System, 2005-2011. We find widespread evidence of U-shapes in well-being whether controls are included or not.

1. Eurobarometers

As noted earlier several studies in well-being in the psychology literature cited Ingelhardt (1990) as not finding a U-shape in happiness. As noted above Ingelhardt did find U-shapes in happiness in nine of the sixteen countries examined in his Tables 7.3-7.5. He used data from Eurobarometers #13-#26 (April 1980-November 1986) on twelve European countries. These data are available in the Mannheim trend file and so in Table 1 we report three sets of estimates. First, we examine life satisfaction as reported in his table 7.3 – this is the standard Eurobarometer 4-step question (n=97970).

[6] In the first equation (n=159,999) with the dependent variable log of weekly pay on only the public sector dummy, the coefficient is +.166 (t=29) adjusted R^2=.0054. Then adding education and state controls with the same sample size the coefficient becomes -.011 (t=2.1), adjusted R^2 =.1797.

Q1. On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead? Very satisfied=4; Fairly satisfied=3; Not very satisfied=2; Not at all satisfied=1.

We then turn to 3-step happiness which has half as many observations (n=49836)

Q2. Taking all things together, how would you say things are these days - would you say you're very happy =1, fairly happy=2 or not too happy-3 these days?

In part 1) of the table we report on the results of estimating country level equations with the same data that contains year dummies plus age and its square. We also report an overall equation that includes country dummies that has a midpoint of 47 there are significant U-shapes in 9/12 countries. Adding controls in part 2) there are significant U-shapes in all twelve. We then go to part 3) when we use the happiness variable with controls and there are U-shapes in all twelve again. To get a sense of the scale of the drop, in the raw data life satisfaction was 3.24 at age 15 falling to 2.95 at age 48. Being married had an average score of 3.08 versus 2.93 for widowed, so the drop, in life satisfaction to midlife was double the drop from losing a spouse. Hardly trivial.

Diener and Suh (1998) cite work by Okma and Veenhoven (1996), henceforth OV that does not seem to have ever been published and we have not been able to find a copy, but which according to Diner and Suh also used the Eurobarometers for 8 nations in the Eurobarometers between 1980 and 1990. They argue that Okma and Veenhoven "*showed an almost flat line with age. From around age 18 to 90 there was almost no change in life satisfaction*". So, we went back to analyze these same Eurobarometer files for 1980 through 1990 which are also part of the publicly available Mannheim Trend file. They cover Eurobarometers #13 through #34.1, noting that not all of the surveys over this period contain the life satisfaction question. It is unclear which eight nations were the focus of the OV study, so we examine nine nations for which there are at least 20,000 observations over this time period – France; Belgium; Netherlands; Germany; Italy; Denmark; Ireland: UK and Greece so there are 207,558 observations in total.[7] The life satisfaction question is the same as that used in Q1 above.

Across these nine nations the average score for those under 20 was 3.14, reaching a low point of 2.97 at age 54 and then rising to 3.20 at age 90. So, it is true that life satisfaction scores at age 90 are not that different from age 18 but that ignores the midlife drop. Without out controls there is a well-defined nadir in well-being in age controlling for year and nation that minimizes at age 48 and also one with controls – for gender, education, marital and labor force status - that minimizes at age 43.

	Age	Age^2	Minimum	N
No controls	-.009752 (20.50)	.000101 (19.74)	48	207,363
With controls	-.015258 (24.58)	.000176 (26.66)	43	207,363

It seems then that Diener and Suh (1998) were incorrect claiming there was a flat line in age from age 18 to 90 across these nations. The decline in life satisfaction from under 20 to age 48 of .17 is about the same as a fall in life satisfaction of .16 from married (3.10) to widowed (2.94). Not trivial.

[7] Diener and Suh claim there were 300,000 observations but we were unable to confirm that.

In a recent article Morgan and O'Connor (2017), henceforth MO, examined Eurobarometer data for 17 countries for the years 1973-2016 and argued that there is a M-shape in age rather than a U-shape after controlling for country; year, cohort and education effects (Blanchflower, 2020d). This stands in marked contrast to findings in Blanchflower and Oswald (2008 and 2019) and Blanchflower and Clark (2019) using the same Eurobarometer data that found U-shapes. MO argue there is a local maximum in life satisfaction around age 30, declining life satisfaction until around age 50 followed by rising life satisfaction, and then declining life satisfaction after age 75. This they claim traces out an M-shape in the data. It turns out that their results are driven by the fact that they exclude (happy) students from their analysis and sample. This M-shape is not there when students, who tend to report high levels of happiness, are included in the analysis.

We examined a pooled Eurobarometer file from 2009-2019 used in Blanchflower and Clark (2019) with around 1 million observations covering 37 European countries. Below are the life satisfaction scores of the young happy students in this 2009-2019 Eurobarometer file for those age 15-27 in the first column versus an overall average in the sample as a whole of 2.94. Without students, happiness rises with age, without them it falls.

	Student	With students	Without students
15	3.36	3.32	2.80
16	3.30	3.27	2.92
17	3.26	3.21	2.93
18	3.20	3.13	2.91
19	3.18	3.10	2.95
20	3.15	3.05	2.93
21	3.14	3.04	2.93
22	3.13	3.01	2.92
23	3.12	2.99	2.93
24	3.13	2.99	2.94
25	3.14	2.98	2.95
26	3.16	2.98	2.96
27	3.14	2.98	2.96

Students, account for 45% of those ages 27 and under in the sample. Life satisfaction is higher among students than among the other groups – working (37%); responsible for shopping (4%); unemployed (12%) and unable to work (2%). Happiness among students is especially high for ages 15, 16 and 17. Including students in the second column shows an obvious steady decline in happiness. Excluding them in the third column shows a steady rise in happiness which is what the M-shape is picking up. There is no good reason to drop the happy students.[8]

To show this another way we ran a series of life satisfaction regressions which included single year of age dummies as well as year and country dummies. In Chart 1 we did this first for the overall sample and then excluding students. We took the individual coefficients in each case and added them to the constant and plotted. There is the uptick among the young – the M-shape

[8] The authors argued that "*students were dropped from the sample because it is impossible to determine the final educational outcome of a student surveyed in cross sectional da*ta." This looks like a mistake.

reported by MO – which disappears when students are added to the raw data, and a clear U-shape emerges. The M-shape disappears once happy students are added to the sample.

Once controls are included – for gender, education, labor force and marital status plus year and country dummies there are U-shapes for both samples with and without happy young students. Chart 2 reports what happens when controls for marital and labor force status, cohort and education are added and the age coefficients once again are added to the constant and plotted. Both lines show clear U-shapes. The U-shape is sharper using the controls. The M-shape only occurs when controls are omitted in the no-student sample. The M-shape emerges in the MO paper because of the exclusion of young, happy students. There are U-shapes in the Eurobarometer data with and without controls over the entire period 1980-2019.

2. Gallup World Poll (2005-2019)

JMTD use the Cantril life satisfaction ladder question plus two conglomerate variables of positive and negative affect in their paper. These are the average of three and five dichotomous variables respectively. The authors do not explain why it is appropriate to average such variables and there is no previous literature using these composite affect variables. Moreover, the report of a National Academy of Sciences panel on well-being urges caution in aggregating well-being variables. Positive affect variables track similarly with each other, but negative affect variables are much less consistent (Stone and Mackie, 2013).[9] JTMD argue that "*much about the U shape has been overblown*". Further, the authors claim that a fall in well-being of below 1.0 (on an 11-point Likert scale) is "*trivial.*" Yet the units on this scale have no cardinal value, and the only basis for determining magnitudes is via comparisons with events that are known to be important in life. Changing the mean of a wellbeing distribution by 0.5, for example, is exceptionally difficult and as, we show, is equivalent to the effects of major life-changing events.

We disagree with the point about not controlling for confounding factors and discuss that issue in detail in the following section. Regardless, we find evidence of U shapes *with and without* controls in our analysis (below). Meanwhile, a host of papers, including Stone et al (2010), Steptoe, Deaton and Stone (2015), and Deaton (2018) used earlier sweeps of the same data as the authors and find U shapes. Blanchflower and Oswald (2009) found U-shapes in age in 72 developed and developing nations, and from seventy countries (2018). Blanchflower (2020a) finds significant U-curves for 132 developing and developed countries. Graham and Ruiz-Pozuelo (2017), used GWP data from 46 countries with at least 5000 observations and found U-shapes in life satisfaction with midpoints from 25-70 years for 44 countries, and hill curves for stress at 31. Hayo and Seifert (2003) found a U-shape in happiness in East Europe; Gerdtham and Johannesson (2001) find a U (aged 45-64) among Swedish adults. Di Tella et al (2003) find the same pattern across twelve European countries. Beja (2017) also found a U-shape studying 95 countries in the 1995-2014 WVS data. All of these papers included controls for socio-economic variables.

JMTD examined patterns of well-being of individuals across 166 countries nested into ten regions. The regions the authors created range widely in the number of countries covered – from six to forty-three. The number of individuals covered in these ten regions varies from 80,000 to a third of a million. *Latin Europe* includes Malta which is an EU member along with Israel and Moldova which are not. *Nordic Europe* includes ex-Soviet bloc countries Latvia and Lithuania; the rest are

[9] Graham was a member of this panel.

a mix of EU and non-EU members. *Eastern Europe* includes Greece and Cyprus. *Southern Asia* includes Tajikistan. *Arab* includes Azerbaijan; Turkey, and Uzbekistan.

The GWP file the authors used includes a much more natural eleven-region grouping - EU; Europe-other; CIS; Australia-NZ; Southeast Asia; South Asia; East Asia; Latin America; Northern America; Middle/North Africa, and Sub-Sharan Africa. Furthermore, even this grouping is unnecessary as individual data with country identifiers is now available. We use an approach that is standard in the literature, and calculate separate estimates at the country level, pooled across years, which retains more information and allows year and age variables and controls to vary by country. In contrast, JMTD impose the same relation between age and well-being across all countries within the same region, which eliminates important differences across countries from the analysis. We allow age and its square to vary by country.

The new GWP data file we analyze has 2,017,774 observations and 168 countries. As noted, there is little support in the literature for constructing aggregated positive and negative affect variables, and it is unclear what the properties of these aggregated variables are. We used Cantril's *life satisfaction* measure for which there is considerable precedent (see Deaton, 2008, 2018; Stone et al, 2010; Steptoe et al, 2015, Graham and Ruiz-Pozuelo, 2017). Another reason for the choice of this variable is that it is reported in every year and as such each has responses for approximately two million people. In contrast, other relevant variables such as depression, happy and especially fear, used by JTMD have much smaller sample sizes.

In Table 2 we report estimates using the Cantril ladder life satisfaction question as the dependent variable. The question in Gallup is:

Q3. "*Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?*"

We follow three rules for concluding a significant U-shape exists for a country in the case of the Cantril ladder or a hill-shape for stress. We conduct statistical tests for U-shapes; JMTD do not.

a) The age coefficient must be negative (positive) and the age squared coefficient positive (negative) for Cantril and the reverse in parentheses for stress and worry.
b) The coefficients must both be statistically significant. We use a T-statistic ≥1.5 rule but the vast majority of cases the T-vales were above 3 and many were over 10.
c) The minimum or maximum lies in the interval ages 25-70.

In Table 2 we find significant U-shapes in life satisfaction in either or both of the two sets of regressions in 133 countries out of the 168 in the sample. For the life satisfaction ladder variable, without controls we found a significant U-shape in 76 countries and 119 with them. The average for the minimum without controls is 57 and 55 with controls.

Chart 3 plots single year of age coefficients that are added to the constant overall in this GWP data, with and without controls. The U-shape is more apparent with controls.

Jebb et al (2019) argued that, in relation to these GWP data

"it is possible that the U-shaped (or other) curve exists but that it is so small that it is not practically meaningful. In other words, just because differences across age are statistically significant, that does not mean that these differences have practical significance. Researchers in past studies have generally not taken effect size into account,… At some point, an effect size becomes so small that it is truly trivial and lacks practical significance. For our Cantril ladder scale, respondents reported (and probably thought) in terms of the nearest whole scale point from 1 to 10. Therefore, it seemed that differences below 1.00 should be considered quite small."

In the GWP data, the decline in life satisfaction from being married to being widowed is from 5.4 to 4.9, or .5 points on the 0-10 scale. The drop from employed (5.56) to unemployed (4.82) is .74 points. The drop from age 15 (5.75) to age 50 (5.26) is .5. The drop, in well-being, at mid-life in these data is not trivial but equivalent to a major life event such as losing a job or a spouse. Size, significance and stability of estimates clearly is important but a drop, in well-being, of less than 1.00 is clearly not small.

3. US Behavioral Risk Factor Surveillance System (BRFSS), 2005-2011[10]

The BRFSS is the US's premier system of health-related telephone surveys that collect state data about U.S. residents regarding their health-related risk behaviors, chronic health conditions, and use of preventive services. Established in 1984 with 15 states, BRFSS now collects data in all 50 states as well as the District of Columbia and three U.S. territories. BRFSS completes more than 400,000 adult interviews each year, making it the largest continuously conducted health survey system in the world.

Chart 4 reports the results for the USA from estimating life satisfaction regression equations with single year of age controls, with and without controls for labor force, marital status and education using the BRFSS 2005-2011 (n=4,283,544).[11] The exact question well-being question is

Q4. *"In general, how satisfied are you with your life? Very dissatisfied,…., very satisfied."* scored from 1 to 4.

Across states significant U-shapes without controls with a minimum in the age range of 25-70 are rarely found, when a quadratic with age and its square gender and year dummies was estimated. In every state except New Hampshire there are U-shapes as reported in Table 5 when the usual controls are added. Overall when the equation is estimated for the United States as a whole the minimum is calculated at age 43. The average of the estimates across the forty-nine states with U-shapes plus DC, Guam and Puerto Rico, is 42.

So there is an uptick using the BRFSS (2005-2010) without controls as there is using the GSS. Both generate U-shapes though with controls with controls, (Blanchflower and Oswald, 2019). In the next section we show that Cantril life satisfaction data shows an early uptick without controls which disappears when controls are added also. Of interest though is that this uptick is not present

[10] The distribution by year with BRFSS life satisfaction data is 2005=337,546; 2006=674,190; 2007=816,668; 2008=793,472; 2009=805,536; 2010=849,388 and 2011=6,782.
[11] The life satisfaction question was removed after 2011.

when we use bivariate variables relating to happiness, enjoyment and laughing and smiling yesterday.

4. Gallup US Daily Tracker Poll (GUSDTP), 2008-2017

We have the equivalent data to that in the GWP on the Cantril life satisfaction variable available in the GUSDTP starting in 2008 (n=3,350,270). We are thus able to provide estimates for the US as a whole as well as for the fifty states plus DC. We follow the same procedures as above but instead of using countries this time we estimate separate results by 50 states plus DC.

1) We regressed life satisfaction on age and its square, gender, year and state dummies for the US as a whole ('no controls').
2) We added controls for education, marital and labor force status ('with controls').
3) We repeated replacing age and its square with single year of age dummies and re-estimated 1) and 2) and plotted them (Charts 5-8).
4) Then single state regressions were run with and without controls and the minima calculated (Tables 2 and 3).
5) The 'with controls' equation for the US was re-estimated but including additional controls for Health (cancer; high cholesterol; diabetes, BMI); smoker; #days in last week with >=30 minutes of exercise; # days eating >=5 portions fruit and vegetables; having health insurance and income (Table 4).
6) Steps 1)-5) were then repeated for the other three happiness variables – happiness; enjoyment and smiling (Charts 5-8 and columns 2-4 of Table 4).

We did not have to operate sets of rules to exclude states who did not have age and age squared terms or that had minima outside the 25-70 interval as had to be done with the GWP data. We see evidence of a U-shape in mid-life in the US as a whole and in *every* state, with and without controls in all four variables. That is true for the US as a whole whether the individual year of age variables are plotted in the charts or a quadratic estimated as reported in Tables 2 and 3. In the case of Cantril the estimated age at which the function minimizes averaged across the 51 estimates without controls is 41 and 47 with them. In the case of happiness, it is 55 and 52; for enjoyment 47 and 48 and for Smiling 59 and 54. The average across the 204 estimates without controls was 51 and 50 with them.

In the USDTP Cantril data, the drop from age 18 (7.21) to age 53 (6.66) is .55. Workers have a satisfaction level of 7.06 versus 6.11 for the unemployed, a difference of .95. The decline in life satisfaction from being married to being widowed is from 7.14 to 6.87, or .27 points on the 0-10 scale. The USDTP has health information the Cantril life satisfaction score for someone with cancer is 6.99, diabetes is 6.57 and for those who have had a heart attack is 6.34 and 6.63 for someone classified as obese with a BMI>30 versus an overall mean of 7.02. None involve differences of 1.0 so according to Jebb et al (2019) such differences should all be considered 'small'. The drop in happiness, from being a teenager to midlife is comparable to losing a job or a spouse.

The plots in Chart 5 with and without controls is similar to those in Chart 4 from BRFSS, but those in Charts 6-8 are clearly different as they show U-shapes with and without controls. It remains unclear why there is such a stark difference between these variables.

To explore this issue a little further we plot the 'no controls' data for three 'negative affect' variables in the USGTP file that relate to unhappiness – depression, sadness and pain – all relating to whether these were experienced 'yesterday'. We simply include state and year dummies and add the coefficients to the constants in Charts 9a-9c. The depression plot shows a steady rise to a twin peak in the early fifties. The pain data shows a steady rise through age sixty while the sadness plot has a small jump from age 1-20 and then a small decline through the mid-thirties before picking up to a peak in the mid fifties.

Discussion

An early psychology literature has argued that there was no relationship between well-being and age. Mostly this appears to have been based on studies that included a handful of people with tiny sample sizes. Even where there was evidence of a U-shape (e.g. Cantril ,1965, Ingelhardt, 1990) this was denied in the literature. We reworked a couple of these studies using same data and showed there were U-shapes and their scale was large, comparable to the loss of a spouse, or a job. There have also been claims that the U-shape found in the Eurobarometer data is actually an M-shape rather than a U-shape, with an early jump in well-being in age before a midlife drop. This arises in the data because of the omission of young happy students. When they are included there is a U-shape even in the raw data.

In addition to our findings of U-shapes using life satisfaction data from the Eurobarometers we also looked at Cantril's ladder life satisfaction data using the Gallup World Poll data and found evidence for U-shapes both with and without controls for an additional 64 non-European countries.[12][13]

Of particular note is that when we used the GUSDTP data on well-being – on life satisfaction, happiness, enjoyment and laughing or smiling - there are U-shapes in age with minima averaging around age fifty. This is found across all states with and without controls on all four measures. This is different from the findings using happiness data from the GSS and life satisfaction data from the BRFSS. In all three cases though there are U-shapes with controls. It remains unclear why there is a difference, but in our view what matters are the set of estimates with controls.

Some recent psychological literature has dismissed the literature on the U-curve as "*overblown*" and the scale of the effects as trifling, inconsequential or even "*trivial*" (Jebb et al, 2019). That claim, in our view, seems incorrect. Indeed, the effects of the mid-life dip are comparable to major life events like losing a spouse or job. For example, life satisfaction in the US the drop from age 18 (7.21) to age 53 (6.66) is .55. The decline in life satisfaction from being married to being

[12] Using the GWP data as reported in Table there were 68 countries that had a U-shape with and without controls only five of which were European i.e. Albania; Argentina; Australia; Bahrain; Bangladesh; Bolivia; Brazil; Cambodia; Cameroon; Canada; China; Colombia; Costa Rica; Cyprus; Dominican Republic; Egypt; El Salvador; Ethiopia; Ghana; Guatemala; Honduras; Hong Kong; Peru; Philippines; Saudi Arabia; Slovenia; South Africa; South Sudan; Sri Lanka; Hungary; Iceland; Indonesia; Iran; Ireland; Ivory Coast; Jamaica; Jordan; Kazakhstan; Kuwait; Kyrgyzstan; Lebanon; Lesotho; Libya; Macedonia; Madagascar; Mali; Malta; Mauritius; Mongolia; Morocco; Namibia; Nepal; New Zealand; Nicaragua; Northern Cyprus; Palestinian Territories; Taiwan; Thailand; The Gambia; Togo; Uganda; UAE; United Kingdom; United States; Uruguay; Uzbekistan; Venezuela and Vietnam;

[13] Blanchflower (2020a) reported U-shapes for every European country with and without controls using the Eurobarometers and the European Social Surveys.

widowed is from 7.14 to 6.87, or .27 points on the 0-10 scale, half as much. We also found the decline comparable to having cancer.

Beyond being empirically interesting, there are implications for substantial parts of the world's population. These dips in well-being are associated with higher levels of depression, including chronic depression, difficulty sleeping, and even suicide. In the U.S., deaths of despair are most likely to occur in the middle-aged years, and the patterns are robustly associated with unhappiness and stress. Across countries chronic depression and suicide rates peak in midlife. The mid-life dip in well-being is robust to within person analysis, also exists with the prescribing of anti-depressants and it extends beyond humans. It remains puzzling then why many psychologists continue to suggest that well-being is unrelated to age.

Based on the significant evidence we present across countries and US states and the District of Columbia, the decline in mid-life well-being seems real and consequential. Indeed, there are robust linkages to other serious markers of ill-being. The mid-life dip is real, it applies to most of the world's population, and it links to behaviors and outcomes that merit the attention of scholars and policymakers alike.

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Table 1. Ingelhardt (1990) redone, Tables 7-3 -7-5, 1980-1986

	Age	Age^2	Age Minimum	N
1) 4-step Life satisfaction No controls				
All	-.0095 (13.51)	.0001024 (13.55)	47	97970
France	-.02511 (11.45)	.0002728 (11.63)	46	9867
Belgium	-.0109456 (4.88)	.000081 (3.42)	67	9871
Netherlands	-.0148594 (7.40)	.000154 (7.16)	48	10149
Germany	.003539 (1.82)	-.0000206 (0.97)		10110
Italy	-.0094792 (4.11)	.0000978 (3.82)	48	10760
Luxembourg	-.002416 (0.62)	.000058 (1.35)		2965
Denmark	-.00256 (1.43)	.0000185 (1.01)		9911
Ireland	-.01138 (4.90)	.0001576 (6.09)	36	9914
UK	-.007349 (3.91)	.000097 (4.87)	38	13493
Greece	-.01217 (4.19)	.0001097 (3.50)	56	8956
Spain	-.03432 (4.41)	.000357 (4.30	48	985
Portugal	-.02798 (4.07)	.000255 (3.40)	55	989
2) 4-step Life satisfaction with controls				
All	-.017208 (18.68)	.000202 (20.52)	43	97970
France	-.01722 (5.90)	.000197 (6.19)	44	9867
Belgium	-.02078 (7.33)	.000199 (6.65)	52	9871
Netherlands	-.02237 (8.39)	.00025 (8.75)	45	10149
Germany	-.006262 (2.42)	.000085 (3.09)	36	10110
Italy	-.02299 (7.22)	.000246 (7.20)	47	10760
Luxembourg	-.0204 (3.88)	.000273 (4.85)	37	2965
Denmark	-.00995 (4.12)	.00012 (4.88)	41	9911
Ireland	-.014199 (4.71)	.000208 (6.27)	34	9914
UK	-.01376 (5.75)	.000188 (7.31)	36	13493
Greece	-.0242 (6.26)	.000244 (5.98)	50	8956
Spain	-.0475 (4.53)	.000481 (4.51)	49	985
Portugal	-.0270 (2.66)	.000264 (2.66)	51	989
3) 3- step Happiness with controls				
All	-.01627 (15.25)	.000169 (14.83)	48	49836
France	-.01623 (4.82)	.000143 (3.92)	51	4889
Belgium	-.01552 (4.78)	.000139 (4.02)	58	4920
Netherlands	-.02539 (7.46)	.00026 (7.15)	60	5097
Germany	-.00585 (1.89)	.000064 (1.95)	49	4972
Italy	-.03048 (8.77)	.00029 (7.84)	49	5159
Luxembourg	-.00965 (1.46)	.000126 (1.75)	53	1465
Denmark	-.01376 (3.55)	.00013 (3.36)	40	4790
Ireland	-.0122 (3.53)	.000166 (4.35)	53	4963
UK	-.00834 (2.89)	.000109 (3.51)	38	6690
Greece	-.0205 (5.56)	.000206 (5.27)	42	4928
Spain	-.0271 (3.55)	.00025 (3.17)	51	978
Portugal	-.0051 (0.76)	.0004 (0.61)	54	985

Source: Eurobarometers #13-26. T-statistics in parentheses.

Table 2. Age Minima in Life satisfaction in Gallup World Poll 130/168 Countries, 2005-2019

	No controls	With controls		No controls	With controls
All	75	58	Hungary	69	59
Average	57	55	Iceland	57	51
Albania	58	51	Indonesia	59	35
Algeria		49	Iran	61	55
Argentina	65	58	Iraq		47
Australia	40	46	Ireland	43	48
Austria		69	Israel		69
Azerbaijan		54	Italy		64
Bahrain	55	43	Ivory Coast	56	49
Bangladesh	55	45	Jamaica	51	53
Belgium		54	Japan		64
Benin	68		Jordan	54	48
Bolivia	66	61	Kazakhstan	65	51
Bosnia /Herzgvna		68	Kosovo		58
Brazil	53	50	Kuwait	38	37
Bulgaria		69	Kyrgyzstan	64	50
Cambodia	62	47	Laos	38	
Cameroon	64	59	Lebanon	65	60
Canada	29	45	Lesotho	70	59
Chile		68	Libya	42	42
China	52	50	Lithuania		68
Colombia	62	56	Luxembourg		52
Congo Brazzaville		61	Macedonia	69	62
Costa Rica	59	56	Madagascar	51	44
Cyprus	65	55	Malaysia		48
Denmark		44	Mali	70	42
Dominican Republic	58	58	Malta	62	53
Ecuador		69	Mauritius	47	47
Egypt	53	44	Mongolia	63	47
El Salvador	67	62	Montenegro		65
Estonia		60	Morocco	54	49
Ethiopia	55	42	Mozambique		57
Finland		58	Myanmar	36	
France		59	Nagorno-Karabakh		61
Gabon		66	Namibia	67	56
Georgia		70	Nepal	53	43
Germany		64	Netherlands		49
Ghana	55	49	New Zealand	33	49
Greece		64	Nicaragua	69	63
Guatemala	69	65	Northern Cyprus	53	46
Guinea	47		Norway		49
Haiti		52	Pakistan	65	
Honduras	65	60	Palestinian Territories	69	51
Hong Kong	66	66	Panama		56

Paraguay		69	Syria		56
Peru	67	61	Taiwan	61	55
Philippines	54	50	Tajikistan		64
Poland		67	Tanzania		
Portugal		65	Thailand	61	54
Romania		59	The Gambia	60	53
Saudi Arabia	40	42	Togo	62	54
Serbia		64	Trinidad & Tobago	53	
Singapore		49	Turkey	59	
Slovakia		64	Uganda	96	55
Slovenia	68	62	Ukraine		
Somaliland region		67	UAE	46	47
South Africa	55	44	United Kingdom	39	48
South Korea		62	United States	40	49
South Sudan	60	58	Uruguay	58	57
Spain		57	Uzbekistan	38	40
Sri Lanka	52	43	Venezuela	66	63
Suriname	47		Vietnam	62	48
Swaziland		67	Yemen		54
Sweden		53	Zambia		51
Switzerland		56	Zimbabwe		51
Average	57	55			

Notes: table excludes ten countries that had no U-shapes in life satisfaction.
Estimated by OLS; 'no controls' includes year dummies and 'all' equation also has 167 country dummies. Controls includes dummies for gender; education, marital status, and labor force status.

Table 3. Age Minima by States – No Controls USA 2009-2017

	Cantril	Happiness	Enjoyment	Smiling
USA	41	54	47	59
Alabama	42	58	49	59
Alaska	42	58	54	58
Arizona	41	55	46	57
Arkansas	43	54	49	59
California	43	55	47	61
Colorado	44	56	46	59
Connecticut	40	58	46	59
Delaware	33	44	39	53
District of Columbia	40	56	49	66
Florida	38	52	45	56
Georgia	38	51	45	57
Hawaii	33	58	49	66
Idaho	42	56	48	62
Illinois	44	56	47	60
Indian	44	54	49	59
Iowa	42	53	46	62
Kansas	41	56	48	62
Kentucky	45	53	50	58
Louisiana	40	49	47	55
Maine	40	56	45	59
Maryland	34	58	45	59
Massachusetts	40	58	47	58
Michigan	42	53	44	57
Minnesota	42	53	44	59
Mississippi	42	49	47	59
Missouri	44	54	47	59
Montana	44	59	48	64
Nebraska	47	57	49	61
Nevada	46	60	47	64
New Hampshire	41	53	46	55
New Jersey	43	59	48	61
New Mexico	44	53	51	61
New York	42	59	44	59
North Carolina	43	52	46	57
North Dakota	45	56	51	62
Ohio	41	53	47	57
Oklahoma	43	54	50	61
Oregon	37	54	44	57
Pennsylvania	43	55	46	59
Rhode Island	37	55	43	55
South Carolina	39	50	46	57
South Dakota	44	55	50	62
Tennessee	41	52	48	60
Texas	37	53	46	63
Utah	45	57	52	60
Vermont	37	58	45	59
Virginia	36	53	45	58
Washington	39	55	46	60
West Virginia	42	55	50	56
Wisconsin	44	57	45	59
Wyoming	46	57	55	65
Average	41	55	47	59

Table 4. Age Minima by States – With Controls, GDTP USA 2009-2017

	Cantril	Happy	Enjoyment	Smiling
USA	48	52	48	54
Alabama	45	50	48	53
Alaska	46	55	52	58
Arizona	49	49	49	54
Arkansas	47	49	48	52
California	50	53	50	58
Colorado	50	54	50	56
Connecticut	49	54	49	56
Delaware	46	50	45	52
District of Columbia	44	51	48	63
Florida	47	51	47	52
Georgia	46	49	46	52
Hawaii	48	52	49	57
Idaho	48	51	46	56
Illinois	49	53	49	55
Indian	48	51	48	53
Iowa	48	52	49	57
Kansas	48	53	48	56
Kentucky	46	49	47	51
Louisiana	46	49	47	49
Maine	46	52	46	50
Maryland	46	54	48	54
Massachusetts	47	52	49	54
Michigan	48	51	47	52
Minnesota	48	53	48	55
Mississippi	47	48	48	52
Missouri	47	51	48	53
Montana	49	56	48	58
Nebraska	49	53	50	56
Nevada	49	54	48	55
New Hampshire	47	53	48	52
New Jersey	50	55	50	56
New Mexico	50	52	51	56
New York	49	54	48	56
North Carolina	48	50	47	52
North Dakota	49	49	49	54
Ohio	47	54	47	52
Oklahoma	47	50	48	52
Oregon	48	53	48	55
Pennsylvania	48	52	48	54
Rhode Island	47	53	46	51
South Carolina	45	48	45	50
South Dakota	49	51	45	54
Tennessee	45	48	47	52
Texas	48	51	48	56
Utah	50	53	52	55
Vermont	46	51	46	53
Virginia	46	52	47	54
Washington	48	53	48	56
West Virginia	45	49	46	50
Wisconsin	48	54	49	56
Wyoming	50	54	53	58
Average	47	52	48	54

Table 4. OLS regressions of well-being, USA, 2009-2017

	Cantril	Happiness	Enjoyment	Smile
Age	-.0469 (94.99)	-.0078 (89.24)	-.0071 (77.62)	-.0093 (86.09)
Age^2*100	.0514 (109.33)	.0749 (89.62)	.0752 (85.55)	.0087 (84.42)
Male	-.2244 (75.99)	-.0116 (22.21)	.0034 (6.25)	-.0243 (37.41)
High Cholesterol	-.1116 (34.32)	-.0157 (27.38)	-.0186 (30.60)	-.0219 (30.77)
Diabetes	-.1812 (40.48)	-.0207 (26.09)	-.0259 (30.99)	-.0271 (27.62)
Heart Attack	-.3166 (48.80)	-.0313 (27.28)	-.0414 (34.15)	-.0329 (23.13)
Cancer	-.1395 (29.57)	-.0118 (14.22)	-.0164 (18.67)	-.0170 (16.42)
Smoker	-.4141 (103.90)	-.0405 (57.27)	-.0488 (65.40)	-.0347 (39.70)
#Exercise Days	.0575 (98.16)	.0083 (79.85)	.0104 (94.91)	.0124 (96.12)
#Days Fruit & veg	.0348 (60.99)	.0070 (68.89)	.0077 (72.63)	.0114 (90.86)
Health Insurance	.3908 (76.25)	.0224 (24.71)	.0220 (22.97)	.0148 (13.26)
Black	.2051 (32.71)	-.0006 (0.55)	.0032 (2.80)	.0260 (18.32)
Asian	-.1062 (8.48)	-.0236 (10.13)	-.0224 (9.57)	.0001 (0.06)
Native American	-.0781 (4.46)	-.0160 (4.81)	-.0154 (4.72)	-.0064 (1.57)
Hawaiian	.0133 (0.40)	-.0155 (2.44)	-.0075 (1.22)	.0153 (1.95)
Hispanic	.3231 (58.30)	-.0063 (6.42)	-.0017 (1.71)	.0418 (33.97)
BMI	-.0131 (50.77)	-.0002 (5.73)	-.0005 (10.53)	.0002 (3.06)
Year dummies	Yes	Yes	Yes	Yes
State dummies	Yes	Yes	Yes	Yes
Marital status dummies	Yes	Yes	Yes	Yes
Education dummies	Yes	Yes	Yes	Yes
Income dummies	Yes	Yes	Yes	Yes
Constant	7.1322	.9181	.8376	.8809
Adjusted R^2	.1295	.0480	.0494	.0429
N	1,693,643	1,549,000	1,695,786	1,544,111
Age Minimum	46 (48)	53 (52)	47 (48)	53 (54)
Mean dependent variable	6.91	.882	.846	.822

Excluded category: white. Age minima in parentheses are from Table 3 USA – where controls are age and its square, male, year, state, employment, marital status and education dummies. Experienced happiness/ enjoyment yesterday? Did you smile or laugh a lot yesterday?

Table 5. Age Minima in Life Satisfaction, BRFSS 2005-2011.

USA	43	Tennessee	55
Alabama	38	Texas	43
Alaska	45	Utah	56
Arizona	39	Vermont	41
Arkansas	33	Virginia	32
California	41	Washington	42
Colorado	45	West Virginia	44
Connecticut	36	Wisconsin	47
Delaware	36	Wyoming	47
District of Columbia	35	Guam	46
Florida	41	Puerto Rico	46
Georgia	35	**Average**	**42**
Hawaii	45		
Idaho	45		
Illinois	43		
Indiana	41		
Iowa	42		
Kansas	46		
Kentucky	44		
Louisiana	45		
Maine	28		
Maryland	33		
Massachusetts	43		
Michigan	34		
Minnesota	43		
Mississippi	36		
Missouri	43		
Montana	50		
Nebraska	51		
Nevada	45		
New Hampshire	n/a		
New Jersey	44		
New Mexico	46		
New York	48		
North Carolina	40		
North Dakota	55		
Ohio	39		
Oklahoma	45		
Oregon	41		
Pennsylvania	41		
Rhode Island	36		
South Carolina	29		
South Dakota	55		

Chart 1. Eurobarometer Life Satisfaction With No Controls, 2009-2019

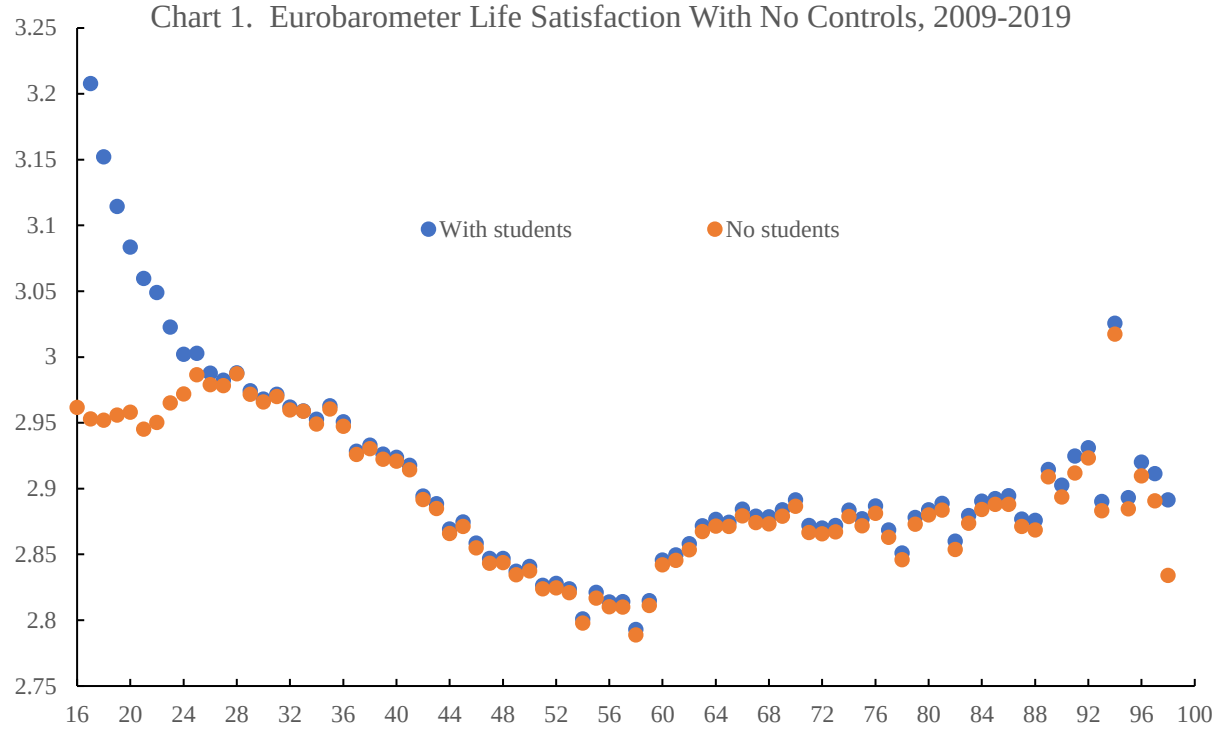
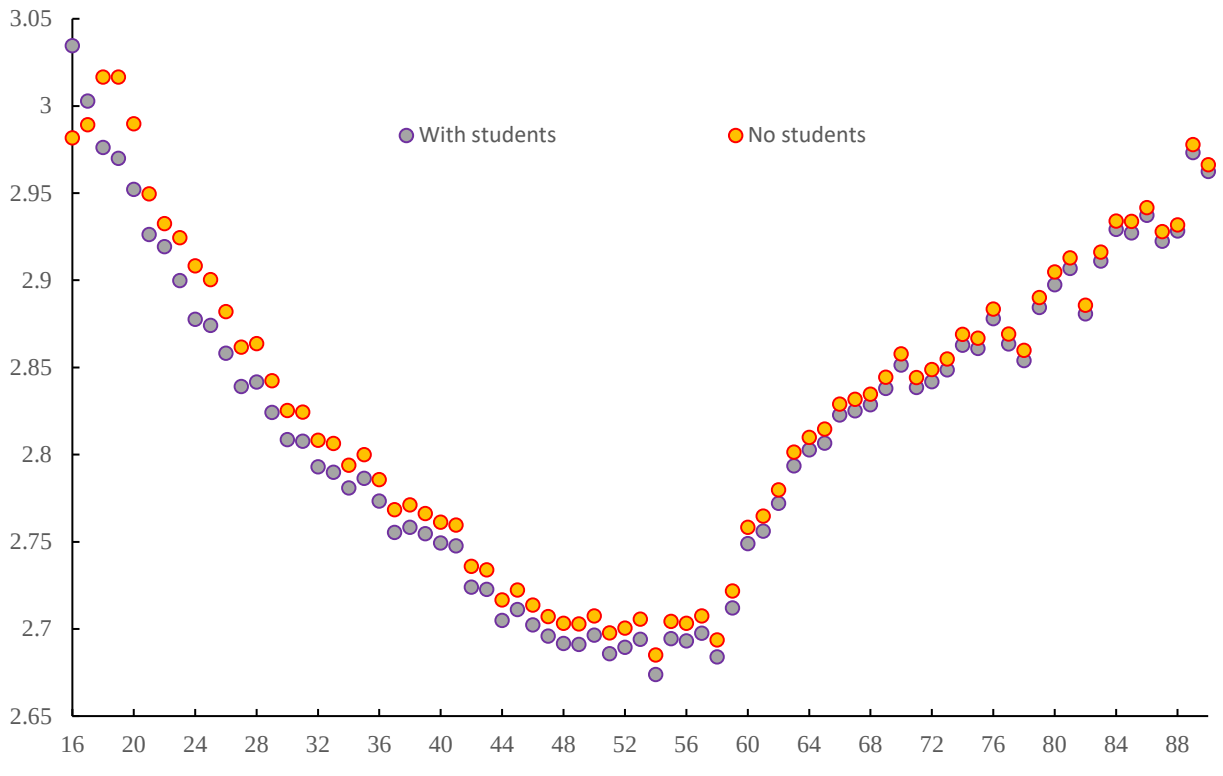


Chart 2. Eurobarometer, Life Satisfaction With Controls, 2009-2019



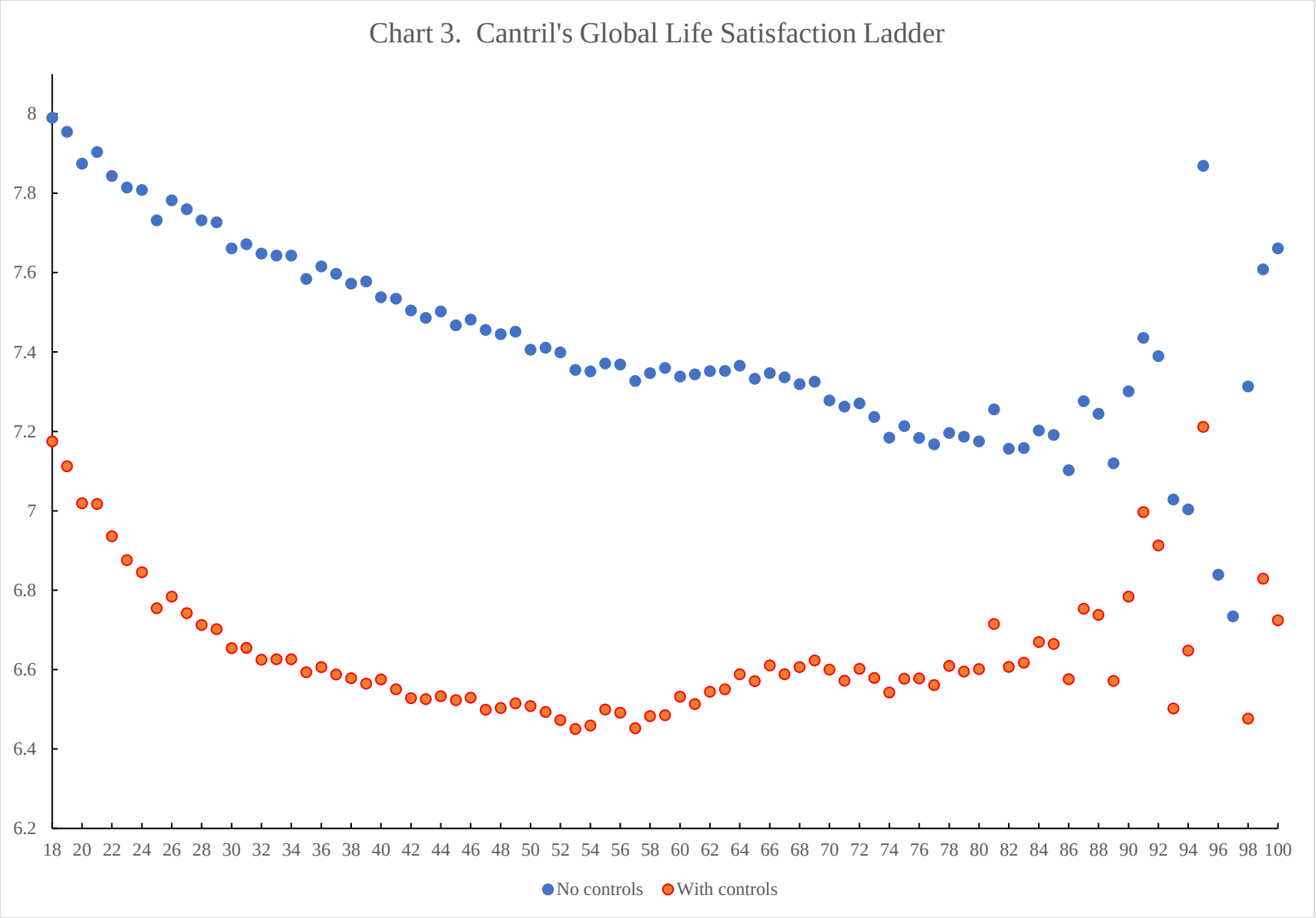


Chart 3. Cantril's Global Life Satisfaction Ladder
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100
No controls
With controls

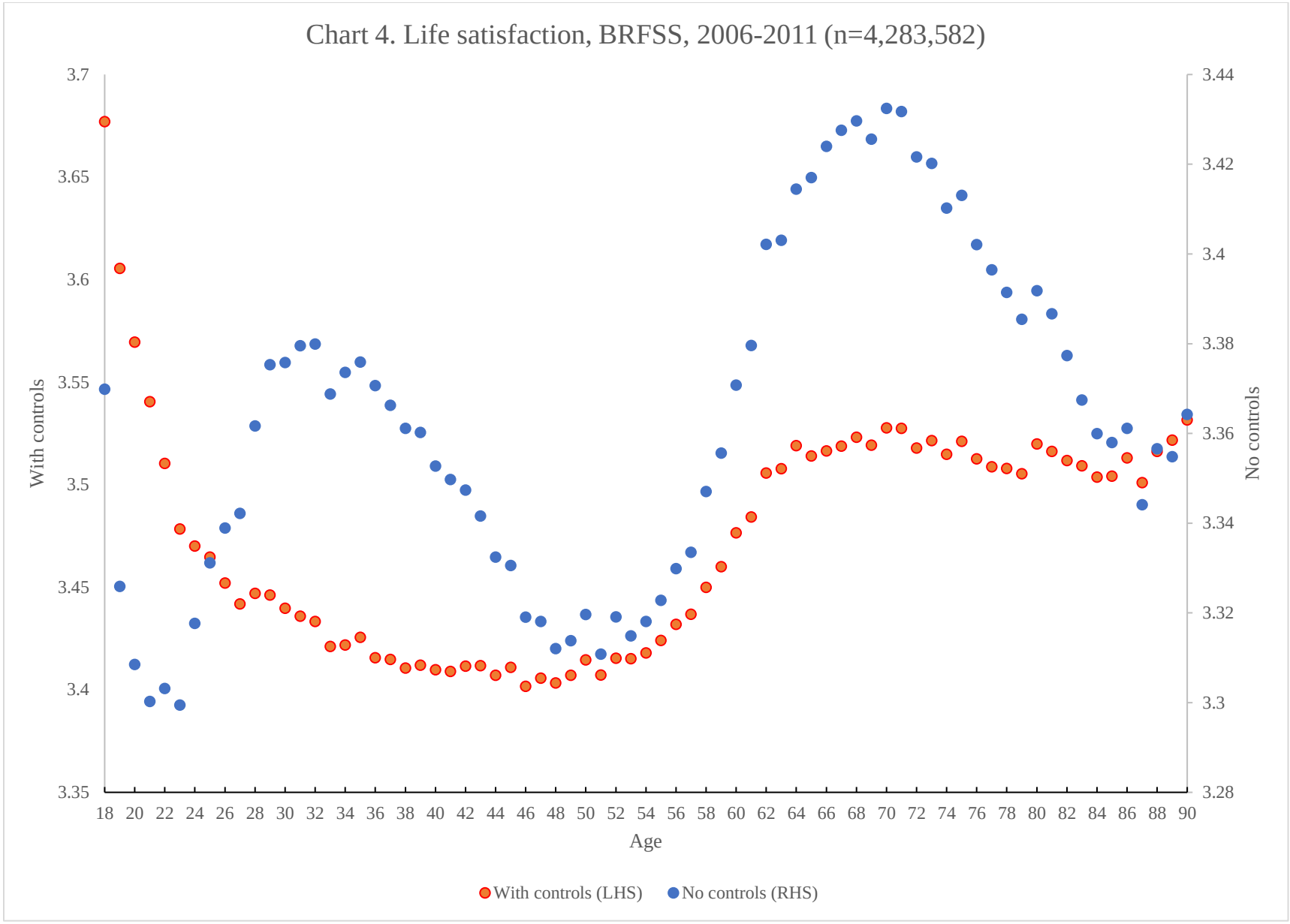
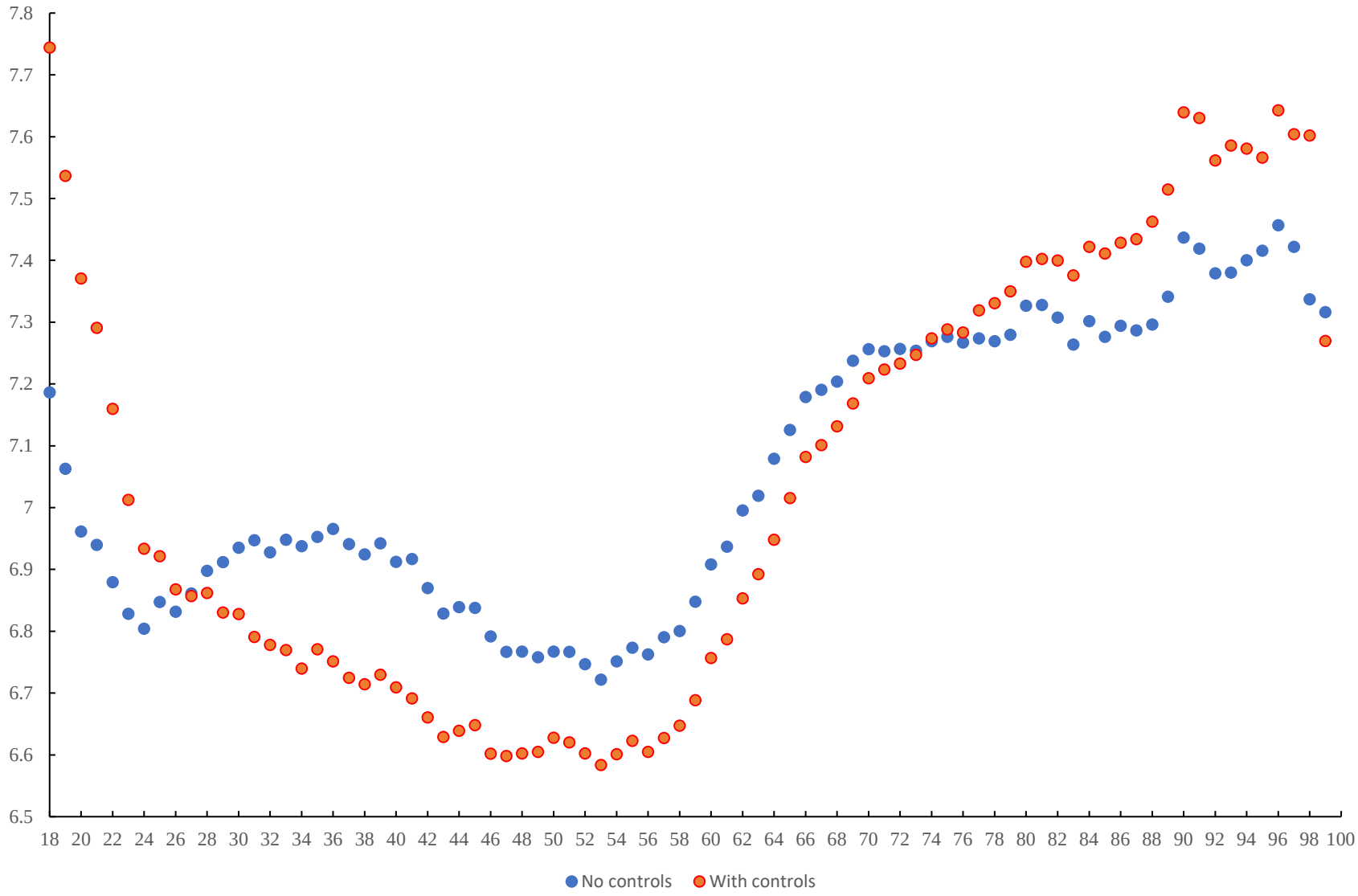


Chart 4. Life satisfaction, BRFSS, 2006-2011 (n=4,283,582)
With controls
No controls
3.7
3.65
3.6
3.55
3.5
3.45
3.4
3.35
3.44
3.42
3.4
3.38
3.36
3.34
3.32
3.3
3.28
18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90
Age
With controls (LHS)
No controls (RHS)

Chart 5. Cantril Life Satisfaction, US Daily Tracker 2009-2017



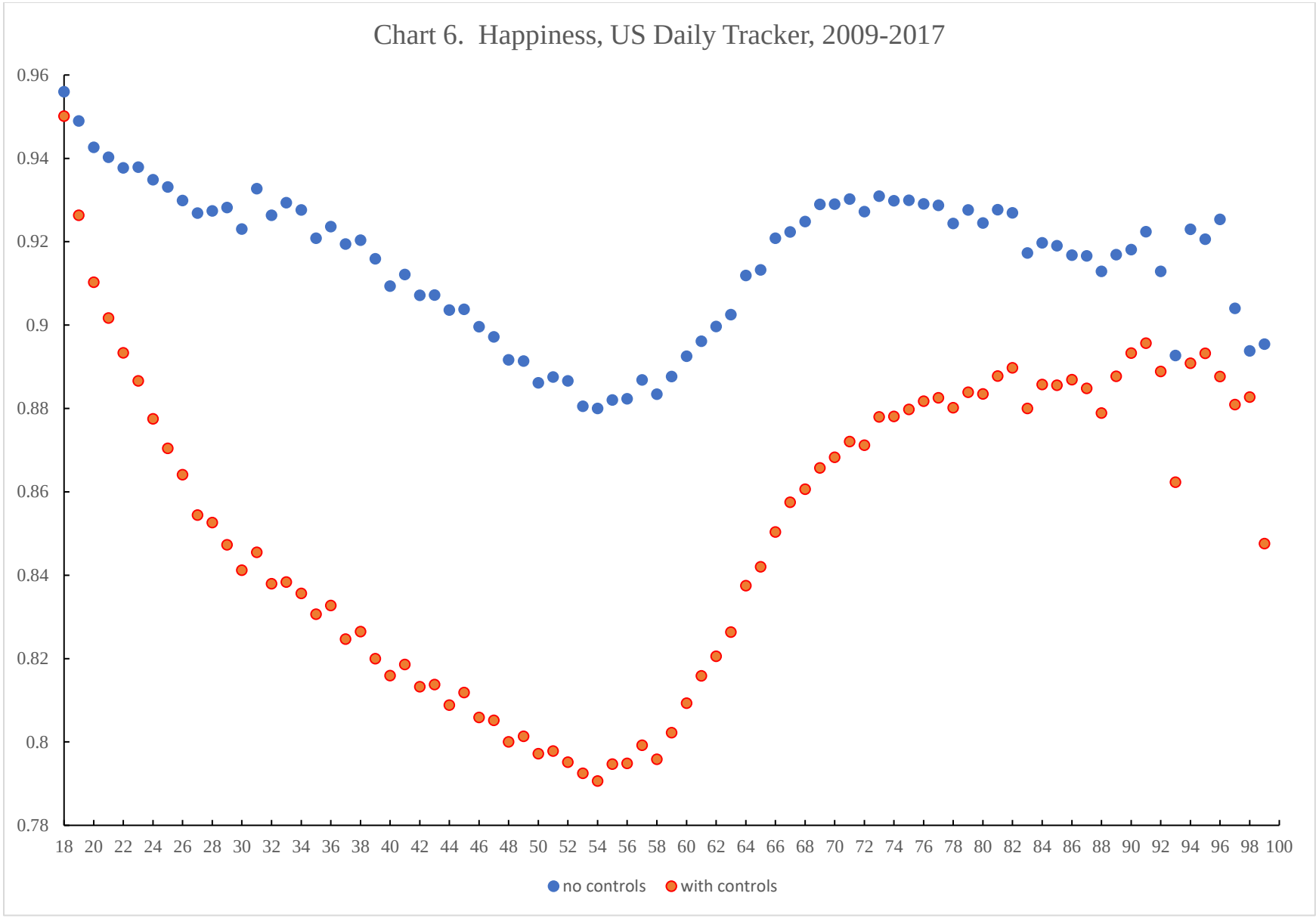


Chart 6. Happiness, US Daily Tracker, 2009-2017
0.96
0.94
0.92
0.9
0.88
0.86
0.84
0.82
0.8
0.78
18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100
no controls
with controls

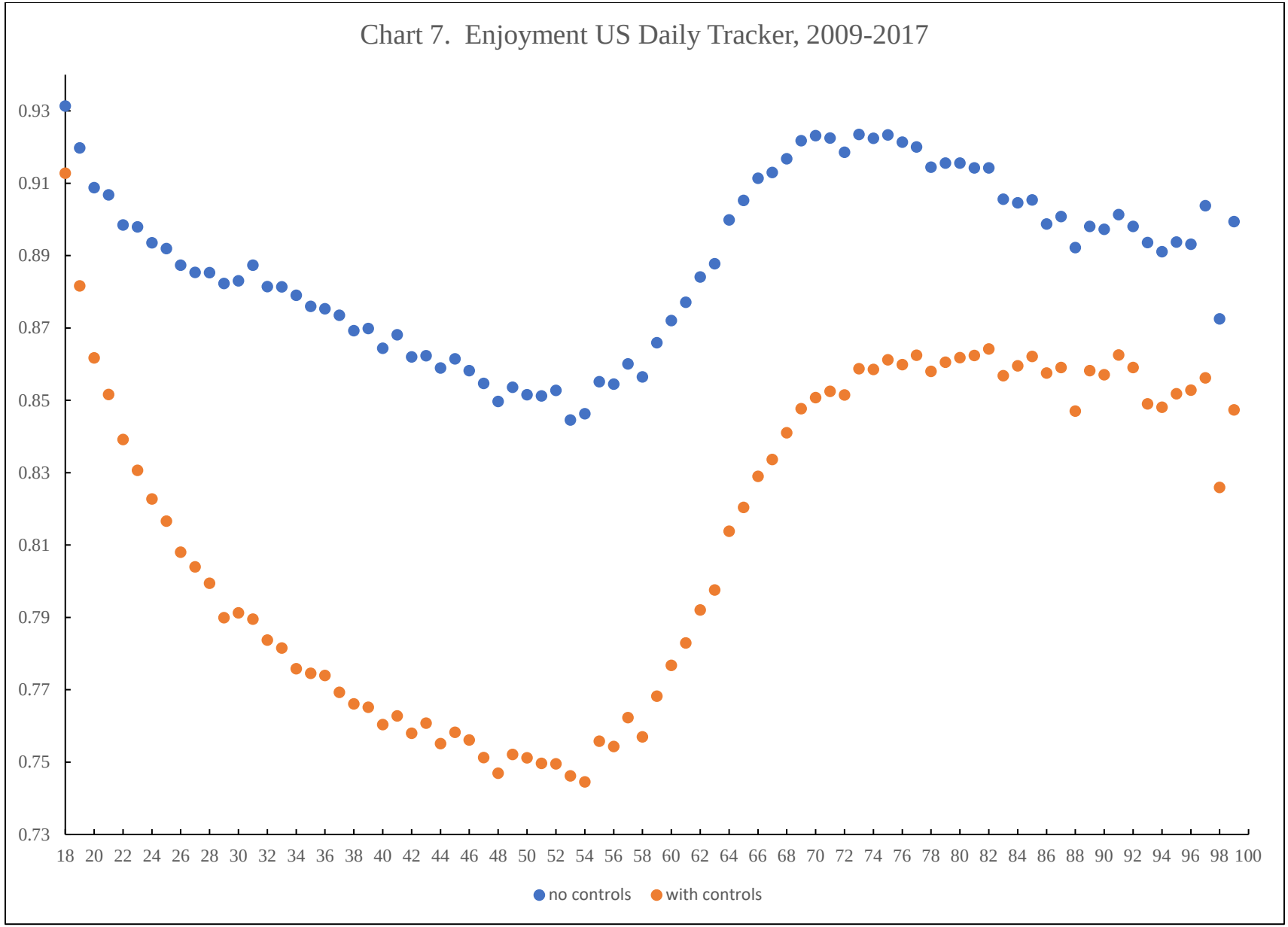


Chart 7. Enjoyment US Daily Tracker, 2009-2017
0.93
0.91
0.89
0.87
0.85
0.83
0.81
0.79
0.77
0.75
0.73
18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100
no controls
with controls

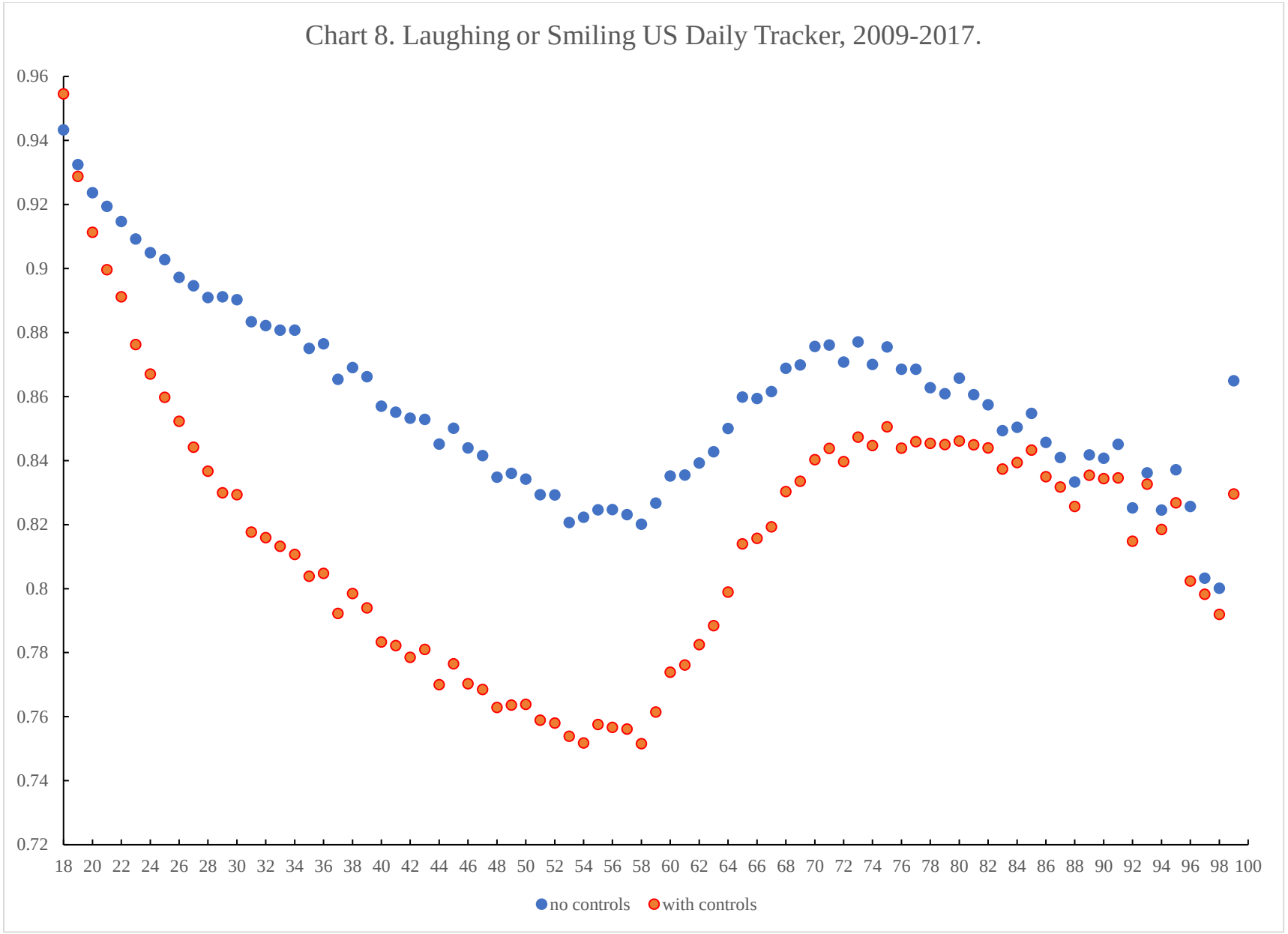


Chart 8. Laughing or Smiling US Daily Tracker, 2009-2017.
0.96
0.94
0.92
0.9
0.88
0.86
0.84
0.82
0.8
0.78
0.76
0.74
0.72
18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100
no controls
with controls

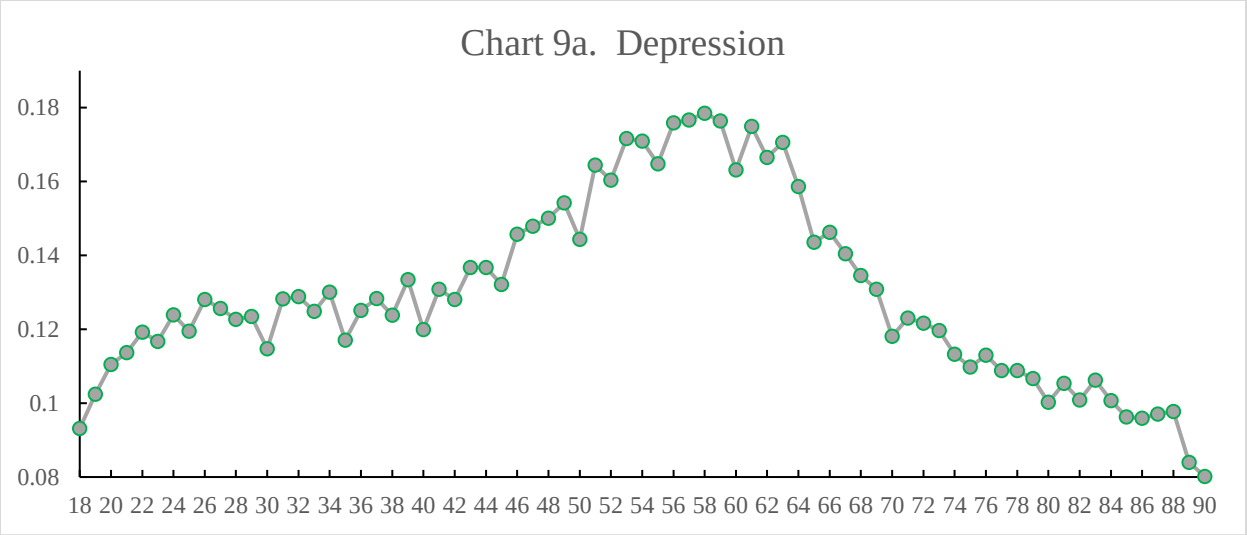


Chart 9a. Depression
0.18
0.16
0.14
0.12
0.1
0.08
18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90

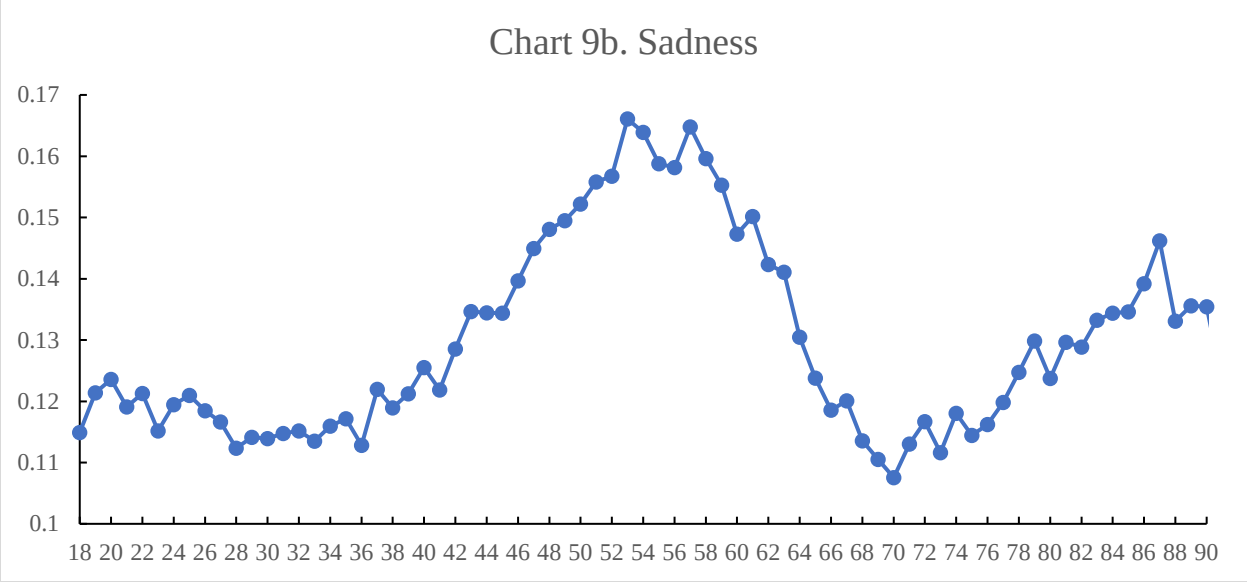


Chart 9b. Sadness
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90

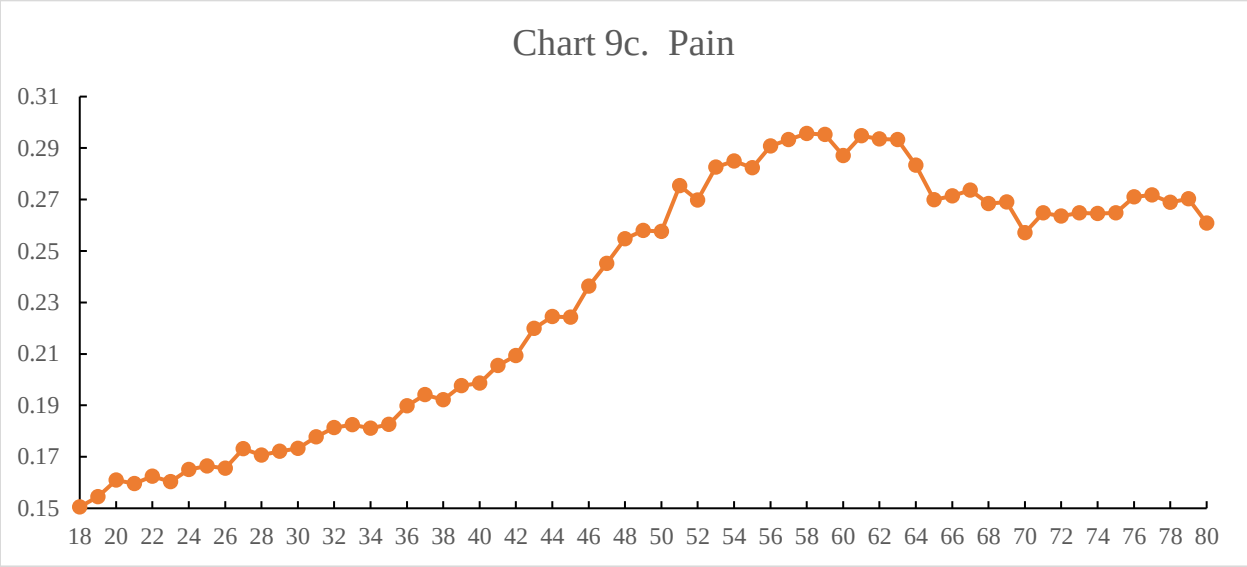


Chart 9c. Pain
0.31
0.29
0.27
0.25
0.23
0.21
0.19
0.17
0.15
18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80