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It's not U, it's me(ssy): Subjective wellbeing is not really U-shaped over the lifespan

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It's not U, it's me(ssy): Subjective wellbeing is not really U-shaped over the lifespan

Abstract

Among the most common tropes in wellbeing research is that it is U-shaped over the lifespan, declining into middle age before rising again into older age. However, the thesis has come under critique or re-appraisal, including even from its original proponents, with claims the pattern is now eroding (possibly due to younger people doing worse lately compared to peers in earlier eras). To explore this question we examined Gallup World Poll data spanning 19 years (2006-2024), covering nearly 3 million participants across 169 countries/territories, exploring the age-related distribution of two forms of subjective wellbeing: evaluative (Cantril's ladder) and affective (Positive Experience Index). With the ladder, although a very vague U-shape was evident if combining all years and regions, when analyzed individually, few years or regions came close to a simple U-shape pattern—as judged by a proposed rubric for ascertaining "U-ness"—although some did bear some resemblance. Additionally, to complement the heuristic U-score, we also developed a statistical system for assessing structural U-shaped scores that quantify the geometric coherence of age–wellbeing profiles, which indicated that the strongest U-dominant years globally occurred in 2018 and 2019, which reflect relatively deep and coherent midlife troughs. As for positive experience, this instead tended to simply decline with age, albeit with a slight uptick around age 60. But any general patterns were subject to considerable variation, both in terms of year and region. With the year, there was a general trend of both outcomes improving over time, but especially for older people, meaning the general U-shape curve (vague and imperfect as it was) was becoming more "J-shaped." And with regions, there were striking outliers to the general trends, such as the EU with respect to the ladder (with a simple decline with age), and North America with regard to positive experiences (which did have a U-shape, with older people

doing as well as younger people). The data show the complicated nature of age-related wellbeing trends and point towards the need for more research.

Keywords: age, wellbeing, U-shaped, global, Gallup World Poll

Introduction

Recent decades have seen an ever-increasing interest in subjective wellbeing (SWB), not only in academia, but also among intergovernmental organisations (e.g., UN, WHO, OECD) which have advocated for including SWB indicators alongside traditional economic metrics like GDP when assessing societies and making public policy.[1,2,3,4,5] Relatedly, a vast literature has emerged exploring the myriad dynamics of SWB, ranging from its distribution among countries, as exemplified by the World Happiness Report,[6] to socio-demographic factors associated with its attainment. While this work has generated extensive debates, with many questions yet to be resolved, a few trends have come to be regarded as well established. One is the notion that SWB is "U-shaped" over the lifespan—being fairly high in youth, falling to a nadir around middle-age, then rising into older age—with Blanchflower and Graham, two of the foremost scholars associated with this thesis, concluding in 2021 that the trend is "one of the most robust patterns in the data in social science."[7] However, the idea has come under increasing challenge in the past few years, including even from Blanchflower, who in 2025 published a paper titled, "Life satisfaction in Western Europe and the gradual vanishing of the U-shape in age."[8] One concern is that the left-hand side of the curve has been flattening, with younger people faring worse compared to people of similar age in earlier eras[9,10] (although in Blanchflower's analysis, while this was true in Northern Europe, where the U-shape was replaced by SWB rising with age, in Southern European countries it was now *declining* with age). There is thus a need to re-visit the U-shape idea, especially using datasets spanning

many countries and years, as we do here, using Gallup World Poll (GWP) covering 169 countries and territories and nearly 3 million people from 2006 to 2024. Before introducing the analysis itself, we briefly introduce the concept of SWB and review existing work on its potential U-shape.

Subjective Wellbeing

Although the construct of SWB is widely used, definitions vary. Arguably the most influential conceptualization is that of Diener and colleagues, with two dimensions: cognitive/evaluative (e.g., life satisfaction), and affective (positive and negative affect).[11,12] Other perspectives are slightly broader. The OECD, for example, also includes eudaimonia: the stated definition in its 2025 guidelines[13] emphasizes the two dimensions associated with Diener, defining SWB as "Good mental states, including all of the various evaluations, positive and negative, that people make of their lives and the affective reactions of people to their experiences" (p.12). However, the executive summary also includes eudaimonia in its description, stating that "Each component of subjective well-being – life evaluation (reflective assessments, such as satisfaction with life), affect (feelings or emotional states) and eudaimonia (a sense of worth, meaning and purpose) – captures a distinct and meaningful facet of people's subjective life experiences" (p.8). Whatever the approach though, conceptualizations of SWB invariably include an evaluative (E-SWB) and an affective (A-SWB) component.

Among the prominent approaches for conceptualizing and assessing E-SWB—sometimes referred to generically as "life evaluation"—are Cantril's "ladder"[14] (CL), life satisfaction, and happiness. CL invites people to imagine where they stand on a 10-rung ladder whose base and top respectively represent the worst and best "possible life." With life satisfaction, perhaps the most influential definition is Shin and Johnson's[15]—who call it "avowed happiness"—as "A global assessment of a person's quality of life according to his chosen criteria," which is the definition used in the Satisfaction with Life Scale.[16] As for

happiness, this is a more ambiguous and contested concept,[17] with its meaning essentially depending on the framing. Diener, for instance, reviewed definitions of happiness and grouped these into three types: normative (i.e., invoking "external criteria such as virtue"); evaluative (e.g., Shin and Johnson's operationalization above); and affective (i.e., involving "pleasant emotional experience").[18] In a 2009 paper with Oishi and Lucas though,[19] they state they prefer to interpret/use it as an *evaluative* concept: while they "conceptualize happiness as being hierarchically organized to emphasize complexity of the concept," the "highest level of the abstraction is … a summary judgment of one's life. That is, we do not use the term happiness to refer to the momentary feeling state of happiness. Rather, we use this term to refer to a relatively stable feeling of happiness one has towards his or her life" (p.347). Similarly, the World Happiness Report[20] primarily interprets/uses happiness in an evaluative sense. As Helliwell explains,[21] the report "justifies its title by arguing that there are two quite different uses of the word happiness. One is to describe the emotion of happiness, as in questions about happiness yesterday. The second use is judgmental, asking whether one is happy about something." The World Happiness Report primarily uses the term in its latter sense, harnessing the CL item in the GWP that we also explore in the present paper (though it also uses it in the emotional sense in its tracking of positive and negative affect).

As for *A*-SWB, happiness can also serve as a construct/measure in that capacity. As Helliwell explains,[21] drawing on linguistic philosophy,[22] "any potential ambiguity is resolved by the logic of the conversation in which the word is used," whereby answers to "the emotion question depend on what was going on the day before, while happiness with life reflects a longer-term judgment more based on the overall pattern of life" (e.g.,[23]). It is in the former sense, for example, that the OECD[13] recommends asking about happiness, situating it within an affect module asking people "how you felt yesterday on a scale from 0 to 10," which includes asking if people felt happy, worried, calm, sad, angry, joyful, tired, stressed, and

smile[d]/laugh[ed]. In its variety of both positive and negative affect forms, the module is designed to capture the broad emotional territory of A-SWB. So does a similar set of items in the GWP, which include five positive experiences (well-rested, treated with respect, smile or laugh, learn or do something interesting, and enjoyment) and five negative ones (physical pain, worry, sadness, stress, anger). The GWP moreover respectively aggregates these items into a Positive Experience Index—which we explore in the present paper—and a Negative Experience Index (which we omit here for reasons of space, but which future research would do well to explore too).

The foregoing provides a very brief summary of some of the conceptual terrain delineated by SWB, including its evaluative and affective dimensions. Now we turn to the question at the heart of the paper, namely whether SWB is "U-shaped" over the lifespan. Note that this claim usually pertains specifically to *E*-SWB, which is the focus of most scholarship in this area (even if such work often simply refers generically to "wellbeing" or "happiness"). While there are far fewer studies looking at *A*-SWB, the data that does exist suggests it more usually simply declines with age. A meta-analysis of 14 longitudinal studies, for example, reported "positive affect remained stable across most of the younger and middle-aged adult lifespan, before starting its descent in later middle-aged adulthood and continuing to decline throughout older adulthood."[24] But as far as E-SWB is concerned, at least until recently, the U-shaped thesis had gained increasing traction over recent years, as we explore next.

A U-Shaped E-SWB Curve?

The idea that SWB—and especially E-SWB—has a U-shaped pattern has a long pedigree, especially in specific domains. Writing about job attitudes back in 1957, Herzberg and colleagues reported that "in general, morale is high among young workers. It tends to go down during the first few years of employment. The low point is reached when workers are in their middle and late twenties or early thirties. After this period, job morale climbs steadily

with age" (pp. 5-6).[25] Such insights were corroborated over subsequent decades, and by the early-mid 1990s were becoming widely disseminated,[26] with articles like "Is job satisfaction U-shaped in age?"[27] Likewise, research in the 1970s was similarly finding a U-shaped curve in arenas like marital satisfaction.[28] As such research accumulated, there emerged a sense that, beyond specific life domains, such patterns might generalize more broadly, with Oswald reporting in 1997 that "Happiness is apparently U-shaped in age (minimizing around the 30s)" (p.1823).[29] This conclusion was by no means unanimous, with prominent scholars such as Diener[30] and Argyle[31] reporting in the late 1990s that SWB tends to just increase with age (or at least does not drop). Over subsequent years though, work continued to emerge showing a U-shape curve, led especially by Oswald and Blanchflower, with a 2008 article—Is well-being U-shaped over the life cycle?[32]—proving particularly influential, finding a U-shaped curve among 72 developed and developing nations, with some exceptions (discussed below). As a result, the U-shape idea became widely-accepted notion (albeit with some dissenters), with Blanchflower and Graham even arguing (in response to one such dissent[33]) that it is "one of the most robust patterns in the data in social science" per se.[7] At the same time though, per our reference to "dissenters," the hypothesis continues to generate lively debate about its limits or issues on numerous fronts—even by proponents such as Blanchflower[8]—especially around questions of: (a) controls; (b) ubiquity; and (c) perenniality.

In terms of controls, essentially the issue is that evidence for a U-shape curve is much stronger if they are included and weaker if they are excluded. In an analysis of 145 countries, for example, Blanchflower[34] conducted analyses both with controls (i.e., gender, education, marital and labour force status, and time) and without: with them, the U-shape was described as "forcefully confirmed" (p.575); without, however, the picture was more ambivalent, and while many countries still had a U-shape, others did not, including notably the US (where the raw data had an "M-shaped" pattern, rising initially to a peak around age 30, declining into

midlife, then rising again after age 70). The question then of course is whether one *should* account for controls or not. Blanchflower and Oswald[35] view this choice as representing two different conceptual approaches, namely a "descriptive" one that just focuses on raw numbers for SWB and age, and one they call a "*ceteris-paribus* ["with other conditions remaining the same"] analytical approach," which studies patterns in regression equations (i.e., adjusting for other influences). While they note "neither is the 'correct' one," they themselves prefer the latter. As Blanchflower puts it,[34] from a policy and public communication perspective, it is "an error to use an equation without controls to tell the public what impact aging has on happiness without separating out the effects of other variables" (e.g., education, marriage, unemployment)," and that if the aim is to understand relationships then "it will rarely be desirable to stop at bivariate patterns." Other scholars though have argued against controls: Glenn[9] for instance suggested the U-shape curve is a result of their "inappropriate use," taking exception especially with controlling for marital status: given that it is widely accepted that SWB affects marital status (happier people are more likely to marry and stay married), he argues that "a variable that is affected by the dependent variable should not be included as a control variable in a simple recursive model."

At present, the debate over whether to employ controls in identifying life-course patterns in SWB remains unresolved in the literature. In our view, however, there is often insufficient justification provided for using them. For instance, Blanchflower[34] offers the following analogy to justify his use of controls: "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,' which requires other confounding variables to be controlled for such as diet, education, income, and exercise. We argued that [it] would be an error to use an equation without controls to tell the public what impact aging has on happiness without separating out the effects of other

variables such as, say, education, marriage, or unemployment." However, the proposed analogy is in fact not straightforward. The logic of controlling for diet and income in assessing the risk of smoking to one's health is that smoking has an independent effect on health, which can in principle be isolated from that of diet and income. But the relationship between age and SWB isn't obviously like that. As Blanchflower himself notes, Deaton[36] proposed, as a "weight[y] argument" for not employing controls, "that many possible and potentially important controls are age dependent, including income and the presence of children but especially health, disability, and marital status." This is correct, and indeed, some of the most plausible explanations of a mid-life decline in E-SWB are that the transition from youth to middle-age often brings with it changes related to work or family life (struggling to "make it" in one's profession, parenting challenges, or coping with aging parents) which are causally related to declining E-SWB, and whose recession as one ages toward retirement explain the subsequent rise in E-SWB. If that's correct, then in controlling for factors such as marriage, children, or employment, Blanchflower has actually controlled for important potential mediators of the effect of age on E-SWB. It is striking that, while he acknowledges Deaton's concerns about such controls, he does not address this objection in the 2021 paper itself.

This issue is of course less pressing if the U-shape is more-or-less evident even without controls, but in data such as those analyzed here, in which it is not evident on its face, controlling for potential mediators of the effect of age on E-SWB would seem to be an odd approach to drawing out that effect. Moreover, once again as noted by Glenn,[9] the control variables are often affected not only by age, but also by SWB itself. As such, in our analyses we *do not* use controls, though in the Limitations and Future Directions section in the Discussion we also present a roadmap for further research in which we *do* recommend a specific strategy for more rigorously investigating the question of controls—which is beyond

the scope of the present paper—and for more conclusively settling the question of whether they should be used (and if so which ones).

The second question is one of ubiquity: to the extent that a U-shaped curve *is* a consistent pattern, is it true everywhere? Again, there is considerable debate. Some studies have indeed found exceptions. Oswald and Blanchflower's aforementioned 2008 analysis of 72 nations,[32] for example, found the U-shape was not observed in 20 places, most of which were developing countries (though these also had relatively small samples); the interpretation offered was that mean lifespans are different in such countries compared to more affluent ones, so it "would be a surprise if exactly the same pattern emerged" (p.1741). In his 2021 paper though Blanchflower was far more confident about its near-universality, writing "No ifs, no buts, well-being is U-shaped in age […] I found evidence of the nadir in happiness in one hundred and forty-five countries."[34] Others though have continued to find exceptions, and not only among developing countries, although the difference may hinge on the question of controls. In an analysis of 29 European countries—which excluded control variables that are affected by age (as these are not antecedents of age), and explored the relationship via models that do not impose a quadratic functional form—Bartram reported that while U-shapes are "reasonably evident" for 18 countries, it is "particularly difficult to discern u-shapes" for 10 (Bulgaria, Czech Republic, Estonia, Finland, Hungary, Ireland, Italy, Portugal, Slovakia and Turkey), while for three (Belgium, Hungary and Lithuania) he is "only willing to say: perhaps" (p.70). One might note, though, that in response, Blanchflower and colleagues took issue with the analyses and data used, and argued there is compelling evidence elsewhere of U-shapes in the countries Bartram reported as being exceptions.[37] Finally, even *if* a U-shape is observed consistently, there are differences in its precise contours; an analysis of 46 countries found that while the U-shape held in 44, the "timing of the turn varies depending on average country-level happiness and on individuals' position in the well-being distribution" (p.255).[38]

A third key issue is whether the U-shape is a perennial trend, or one subject to the vagaries of circumstance, such as prevailing socio-political dynamics. Strikingly, even Blanchflower—arguably the foremost proponent of the U-shape idea, as evident above—suggests it may be the latter, as per his aforementioned article proclaiming "the gradual vanishing of the U-shape in age."[8] Using Eurobarometer data for 21 Western European countries since 1973, he suggests that although the U-shape has been "present for a long time," it has "now vanished." Specifically, in 13 Northern European countries—Belgium, Denmark, Finland, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Sweden, Switzerland, Turkey, and the UK—the U-shape has been replaced by life satisfaction rising with age (with these findings corroborated by data from the European Social Survey, the Global Flourishing Survey, and Global Minds). By contrast, in six Southern European countries—Cyprus, Greece, Italy, Malta, Spain, and Portugal—the U-shape was replaced by satisfaction *declining* with age, while in Austria and France the picture is mixed. Of particular note, besides the departure *per se* from the U-shape, is the divergence between the Northern and Southern countries in the manner of change. There have been suggestions that changes to the U-shape pattern mainly involve the left-hand side flattening in recent years, with younger people faring worse compared to people of similar age in earlier eras,[9,10] with VanderWeele and colleagues—analysing data from the Global Flourishing Study—suggesting the curve is thus becoming more "J-shaped."[39,40] But even if that may be the case in many countries, it was notable to see some Southern European countries in Blanchflower's analysis bucking that trend. However, these observations around the possible erosion of the U-shape are very new and tentative, and more work is needed to explore these dynamics, as we do here by assessing GWP data from 2006 to 2024.

In short, we have one overarching research question: is SWB U-shaped through the life span? Within this, we have several subsidiary questions. (1) Are all forms of SWB U-

shaped, and if so which ones? Then, if some forms *are* indeed U-shaped, (2) is this shape observed consistently over the years, or has it changed over time?, and (3) is this shape observed globally, or is there regional variation? Relatedly, we have one main hypothesis and three subsidiary hypotheses. The main hypothesis is that some basic U-shaped pattern will indeed be observed, at least in some conditions and populations. Then, to the extent that U-shape distributions *are* indeed evident, our three subsidiary hypotheses are that these will: (1) pertain to *E*-SWB rather than A-SWB; (2) be more evident over approximately the first half of our data (e.g., roughly 2006-2015) than the second half, with the pattern recently becoming more "J-shaped" (due to younger people faring less well lately compared to similarly-aged cohorts in earlier years); and (3) not be observed universally, with cross-cultural variation.

Methods

We explored data pertaining to SWB from the GWP, spanning 19 years of data collection, from 2006 to 2024, covering a total of 2,822,731 participants from 169 countries or territories. Salient details of the data collection and analysis as follows.

Data Collection

The GWP has collected data annually from countries worldwide since 2006. The survey usually takes 15-20 minutes to complete, and involves around 60–80 items (with the number varying among respondents based on considerations including screener questions, filters and skip patterns). The selection and number of countries varies each year, but usually features somewhere between 100 and 150 nations. It involves nationally representative, probability-based samples among the adult populations, aged 15 and older involving 1,000 around people per country and a different selection of people each year. This sample size is intended to allow, after accounting for survey weights, a maximum confidence interval of approximately 4 percentage points, providing enough power ($\beta = 0.80$, $\alpha = .05$) to detect a group difference of approximately 9 percentage points. Our analysis harnessed data from all 19 years of data

collection at the time of analysis (late 2025), from 2006 to 2024. The number of countries and participants for each year varies, as detailed in Supplementary Table S1, which shows for example that the number of countries/territories ranged from 95 (in 2007) to 149 (in 2014), with 169 included across all waves collectively, while the number of participants spanned 103,830 (in 2007) to 212,946 (in 2012), with 2,861,616 across all waves collectively.

The analyses focus firstly on Cantril's ladder (CL), introduced above, which is widely used as a measure of E-SWB. This asks, "Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder 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?" This was answered by 2,822,731 participants across all 19 waves of the survey, with precise figures for each year shown in Table 1. Secondarily, the analysis also looked at Gallup's "Positive Experience Index" (PEI), which taps into the *affective* dimension of SWB. This combines five items pertaining to experience the previous day, "Did you feel well-rested yesterday?"; "Were you treated with respect all day yesterday?"; Did you smile or laugh a lot yesterday?"; Did you learn or do something interesting yesterday?"; and "Did you experience the following feelings during a lot of the day yesterday? [Followed by a series of prompts, including …] How about enjoyment?" These items were answered by 2,738,642 participants across all 19 waves of the survey, with precise figures for each year shown in Supplementary Table S4. Note that S4 also includes the global mean and standard deviation values for the PEI, while for CL these data are separated in the main Results section here, with participant numbers in Table 1 and global mean and standard deviation values in Table 2.

Table 1. Participant numbers for Cantril's ladder from 2006-2024, in total and separated by age bracket

Age	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
15-19	11912	11111	13365	14897	15340	18942	20936	12984	15926	13213	13170	13415	13282	15481	9378	9521	11658	11352	11274	257157
20-24	14827	11961	14172	16580	16784	20994	22788	14601	18210	15482	15071	15759	15296	18609	16626	13467	14462	14574	14240	304503
25-29	14482	11871	14291	16858	17068	21502	24135	15680	20012	16314	16655	17171	17130	19481	17171	14211	15665	15287	14890	319874
30-34	13321	10778	12546	14723	15221	19207	23013	14402	19297	15547	15648	16223	16092	18287	15490	13880	14911	14883	14792	298261
35-39	12808	10459	12499	13715	14838	18059	21523	13221	17385	14067	13965	14594	14695	16518	13259	12426	13369	13780	13820	275000
40-44	11873	9214	11396	12317	13405	16973	20474	11949	16647	12654	12728	12822	12405	14159	11158	11317	12232	12644	12539	248906
45-49	10125	8114	10070	10723	12400	15512	18692	11107	14998	11248	11456	11502	11121	12725	9318	9559	10374	10975	10863	220882
50-54	9233	7156	8947	9097	11051	13790	17381	10454	14826	11002	11139	10885	10536	12129	8493	9317	10105	10502	10330	206373
55-59	7463	5727	7329	7420	9123	11554	14512	8529	12364	9337	9360	9794	9487	11008	6891	7549	8801	9172	9029	174449
60-64	6359	4861	6283	6494	7940	11163	14115	8073	11898	8910	9001	8942	8785	10417	6258	7701	9151	9256	8931	164538
65-69	5040	4040	5084	4998	5898	7570	9985	5685	9642	7314	7579	7822	7761	9060	4969	5992	7952	8142	8448	132981
70-74	3945	3040	3943	4010	4830	6475	8549	4334	7239	5110	5634	5798	5811	7055	4060	4909	5930	6299	6311	103282
75-79	2483	1929	2433	2298	2915	3938	5311	2873	4485	3427	3631	3770	3567	3947	2047	2656	3606	3917	3839	63072
80-84	1466	927	1326	1330	1638	2376	3072	1589	2681	1817	2190	2163	2026	2464	1177	1603	2258	2145	2137	36385
85-89	388	347	507	404	582	911	1187	618	930	781	871	903	774	897	454	614	922	790	853	13733
90-94	77	48	84	79	139	213	315	168	234	176	230	230	170	232	117	192	236	179	216	3335
Total	125802	101583	124275	135943	149172	189179	225988	136267	186774	146399	148328	151793	148938	172469	126866	124914	141632	143897	142512	2822731

Data Analysis

The data analysis had two main phases: (1) extraction of basic data from the GWP, (2) preparation and analysis of visual figures based on the basic data; and (3) statistical analysis of the CL data.

Extraction of Basic Data

First, in terms of (1), as noted above, there were two outcomes of interest: CL and the PEI. CL is on an 11-point scale, where "0" represents a participant's "worst possible life," and "10" their "best possible life." For the PEI, Gallup's Research Methodology and Codebook[41] states that "Index scores are calculated at the individual record level. For each individual the following procedure applies: The five items are recoded so that positive answers are scored as a "1" and all other answers (including don't know and refused) are scored as a "0." If a record has no answer for an item, then that item is not eligible for inclusion in the calculations. An individual record has an index calculated if it has at least four out of five valid scores (0 or 1). The record's final score is the mean of valid items multiplied by 100. The final country-level index score is the mean of all individual records for which an index score was calculated. Country-level weights are applied to this calculation." For both main outcomes, we simply extracted the mean and standard deviation, stratified in three key waves: (a) by year of the GWP (from 2006 to 2024); (b) by age group, with participants stratified into 14 separate 5-year brackets (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, and 90-94); and (c) by world region (with Gallup organizing the dataset as standard into 11 regions: European Union, Europe Other, Independent States, Australia and New Zealand, South East Asia, South Asia, East Asia, Latin America, North America, Middle East and North Africa, and Sub-Saharan Africa). These data were transferred from SPSS to Excel, with the latter used to make the tables and figures in the Results section and Supplementary Files.

Analysis of Visual Figures

The second phase of the analysis involved preparation and analysis of visual figures based on the basic data. Their preparation involved creating simple line figures using Excel. Two main types of figures were produced. The first type shows *all* years of the GWP, with the main outcome (i.e., either the CL or PEI mean) as the *y* axis, the years of the GWP as the *x* axis, and the age brackets as the lines. Such figures include, for instance, Figures 1a-c in the Results below, which illustrate the change in CL means for each age bracket over the 19 years of the GWP. The second type of figure usually focuses just on a single year (apart from Figures 2a-c below, which combine all years), with the main outcome again (i.e., either the CL or PEI mean) as the *y* axis, but this time with the age bracket as the *x* axis, and just a single line to show the comparison between age brackets. It is primarily using this second type of figure that we seek to answer the research question at the heart of the paper, namely whether SWB is U-shaped over the lifespan. For these second figures, there are several points to note. First, we only include 12 age brackets, excluding the 85-89 and 90-94 groups, since these are invariably numerically very small (e.g., in some regional data, there was just one person in the 90-94 bracket), and including them could produce a misleading picture. Second, we include two iterations of such figures: the main one, on the left-hand side of the page, has a standardized *y* axis (i.e., with the same scale as all other figures of that type), then to the right we have a smaller image featuring an axis that zooms in on the line, exaggerating its form. Third, in the main text we just include global tables and figures for each year of the GWP, both for CL and the PEI. Then, in the Supplementary Files we provide tables and figures for the 11 global regions. For these regions though, rather than presenting data for all 19 waves (since that would produce an unwieldly number of figures), we just have data for three waves, at the beginning (2006), middle (2015), and end (2024) of the total data collection period.

In terms of the *analysis* of the figures, rather than simply canvassing our subjective impressions of whether a given figure was indeed U-shaped, we sought to design more precise and quasi-objective schemas for making that assessment. Two different schemas were devised: a rubric to quantify the visual inspection of the figures, and a statistical system for assessing structural scores that quantify the geometric coherence of age–wellbeing profiles. Taking first the rubric, this involved identifying four distinct criteria: (a) the number of Us; (b) the number of kinks; (c) the skew; and (d) the incline. The first author then rated each figure according to these criteria. We acknowledge that the rubric currently is unvalidated, and still remains somewhat subjective (i.e., based on the visual interpretation of a single rater). Future work will include evaluating and validating the rubric itself, and establishing inter-rated reliability. The present paper, however, at least puts forward criteria to attempt to move somewhat beyond simple standard visual inspection. With that said though, we are still alert to potential issues with the rubric, which will ideally be refined in future validation efforts, as we articulate further in the Discussion. With such caveats in mind though, we shall use Figures 3b and 3c, as examples here, which depict the overall CL mean values for each age group in 2007 and 2008 respectively.

First, a "U" represents a point of down-up inflection in a figure, such that a line "changes direction" upwards in a substantive way (with "substantive" defined as involving two or more brackets after the inflection). In Figure 3c this occurs at the 25-29 age group, where from an initial high of 5.63 for those aged 15-19, it falls to 5.35 for those 20-24, then reaches a nadir of 5.32 for those 25-29, after which it climbs again. With 3b though, there are *two* U points: one again at 25-29, but also one at 70-74. There are also occasional "half" Us, in which a U-shape is followed by a decline into older age (e.g., as seen in Figure 3g, showing 2012), but one which doesn't then rise again into very old age (in which case it would constitute a second U). The second criteria was the presence of a "kink" in a line: not an

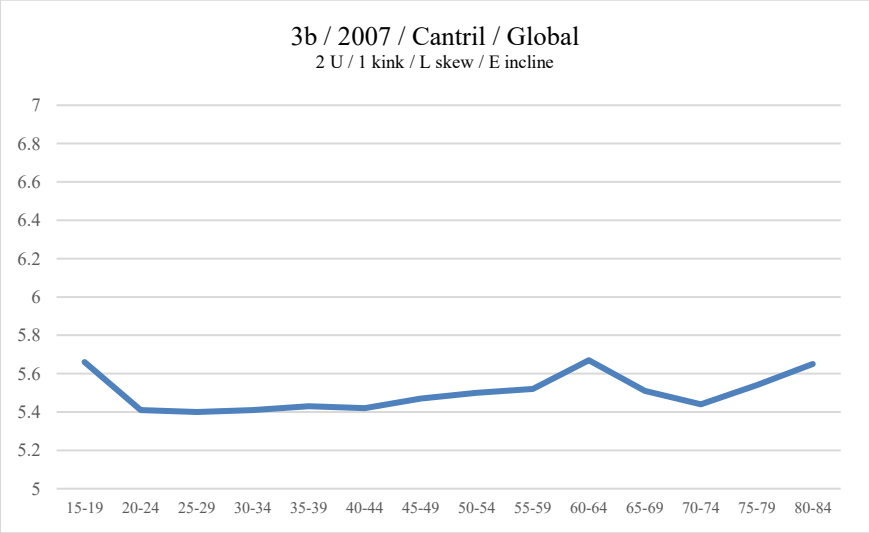
inflection point per se but the interruption of a trend line by just one age category. One sees this for instance in 3b, in which a gentle upward slope after the 25-29 bracket is slightly interrupted by a slight fall at 40-44. It is the interruption of a trend by just *one* bracket that makes it a kink; an interruption by two would turn it into a second U (e.g., in 3b, if the slight fall at 40-44 was followed by an even further slight fall at 45-49, after which it then rose again, then this would constitute a U rather than a kink). One point to note is that, for several figures, there was an ambiguous situation for the very oldest brackets, in which there was a peak at 65-69, followed by downward incline through 70-74 and 75-79, then an uptick for 80-84. In that case, it is unclear—since we do not include the bracket above (85-89)—whether the latter uptick constitutes a kink interrupting an ongoing decline or an upward slope of a new U. In such cases we have designated it as a U, though equally other people may prefer to interpret it as a kink.

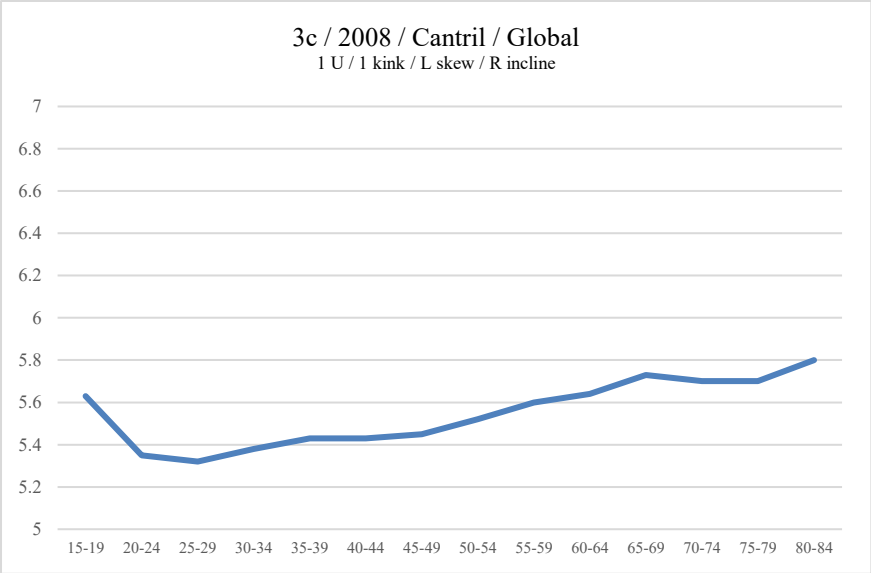
The third criteria is "skew," which refers to the general impression of whether the lowest point, and more generally the lowest parts of the figure, are either towards the left (i.e., younger people overall generally doing worse), middle, or right (older people doing worse), which in both 3b and 3c is towards the left. Finally, incline refers to the general impression regarding whether the highest point, and more generally the highest parts of the figure, are either towards the left (i.e., younger people), middle, or right (older people). Note that sometimes both skew and incline can be on the same side (e.g., both being towards the left), such as global in CL 2013 (Figure 3h). In some instances, such as 3b, the high points on either side are roughly equal (e.g., separated by no more than 0.1 point on the 10 point scale).

Lastly, we then sought to rate the CL figures according to these U-shaped criteria to give each an overall grade of "U-ness." While a "perfect" U figure—i.e., precisely matching the shape of the actual letter—is not realistically attainable, in the present context we would deem a figure to be fully U-shaped if it had, (a) one U, (b) no kinks, (c), a medium skew (i.e.,

the low point was in the middle), and (d) an equal incline (i.e., the high points on either side were roughly equal). We then subtracted from each figure one point for every departure from these criteria. Thus, 3b for instance has *two* Us, one kink, a left skew, and an equal incline, so it has a score of -3. The exception to this scoring is the case of zero Us (e.g., just a general decline), which is so undermining of the U principle as to be deemed worth subtracting *five* points. This pilot scoring system, while no doubt imperfect—and moreover one which we aim to evaluate and validate in a future paper devoted specifically to the rubric, as noted above—allows us to compare figures across different years for their degree of U-ness, as shown in Tables 3 and 4. In these Tables we also grouped GWP waves into five batches (i.e., 2006-2009, 2010-2013, 2014-2017, 2018-2021, and 2022-2024), averaging the scores across the waves from each batch, to explore whether there has been a general change in U-ness over time. A final point to mention is that we only analyzed the CL figures in this way. The figures for the PEI all essentially took the shape of an overall decline (apart from often a kink/uptick usually around 60-64), and the U-shape analysis was generally moot.

Figures 3b and 3c. Global Cantril means for 2007 and 2008, shown for illustrative purposes





Statistical Analysis of the CL Data

To complement the heuristic U-score rubric, we developed a system for assessing structural U- and J- "beauty" scores that quantify the geometric coherence of age–wellbeing profiles. Rather than evaluating similarity to a symmetric template, these scores assess the strength of two competing structural regimes: an interior-trough pattern (U) and a monotonic age-gradient pattern (J). The U-beauty score captures the coherence of a midlife dip by aggregating measures of trough depth, interiority, monotonic consistency, curvature, and symmetry. The J-beauty score analogously captures the coherence of a monotonic rise by combining measures of net age gradient, monotonicity, convexity in later life, and structural stability. Both scores are bounded between 0 and 1 and are interpreted relative to the empirical distribution of observed values. Based on empirical quantiles of the full sample distribution, values in the lower quartile (approximately < 0.02) are interpreted as weak structural coherence, values within the interquartile range (approximately 0.02–0.10) as moderate coherence, and values in the upper quartile (approximately > 0.10) as relatively strong geometric structure. Because the scores are multiplicative and therefore compressed in

magnitude, interpretation focuses on relative strength across years and regions rather than absolute numeric size.

Structural dominance is measured using a normalized difference index defined as

$$D = \frac{U - J}{U + J}$$

where U and J denote the U-beauty and J-beauty scores, respectively. This bounded and scale-invariant measure ranges from −1 to 1 and captures the relative strength of competing structural regimes. Positive values indicate U-dominance (interior-trough structure), negative values indicate J-dominance (monotonic age-gradient structure), and values near zero indicate weak or ambiguous structural coherence. Unlike the heuristic U-score, which evaluates conformity to a symmetric benchmark, the dominance metric identifies the prevailing geometric regime and therefore clarifies whether weakening U-patterns reflect asymmetry or structural transition. By computing both scores for each year and region and evaluating their relative dominance, we identify the prevailing structural regime and assess its strength. This framework moves the analysis beyond the question of whether a symmetric U exists toward a more general assessment of the functional form governing age–wellbeing relationships.

The heuristic and structural approaches therefore answer different but complementary research questions. The heuristic U-score evaluates how closely the data conform to the canonical symmetric midlife-centred U-shape, preserving continuity with the existing literature. The structural U- and J-scores, by contrast, identify the underlying functional regime and quantify its geometric coherence. Together, they allow us not only to assess whether the symmetric U weakens over time, but also to determine whether that weakening reflects asymmetry within a U-pattern, structural flattening, or a transition toward J-dominance. In this sense, the heuristic approach tests the classical hypothesis, while the structural framework explains the mechanism behind its instability.

Operationally, each country–year age profile is approximated using a cubic B-spline, a flexible smoothing technique that fits a smooth curve through the data without imposing a predetermined functional form. Spline complexity is selected using standard model selection criteria, ensuring a flexible fit while avoiding overfitting. This approach allows the data to determine curvature without imposing a quadratic structure that could mechanically induce U-like patterns. Second, geometric features of each fitted spline are extracted, including amplitude, endpoint differences, trough depth and location, monotonicity, curvature, and turning behaviour. These features constitute the basis of the continuous U- and J-beauty scores described above, providing a direct geometric characterization of the age–wellbeing profile. Third, for each country–year spline, the multiplicative beauty scores are computed. The resulting U- and J-scores are continuous and bounded, allowing comparison across years and regions as well as aggregation across countries. Because the scores are products of several geometric components, their magnitudes are naturally small; interpretation therefore relies on relative comparison and on the dominance index rather than on absolute size alone. Full methodological details, including spline estimation, geometric definitions, parameter values, and robustness checks, are provided in the Supplementary Appendix titled *Structural Classification of Age–Wellbeing Profiles*.

Results

The Results section is in two main parts. First, we present the data for CL, then for the PEI.

Cantril

This first part shows the main global results for CL, beginning with tables and then figures. The regional results can be found in the Supplementary Files, as detailed below. Beginning with the Tables, Table 2 provides the global CL mean values from 2006-2024, separated into 14 age brackets, as well as in total. We shall not summarize the table here, as that is the purpose of the figures shown below, which illustrate the details in the Table. Additionally, to

explore changes in CL scores over time, in Table 3 we clustered participants into three broad age ranges (younger, middle, and older) and the years into five batches. If we compare mean scores between the first batch (2006-2009) and the most recent (2022-2024), while there was a general rise of 0.21 (from 5.47 to 5.58), the increase was smallest for the youngest participants (0.06, from 5.46 to 5.52), with a bigger rise of 0.19 for the middle aged (0.19, from 5.44 to 5.63), and an even larger one for older participants (0.37, from 5.51 to 5.88).

Table 4 then presents our analysis of the U-ness of the global CL figures, both for each year, and separated into five batches. There we can see, for instance, that the year with the least U-ness was 2015, with a score of -7 (produced by having two Us, two kinks, a left skew and a right incline), while the most U-shape pattern was in 2020, with a score of -2 (produced by having one U, no kinks, a left skew and a right incline). Overall, there was an average score (see final column) of -4.2, but the figures perhaps become slightly less U-shaped over time, with an average score of -3.5 across 2006-2009, falling to -3.8 in 2010-2013 and then -4.7 in 2014-2017, rising back to -3.7 in 2018-2021, and falling again to -5.7 in 2022-2024. Also, most figures had a left skew (17 out of 19, with two skewed to the right), suggesting generally lower scores for younger people, while most figures had an incline towards the right (13 out of 19, with three having a left incline and three with equal incline), indicating generally higher peaks for older people versus younger people. Additionally, although the regional figures are provided in the Supplementary Files, here we nevertheless include our analysis of these in Table 5. This shows the U-shape scores for the three select years we have focused on for the regional data (2006, 2015, 2024), as well as the mean for all three years. There we see, for instance, that the region with the most U-like distribution is South East Asia (a mean of -3.3), while the EU has the least U-like distribution, involving numerous kinks (-10.7).

Table 4 also reports heuristic U-scores alongside structural U- and J-beauty scores and their associated dominance values for the global sample. To facilitate interpretation of the beauty scores, we classify structural strength relative to the empirical distribution of observed scores rather than imposing arbitrary cutoffs. Specifically, values below the 25th percentile of the distribution are interpreted as weak structural coherence, values between the 25th and 75th percentiles as moderate, and values above the 75th percentile as relatively strong. Because the beauty scores are multiplicative and bounded in the unit interval, absolute magnitudes are naturally compressed; interpretation therefore focuses on relative differences across years. Under this distribution-based interpretation, the strongest U-dominant years globally occur in 2018 and 2019, which lie in the upper tail of the U-beauty distribution and reflect relatively deep and coherent midlife troughs. Earlier years, such as 2010–2013, generally fall into the moderate range. In contrast, the most recent period (2020–2024) is characterized by either weak U-coherence or clear J-dominance, with 2021 and 2024 displaying particularly strong J-structure relative to the sample distribution. Years such as 2020 and 2023 exhibit structurally weak profiles overall, with both U- and J-beauty scores near the lower tail of the distribution. Taken together, the strength distribution reinforces the broader temporal pattern. The canonical U-shape appears strongest in the late 2010s but weakens substantially thereafter, while J-dominance becomes more pronounced in several post-2020 years. The evidence thus suggests not only instability in the symmetric midlife dip but also a gradual reconfiguration of the underlying age-profile structure.

The heuristic measure indicates substantial temporal variation in conformity to the symmetric midlife-centred U benchmark. However, the structural scores clarify that low heuristic scores do not necessarily imply the absence of structure; rather, they reflect shifts in underlying geometric dominance rather than uniform erosion of a single pattern. In the late 2010s, particularly 2018 and 2019, U-beauty scores lie in the upper tail of the empirical

distribution, indicating relatively strong interior-trough coherence despite moderate asymmetry penalties in the heuristic metric. By contrast, the post-2020 period displays markedly different structural characteristics. While heuristic U-scores remain weak, the structural framework reveals increasing J-dominance in several years, most notably 2021 and 2024. In these years, J-beauty substantially exceeds U-beauty, reflecting stronger monotonic age gradients and diminished interior trough coherence. Other recent years, such as 2023, exhibit only mild dominance and low absolute beauty scores, suggesting structurally weak or diffuse profiles rather than clearly defined U-patterns. Taken together, the global evidence indicates that the canonical symmetric U-shape is neither uniformly strong nor temporally stable. Declines in heuristic U-quality in recent years correspond not merely to increased asymmetry but, in several cases, to a shift toward J-dominant structural regimes. The structural framework thus decomposes the heuristic signal, distinguishing weakening symmetry within a U-pattern from a reconfiguration of the underlying age–wellbeing structure.

Table 5 then extends the structural analysis to regional subsamples for benchmark years. Substantial heterogeneity emerges across regions, both in the strength of structural coherence and in the dominant regime. Several regions (e.g., Latin America and South Asia) display persistent U-dominance across benchmark years, with moderate to strong U-beauty values and minimal J-coherence. In these cases, heuristic asymmetry penalties largely reflect skew or incline effects rather than the absence of a coherent interior trough. The structural evidence therefore indicates that midlife dips remain geometrically meaningful in these regions despite deviations from strict symmetry. Other regions exhibit greater structural instability. North America and Sub-Saharan Africa show weaker U-coherence and, in some benchmark years, increasing J-dominance or overall structural weakness. In these cases, declining U-beauty is not accompanied by strong geometric reinforcement, suggesting

flattening or partial reconfiguration rather than stable U-patterns. Where J-beauty becomes comparatively stronger, the dominance index indicates a shift toward monotonic age gradients rather than merely asymmetry within a U-form. Importantly, the structural framework clarifies that regional variation is not simply a matter of stronger or weaker conformity to a symmetric benchmark. Instead, regions differ in their prevailing functional regimes, ranging from relatively coherent U-dominant structures to weak or J-dominant patterns. This heterogeneity reinforces the conclusion that age–wellbeing profiles are neither universally symmetric nor structurally invariant across contexts.

Finally, Table 6 reports annual cross-country summaries of structural beauty scores, dominance, and the shares of U- and J-dominant as well as structurally weak countries. Annual summaries are constructed by first calculating U- and J-beauty scores and the dominance index for each country–year observation, after which simple averages are taken across countries for each year. Average U-beauty is moderate in the early period and peaks around 2010 (0.0495), before declining to 0.0171 in 2020. Although there is a partial recovery in 2021–2022, the score remains below earlier levels (0.0289 in 2024). By contrast, J-beauty is negligible in the early years (around 0.001–0.002), increases gradually, and reaches its maximum in 2021 (0.0149), remaining elevated relative to the pre-2015 period thereafter. Consistent with these movements, dominance is strongly positive in early years (above 0.25), declines to 0.1012 by 2017, and stabilizes thereafter at approximately 0.10–0.15. Thus, U-dominance persists on average, but at a reduced level relative to the beginning of the sample. The distributional shares mirror this pattern. The proportion of U-dominant countries falls from above one-third in early years to 28–29% in recent years, while the share of J-dominant countries rises from roughly 10% to above 20%. Nonetheless, U-dominance remains more common than J-dominance throughout. A substantial majority of countries (70–80%) exhibit structurally weak profiles in most years, indicating that strong geometric regimes are

uncommon at the national level. Overall, the country-level evidence points to a gradual weakening of U-dominance and an increasing presence of J-shaped profiles, rather than a complete structural reversal. Detailed country-level averages are reported in the Appendix.

Table 2. Global Cantril mean values, 2006-2024, separated by age

Age	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Mean
15-19	5.63	5.66	5.63	5.70	5.67	5.64	5.67	5.47	5.67	5.50	5.47	5.59	5.77	5.65	5.89	5.74	5.54	5.63	5.66	5.64
20-24	5.46	5.41	5.35	5.46	5.48	5.47	5.52	5.40	5.58	5.44	5.44	5.44	5.51	5.44	5.67	5.56	5.44	5.49	5.53	5.48
25-29	5.39	5.40	5.32	5.39	5.39	5.39	5.41	5.28	5.47	5.33	5.32	5.32	5.40	5.32	5.59	5.56	5.40	5.47	5.54	5.40
30-34	5.46	5.41	5.38	5.41	5.43	5.42	5.42	5.28	5.53	5.35	5.34	5.39	5.38	5.33	5.66	5.60	5.44	5.54	5.55	5.44
35-39	5.50	5.43	5.43	5.37	5.48	5.46	5.44	5.31	5.57	5.33	5.29	5.37	5.34	5.31	5.67	5.58	5.36	5.55	5.59	5.44
40-44	5.48	5.42	5.43	5.39	5.47	5.53	5.52	5.34	5.60	5.39	5.39	5.45	5.40	5.43	5.73	5.60	5.47	5.56	5.56	5.48
45-49	5.39	5.47	5.45	5.36	5.46	5.52	5.55	5.39	5.62	5.36	5.43	5.43	5.44	5.42	5.77	5.73	5.51	5.63	5.69	5.51
50-54	5.37	5.50	5.52	5.29	5.45	5.50	5.58	5.36	5.63	5.37	5.49	5.43	5.53	5.54	5.84	5.69	5.55	5.62	5.73	5.53
55-59	5.51	5.52	5.60	5.38	5.50	5.54	5.62	5.40	5.73	5.42	5.50	5.48	5.57	5.50	5.97	5.82	5.60	5.74	5.89	5.59
60-64	5.52	5.67	5.64	5.43	5.55	5.71	5.73	5.39	5.77	5.42	5.52	5.49	5.54	5.40	6.06	5.86	5.63	5.68	5.79	5.62
65-69	5.45	5.51	5.73	5.40	5.52	5.73	5.82	5.43	5.93	5.64	5.70	5.70	5.68	5.63	6.39	5.97	5.76	5.90	5.95	5.73
70-74	5.41	5.44	5.70	5.23	5.37	5.60	5.77	5.28	5.80	5.59	5.69	5.67	5.18	5.74	6.63	6.10	5.70	5.81	5.98	5.67
75-79	5.41	5.54	5.70	5.20	5.39	5.60	5.76	5.32	5.74	5.50	5.67	5.61	5.78	5.70	6.62	6.33	5.98	6.02	6.11	5.74
80-84	5.49	5.65	5.80	5.30	5.40	5.74	5.75	5.41	5.80	5.54	5.61	5.61	5.60	5.63	6.58	6.26	6.00	5.90	6.05	5.74
85-89	5.84	5.69	5.89	5.43	5.62	5.83	5.91	5.38	5.73	5.51	5.68	5.62	5.60	5.71	6.49	6.16	5.98	5.94	6.22	5.80
90-94	5.42	4.83	6.14	5.14	5.48	5.47	6.04	5.40	5.82	5.41	5.60	5.70	6.02	5.68	6.43	6.25	6.07	6.31	5.79	5.74
Total	5.48	5.47	5.61	5.37	5.48	5.57	5.66	5.37	5.69	5.44	5.51	5.52	5.55	5.53	6.06	5.86	5.65	5.74	5.79	5.60

Table 3. Change in Global Cantril mean values, 2006-2024, separated by age and clustered into years

Age	06-09	10-13	14-17	18-21	22-24	06-09 – 22-24 diff.
15-19	5.66	5.61	5.56	5.76	5.61	0.05
20-24	5.42	5.47	5.48	5.55	5.49	0.07
25-29	5.38	5.37	5.36	5.47	5.47	0.09
30-34	5.42	5.39	5.40	5.53	5.51	0.09
35-39	5.43	5.42	5.39	5.48	5.50	0.07
Younger	5.46	5.45	5.44	5.56	5.52	0.06
40-44	5.43	5.47	5.46	5.54	5.53	0.10
45-49	5.42	5.48	5.46	5.59	5.61	0.19
50-54	5.42	5.47	5.48	5.65	5.63	0.21
55-59	5.50	5.52	5.53	5.72	5.74	0.19
Middle	5.44	5.48	5.48	5.62	5.63	0.19

60-64	5.57	5.60	5.56	5.72	5.70	0.13
65-69	5.52	5.63	5.74	5.92	5.87	0.35
70-74	5.45	5.51	5.69	5.91	5.83	0.38
75-79	5.46	5.52	5.63	5.63	6.04	0.58
80-84	5.56	5.58	5.64	6.02	5.98	0.42
Older	5.51	5.56	5.65	5.84	5.88	0.37
Total	5.47	5.50	5.53	5.68	5.68	0.21

Table 4. Global Cantril U-shape ratings, 2006-2024

Feature	All	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	06-09	10-13	14-17	18-21	22-24	Me
Spline shape class	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U(4/0/0)	U(4/0/0)	U(4/0/0)	U(4/0/0)	U(3/0/0)	U(19 0)
U	2.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	2.0000	3.0000	2.0000	3.0000	2.0000	3.0000	2.0000	2.0000	2.0000	1.0000	4.0000	1.0000	2.0000	3.0000	2.7500	2.5000	1.7500	2.3333	2.47
Kink	1.0000	2.0000	3.0000	2.0000	2.0000	3.0000	2.0000	2.0000	4.0000	1.0000	2.0000	1.0000	2.0000	2.0000	2.0000	1.0000	1.0000	4.0000	1.0000	2.0000	2.2500	2.7500	1.5000	1.5000	2.3333	2.05
Skew	L	M	R	L	R	R	L	L	L	L	L	L	L	L	L	L	L	L	L	L	R(1/1/2)	L(3/0/1)	L(4/0/0)	L(4/0/0)	L(3/0/0)	L(15 3)
Incline	R	L	L	R	L	L	R	R	L	R	E	R	E	L	L	R	R	R	R	R	L(3/0/1)	L(2/0/2)	E(0/2/2)	L(2/0/2)	R(0/0/3)	R(7/ 0)
Score	-4.0000	-5.0000	-7.0000	-6.0000	-6.0000	-7.0000	-6.0000	-5.0000	-8.0000	-4.0000	-5.0000	-4.0000	-5.0000	-5.0000	-5.0000	-4.0000	-3.0000	-9.0000	-3.0000	-5.0000	-6.0000	-6.5000	-4.5000	-4.2500	-5.6667	-5.36
U-beauty	**0.1159**	**0.0621**	**0.0347**	**0.0348**	**0.0021**	**0.0007**	**0.0995**	**0.1146**	**0.0932**	**0.0671**	**0.1181**	**0.1115**	**0.1035**	**0.1762**	**0.1043**	**0.0321**	**0.0030**	**0.0105**	**0.0087**	**0.0025**	**0.0334**	**0.0770**	**0.1001**	**0.0789**	**0.0072**	**0.06**
J-beauty	0.0364	0.0000	0.0000	0.0150	0.0000	0.0000	0.0058	0.0099	0.0000	0.0406	0.0002	0.0276	0.0019	0.0000	0.0000	0.0763	0.1960	0.0021	0.1602	0.0436	0.0037	0.0039	0.0176	0.0681	0.0686	0.03
Dominance	0.5222	1.0000	1.0000	0.3985	1.0000	1.0000	0.8896	0.8411	1.0000	0.2460	0.9961	0.6037	0.9648	1.0000	1.0000	-0.4077	-0.9701	0.6686	-0.8966	-0.8924	0.8496	0.9327	0.7026	0.1555	-0.3735	0.49

Table 5. Regional Cantril U-shape ratings, 2006, 2015, and 2024

	EU				Europe Other				Independent States				Australia / New Zealand				Sout East Asia				South Asia			
Feature	2006	2015	2024	Mean	2006	2015	2024	Mean	2006	2015	2024	Mean	2006	2015	2024	Mean	2006	2015	2024	Mean	2006	2015	2024	Mean
Spline shape class	neither	neither	neither	neither(0/0/3)	U	U	neither	U(2/0/1)	neither	U	neither	neither(1/0/2)	neither	U	J	U(1/1/1)	neither	U	U	U(2/0/1)	U	U	U	U(3/0/0)
U	4.0000	2.0000	2.0000	2.6667	4.0000	2.0000	3.0000	3.0000	3.0000	2.0000	3.0000	2.6667	2.0000	3.0000	4.0000	3.0000	3.0000	3.0000	4.0000	3.3333	2.0000	4.0000	4.0000	3.3333
Kink	3.0000	1.0000	2.0000	2.0000	3.0000	2.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	2.0000	3.0000	3.0000	2.6667	2.0000	2.0000	3.0000	2.3333	1.0000	4.0000	4.0000	3.0000
Skew	R	R	R	R(0/0/3)	L	M	R	L(1/1/1)	R	R	R	R(0/0/3)	L	L	L	L(3/0/0)	R	R	R	R(0/0/3)	R	R	R	R(0/0/3)
Incline	L	L	L	L(3/0/0)	L	L	L	L(3/0/0)	L	L	L	L(3/0/0)	L	L	R	L(2/0/1)	L	R	L	L(2/0/1)	R	L	L	L(2/0/1)
Score	-8.0000	-4.0000	-5.0000	-5.6667	-8.0000	-4.0000	-8.0000	-6.6667	-7.0000	-6.0000	-7.0000	-6.6667	-5.0000	-7.0000	-8.0000	-6.6667	-6.0000	-6.0000	-8.0000	-6.6667	-4.0000	-9.0000	-9.0000	-7.3333
U-beauty	0.0000	0.0000	0.0000	0.0000	0.0276	0.1070	0.0000	0.0449	0.0000	0.0068	0.0000	0.0023	0.0000	0.1731	0.0000	0.0577	0.0000	0.0555	0.2914	0.1156	0.0297	0.0276	0.0797	0.0456
J-beauty	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0044	0.0015	0.0000	0.0018	0.0000	0.0006	0.0123	0.0000	0.0000	0.0041
Dominance	–	–	–	–	1.0000	1.0000	–	1.0000	–	1.0000	–	1.0000	–	1.0000	-1.0000	0.0000	–	0.9378	1.0000	0.9689	0.4154	1.0000	1.0000	0.8051

Zero U = -5

	East Asia				Latin America				North America				Middle East and North Africa				Sub-Saharan Africa			
Feature	2006	2015	2024	Mean	2006	2015	2024	Mean	2006	2015	2024	Mean	2006	2015	2024	Mean	2006	2015	2024	Mean
Spline shape class	U	U	U	U(3/0/0)	U	U	U	U(3/0/0)	U	U	J	U(2/1/0)	U	neither	U	U(2/0/1)	neither	neither	U	neither(1/0/2)
U	3.0000	3.0000	3.0000	3.0000	2.0000	3.0000	1.0000	2.0000	4.0000	2.0000	2.0000	2.6667	3.0000	2.0000	2.0000	2.3333	3.0000	2.0000	2.0000	2.3333
Kink	3.0000	3.0000	3.0000	3.0000	1.0000	2.0000	1.0000	1.3333	4.0000	2.0000	2.0000	2.6667	3.0000	2.0000	2.0000	2.3333	3.0000	1.0000	1.0000	1.6667
Skew	R	M	R	R(0/1/2)	M	R	R	R(0/1/2)	L	L	L	L(3/0/0)	R	R	R	R(0/0/3)	R	R	M	R(0/1/2)
Incline	L	L	L	L(3/0/0)	L	L	L	L(3/0/0)	R	L	E	L(1/1/1)	R	L	L	L(2/0/1)	L	L	L	L(3/0/0)
Score	-7.0000	-6.0000	-7.0000	-6.6667	-3.0000	-6.0000	-3.0000	-4.0000	-9.0000	-5.0000	-4.0000	-6.0000	-7.0000	-5.0000	-5.0000	-5.6667	-7.0000	-4.0000	-3.0000	-4.6667
U-beauty	0.0748	0.1180	0.0042	0.0656	0.0533	0.0317	0.0789	0.0546	0.0987	0.0833	0.0000	0.0606	0.0318	0.0000	0.0187	0.0168	0.0000	0.0000	0.1557	0.0519
J-beauty	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0001	0.0028	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000
Dominance	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9920	1.0000	–	0.9960	0.8356	–	1.0000	0.9178	–	–	1.0000	1.0000

Table 6. National Cantril U-shape ratings, 2006-2024

Feature	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	All
Mean U-beauty	0.0779	0.0231	0.0196	0.0383	0.0277	0.0495	0.0256	0.0278	0.0402	0.0413	0.0359	0.0348	0.0415	0.0341	0.0331	0.0171	0.0367	0.0388	0.0357	0.0289	0.0337
Mean J-beauty	0.0012	0.0013	0.0012	0.0017	0.0054	0.0025	0.0031	0.0017	0.0012	0.0009	0.0028	0.0032	0.0073	0.0027	0.0027	0.0027	0.0149	0.0034	0.0019	0.0026	0.0011
Mean dominance	0.1505	0.2190	0.2771	0.0802	0.1932	0.2812	0.1752	0.1954	0.2836	0.2806	0.1743	0.1630	0.1012	0.1632	0.1992	0.1469	0.1515	0.1666	0.2271	0.1060	0.3455
Share U-dominant	37.50%	38.71%	40.62%	33.33%	31.58%	42.86%	33.78%	36.00%	0.4394%	36.59%	28.12%	35.62%	33.75%	36.76%	34.52%	33.33%	33.85%	35.29%	45.21%	28.75%	35.99%
Share J-dominant	18.75%	9.68%	12.50%	25.64%	10.53%	14.29%	12.16%	14.67%	0.1212%	7.32%	9.38%	13.70%	22.50%	17.65%	13.10%	14.29%	15.38%	16.18%	17.81%	20.00%	1.44%
Share structurally weak	75.00%	70.97%	78.12%	66.67%	71.05%	61.90%	75.68%	70.67%	0.6364%	73.17%	73.44%	67.12%	68.75%	73.53%	70.24%	69.05%	75.38%	69.12%	65.75%	78.75%	73.08%

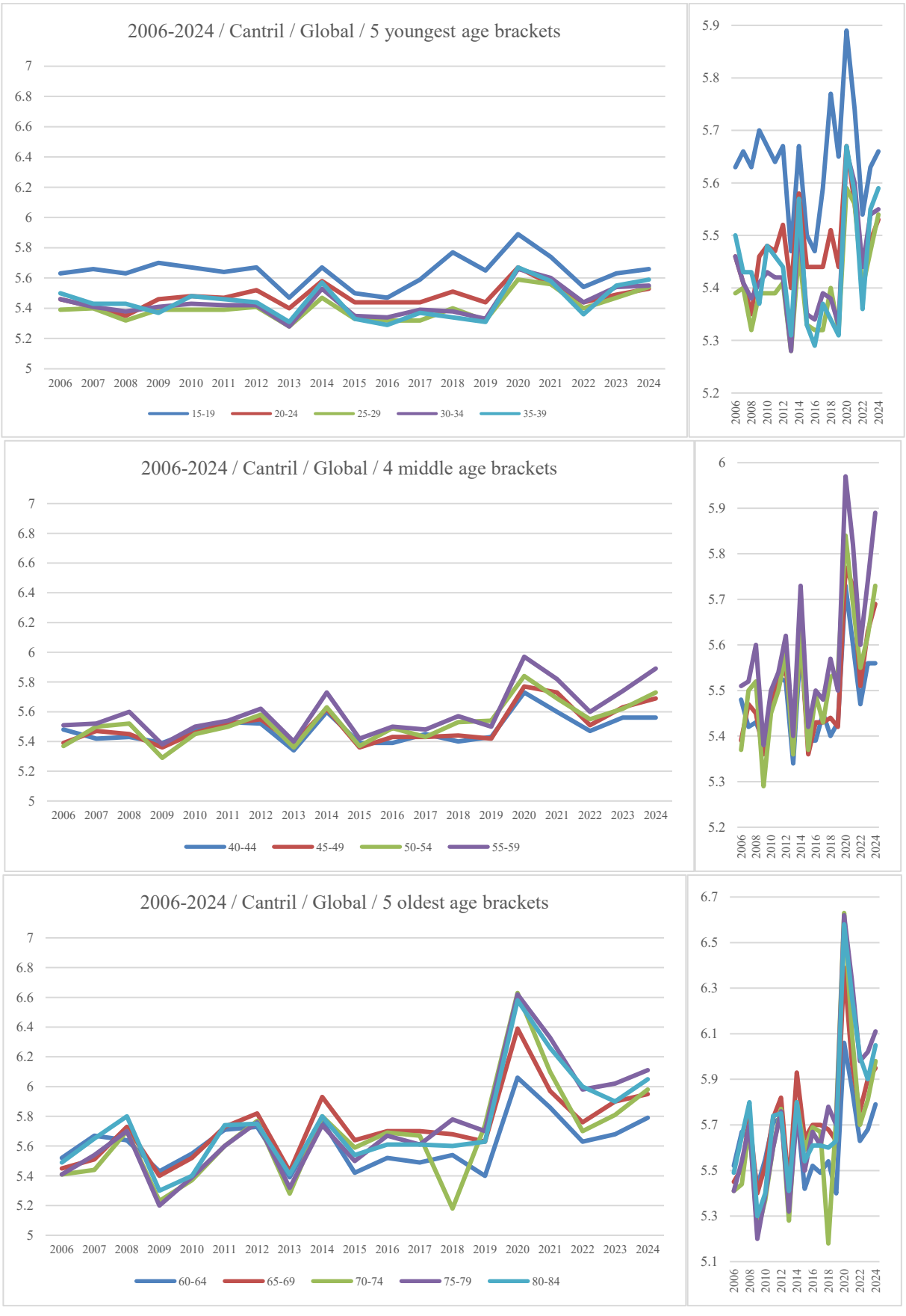
Figures

Turning now to the CL figures, we begin with three (Figures 1a-c) showing the CL means (*y* axis) for each age bracket (the lines) across all 19 GWP waves (*x* axis), grouped in terms of the youngest five brackets (Figure a), middle 4 (Figure b), and oldest 5 (Figure c). Note that, for each figure, as explained above, on the left-hand side we have a standard figure, involving a set *y* axis which is shared in common across all CL figures, which in the main Results is from 5.0 to 7.0 on the 10 point scale (while in the Supplementary Files the range is 4.0 to 8.0, since the regional variability is greater). To the right-hand side though we have a smaller figure that just zooms in on the pertinent range of outcome values to provide a more distinct, exaggerated shape. We repeat this format throughout most of the figures in the Results and Supplementary Files. Overall, as detailed in Table 3, there is a slight rise across the brackets, but with a larger increase for older participants. (Also of note is a notable spike across the brackets in 2020, coinciding with the onset of the Covid-19 pandemic, which is relatively striking and surprising, although this may, at least partly, reflect Gallup's shift from in-person interviews to telephone interviews during the pandemic, since people tend to report slightly higher CL over telephone.[42]) Thus it does appear that younger people are doing less well relative to older people in recent years (compared to previous years), but not because the E-SWB of younger people is declining, but rather because the E-SWB of older people is rising. A key point about using global data, though, is that these trends are not necessarily observed everywhere, as shown in the regional CL figures in the Supplementary Files, in which Figures 1-11 show the means for each region in 2006, 2015, and 2024—once again with separate figures for the youngest five brackets (a), middle 4 (b), and oldest 5 (c)—including the EU (1a-c), Europe Other (2a-c), Independent States (3a-c), Australia and New Zealand (4a-c), South East Asia (5a-c), South Asia (6a-c), East Asia (7a-c), Latin America (8a-c), North America (9a-c), Middle East and North Africa (10a-c), and Sub-Saharan Africa (11a-c). There

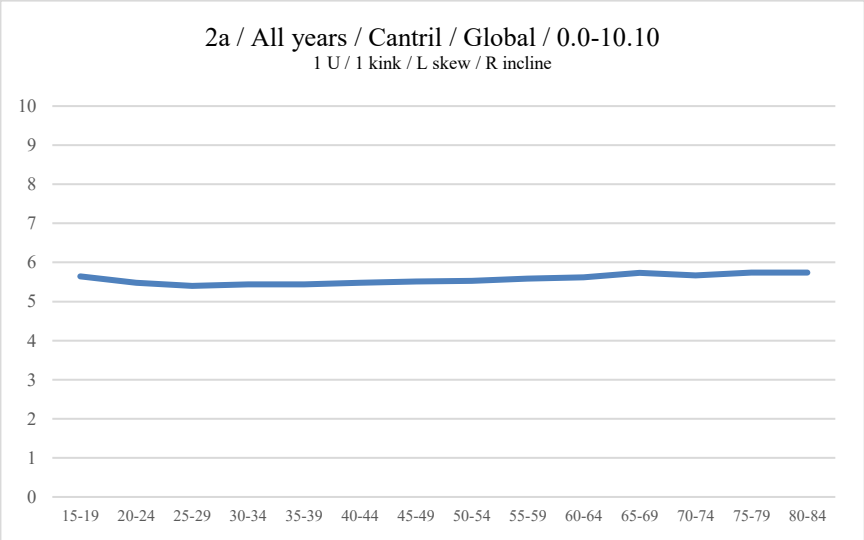
we see, for example, that while some regions mirrored the global trends in showing an increase across all three age groupings (e.g., the EU), others saw a decrease across all three (e.g., Australia and New Zealand), while others had more complicated patterns.

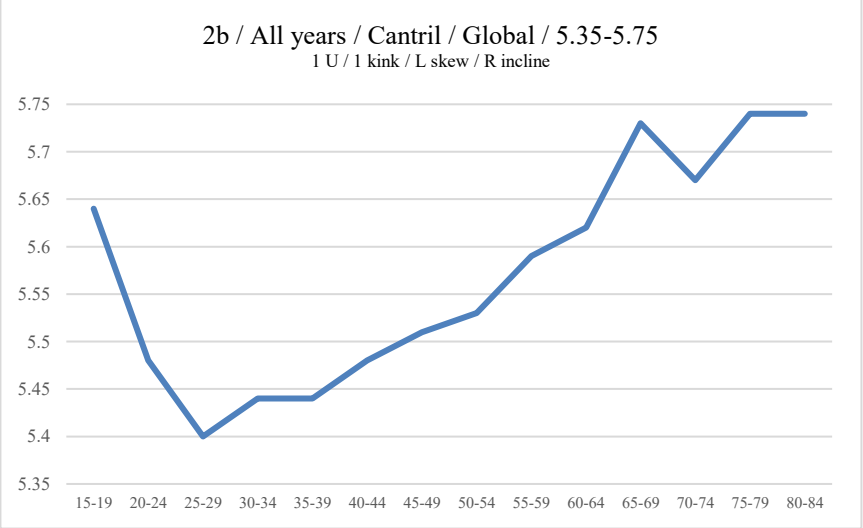
The next set of CL figures in the main Results explore whether the scores are U-shaped. We begin in Figures 2a-c by looking collectively at all years together. Note that we have *three* Figures to illustrate the results in context, and specifically to show the impact of manipulating the *y* axis (showing the outcome variable). Figure 2a shows the *y* scale in its entirety. This is useful since, while various shapes approximating a U can be obtained when zooming in, if considered in terms of the entire 11 point scale, the line is actually relatively flat, suggesting the differences among the age brackets are actually quite small. Nevertheless, even with that caveat in mind, we *are* still interested in the shape of the line, and whether an age-related U-shape can be discerned. Thus, Figure 2b zooms in on the salient portion of the *y* axis to highlight and exaggerate the shape, just as the images to the right hand side of most figures do. Finally, Figure 2c shows the trend line using the CL *y* axis frame which we use consistently through the Results, namely 5.0 to 7.0. Following these, Figures 3a-s show the global CL means for each wave, with one figure per year, spanning 2006 (Figure 3a) to 2024 (Figure 3s). To reiterate the point above, we analyzed each of these figures for the "U-ness" of the curve, with its rating on the four criteria shown underneath the specific figure heading, and with a summary of the ratings detailed in Table 3, as explained above.

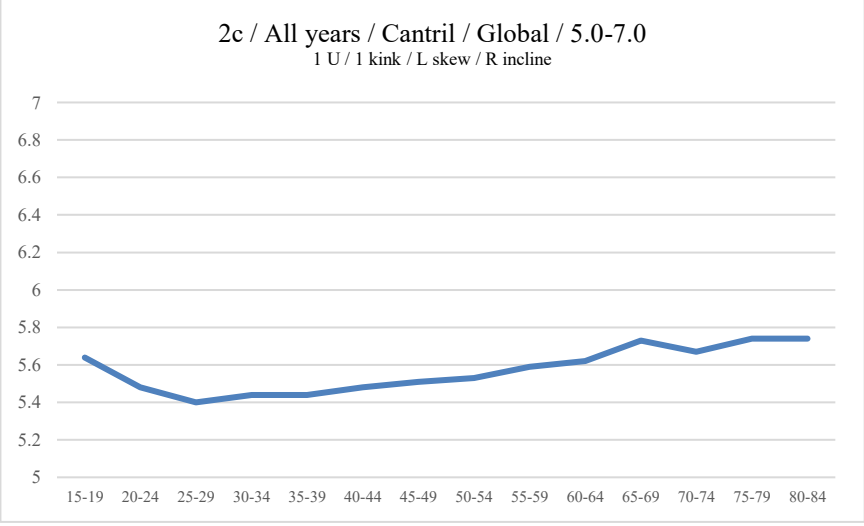
Figure 1a-c. Change in global Cantril means from 2006-2024



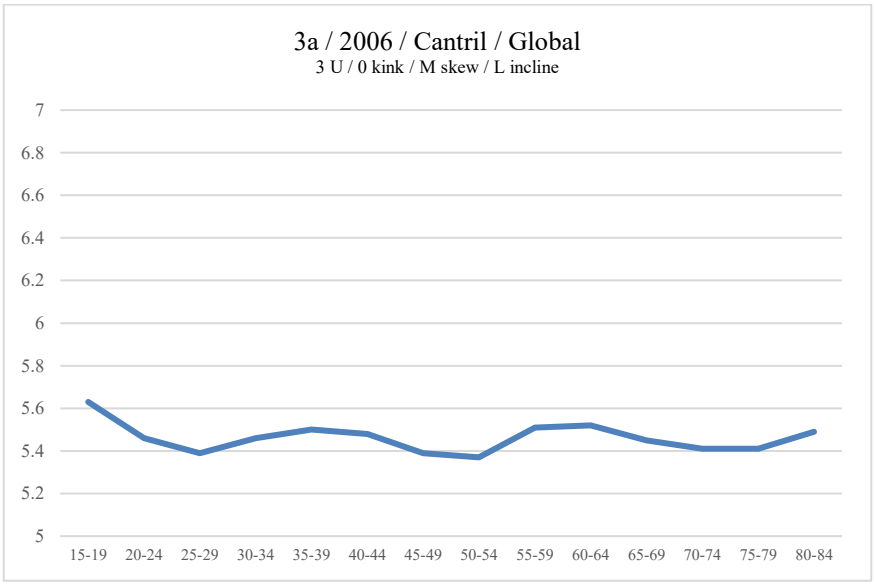
Figures 2a-c. Global Cantril means from 2006-2024 (all years combined)

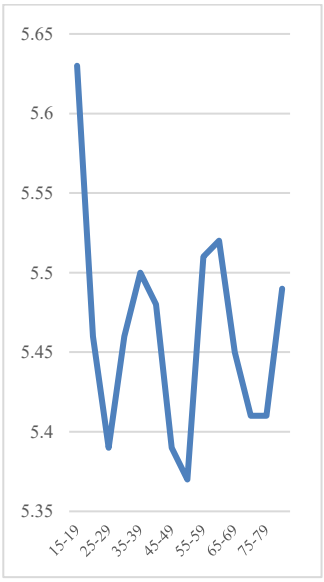


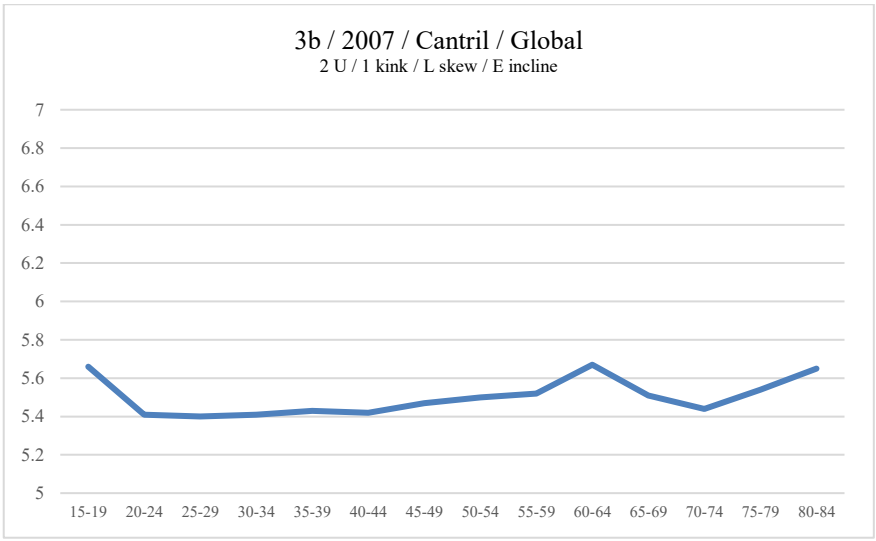


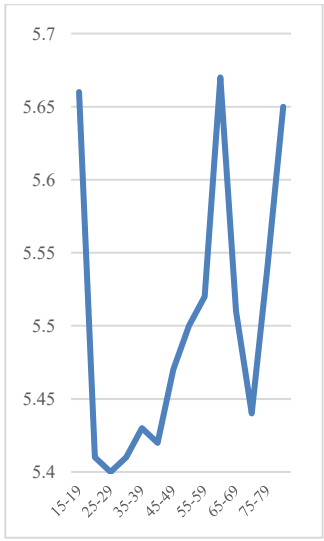


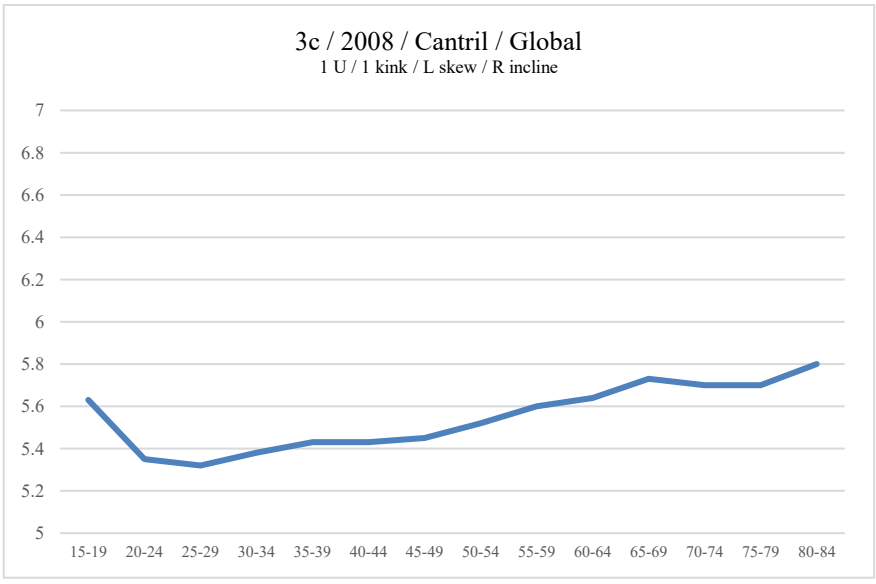
Figures 3a-s. Global Cantril means from 2006-2024 (one year per figure)

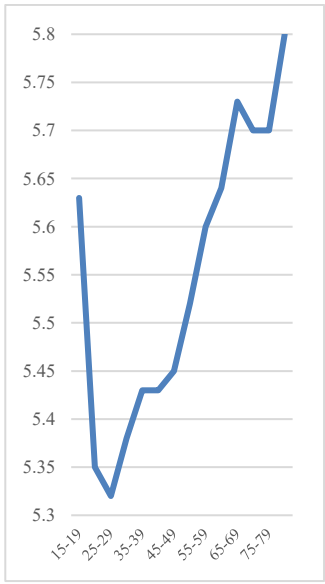


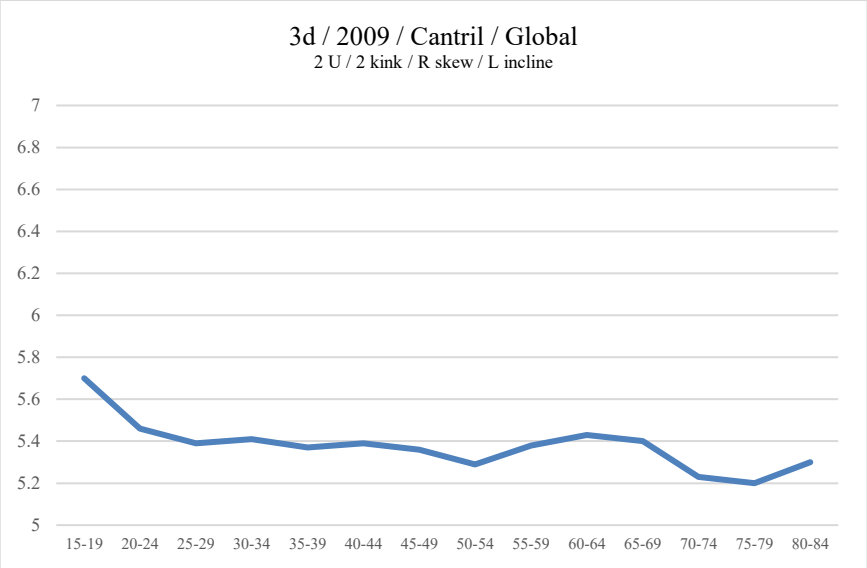


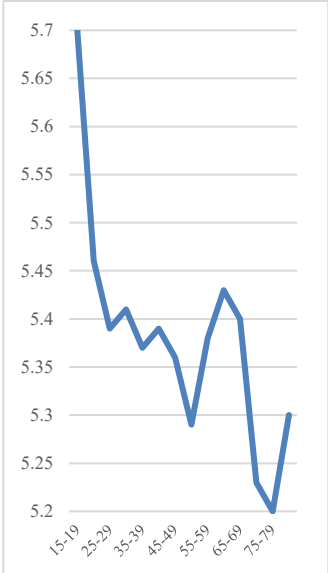


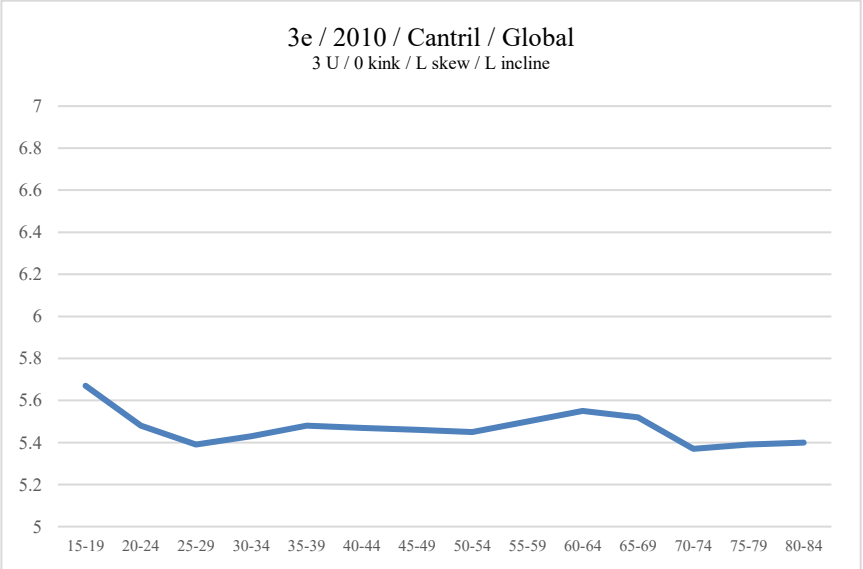


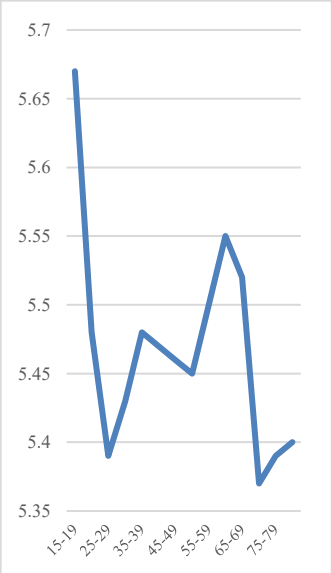


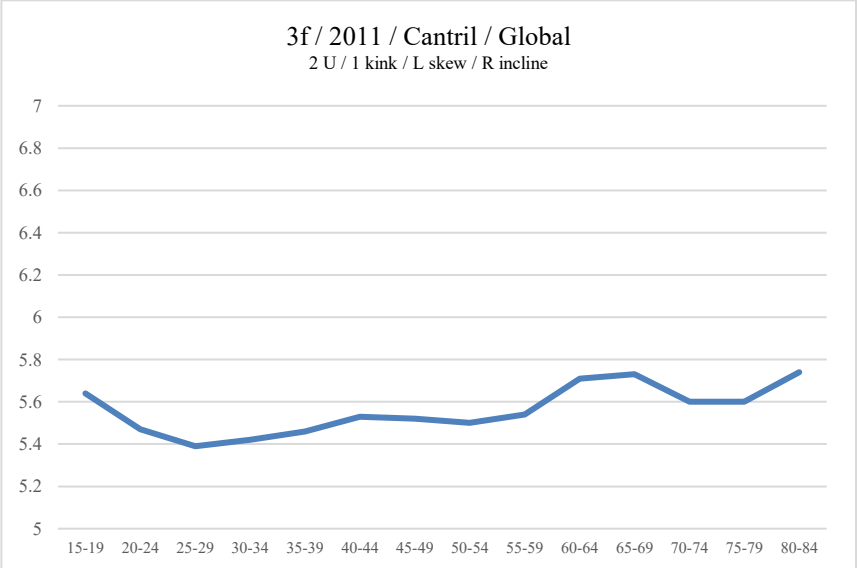


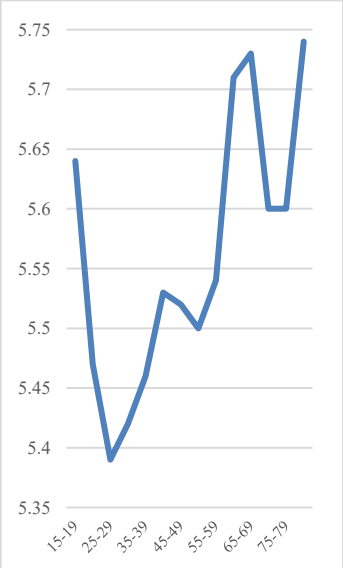

3d / 2009 / Cantril / Global
2 U / 2 kink / R skew / L incline
7
6.8
6.6
6.4
6.2
6
5.8
5.6
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15-19 20-24 25-29 30-34 35-39 40-44 45-49 50-54 55-59 60-64 65-69 70-74 75-79 80-84

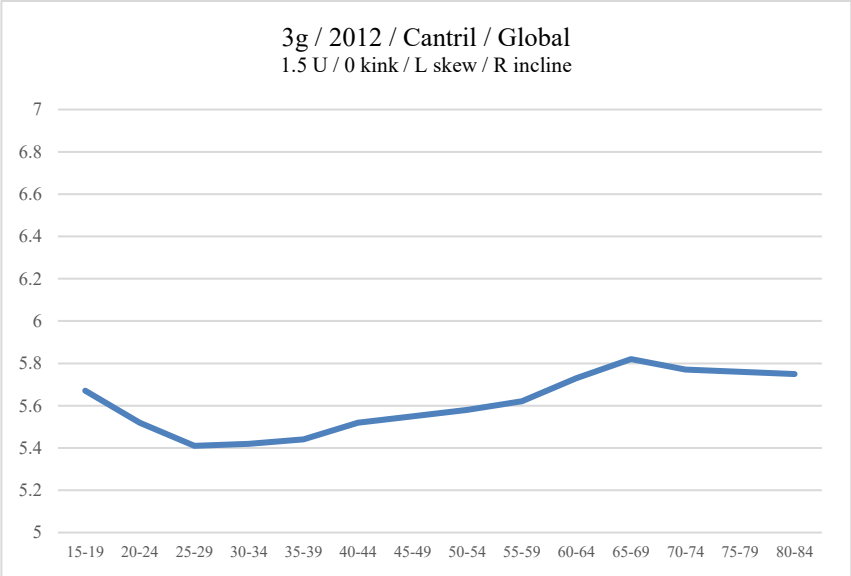

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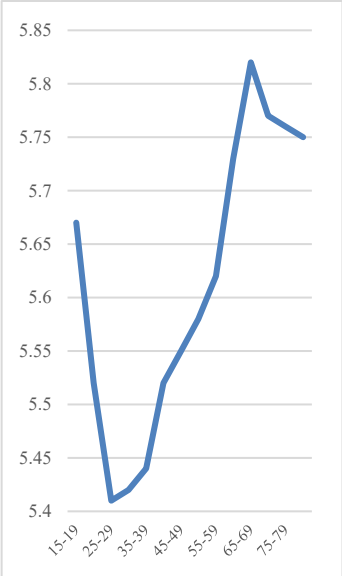

3e / 2010 / Cantril / Global
3 U / 0 kink / L skew / L incline
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15-19 20-24 25-29 30-34 35-39 40-44 45-49 50-54 55-59 60-64 65-69 70-74 75-79 80-84

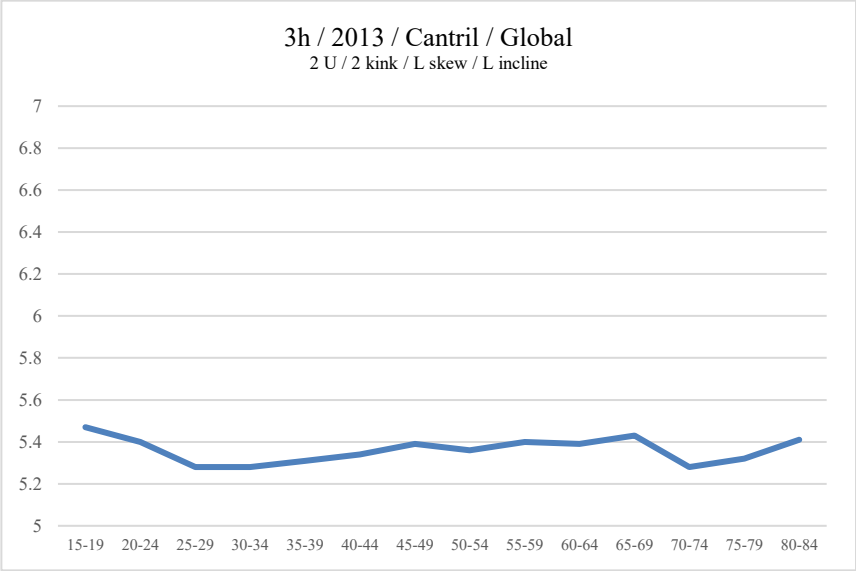

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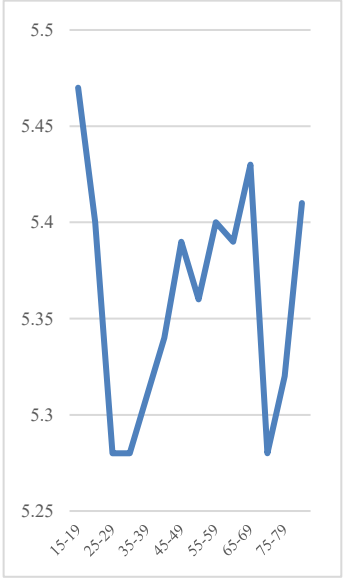

3f / 2011 / Cantril / Global
2 U / 1 kink / L skew / R incline
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15-19 20-24 25-29 30-34 35-39 40-44 45-49 50-54 55-59 60-64 65-69 70-74 75-79 80-84

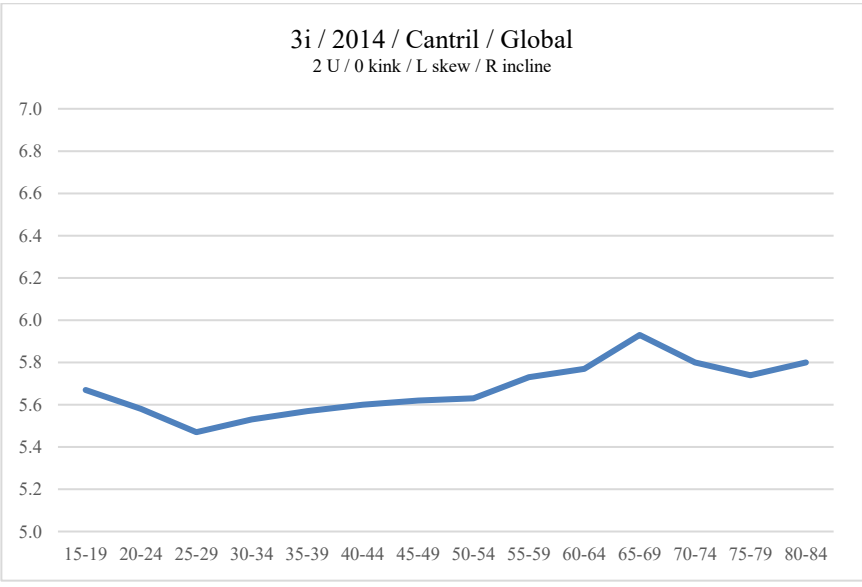

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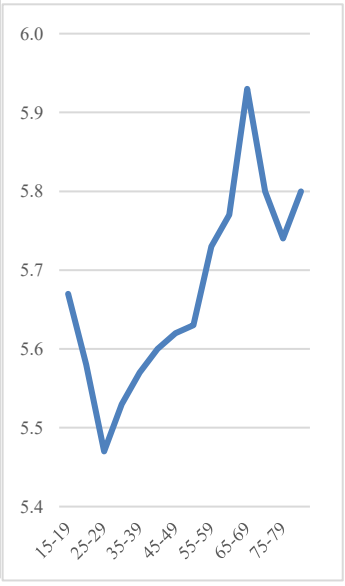

3g / 2012 / Cantril / Global
1.5 U / 0 kink / L skew / R incline
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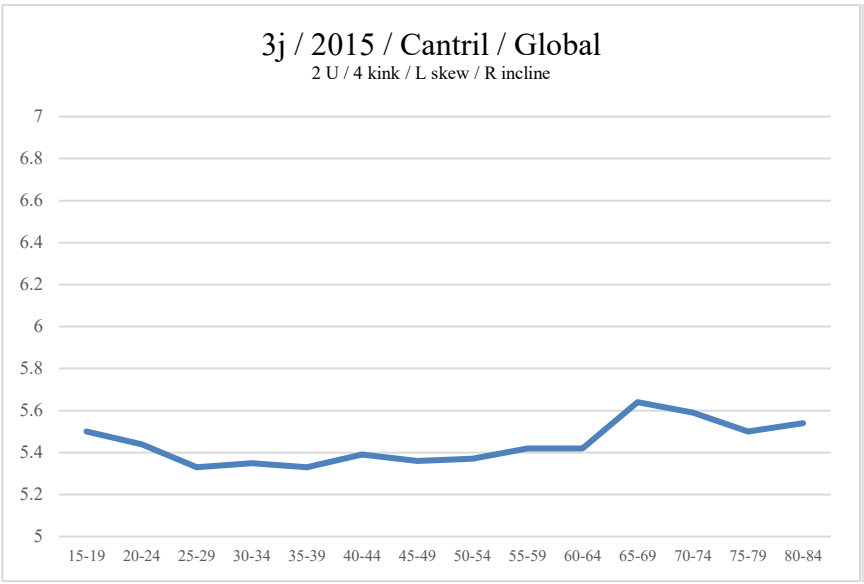

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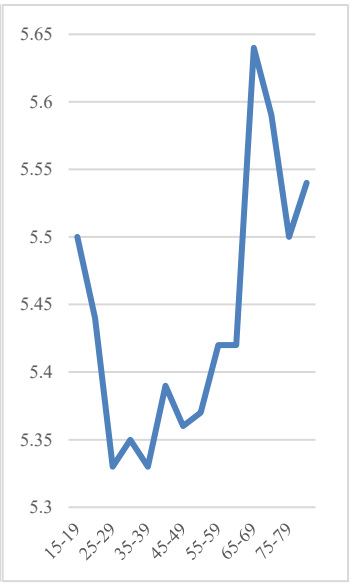

3h / 2013 / Cantril / Global
2 U / 2 kink / L skew / L incline
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
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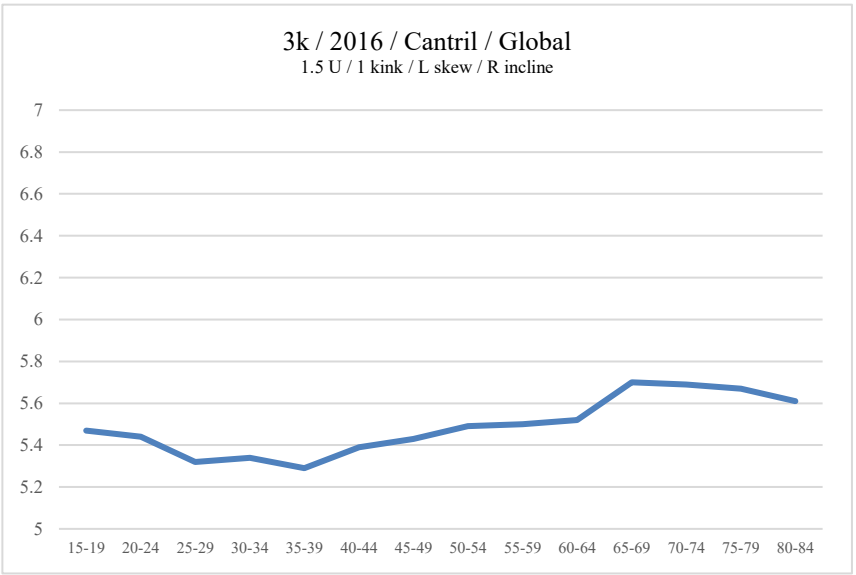

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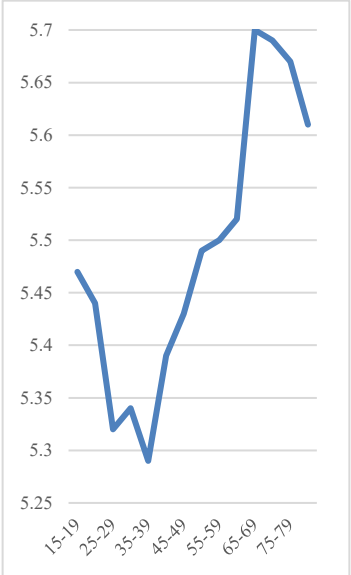

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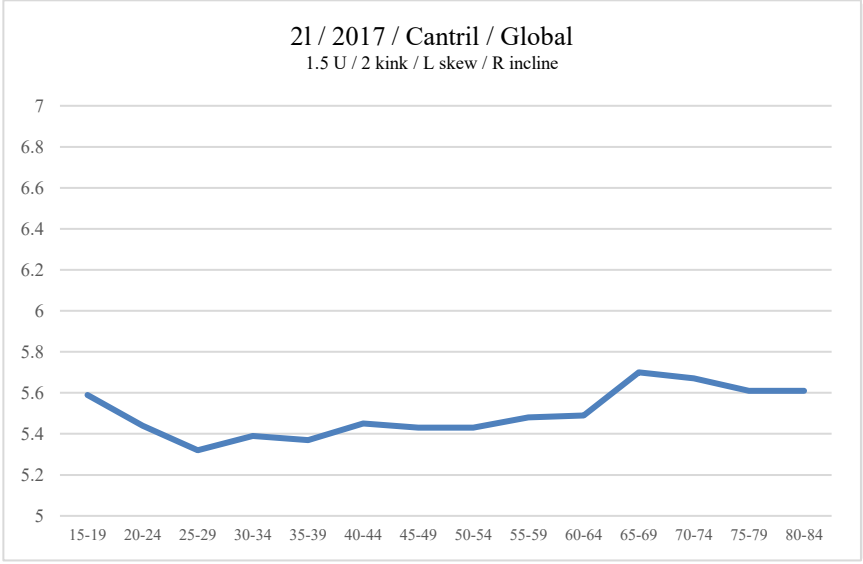

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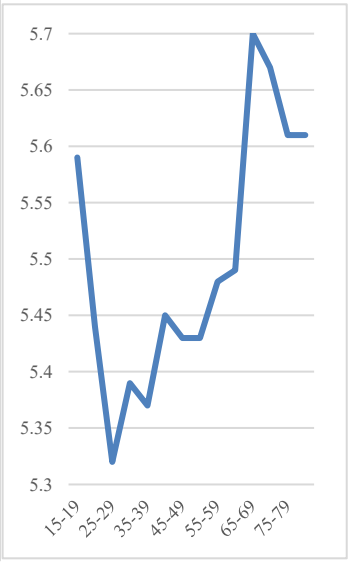

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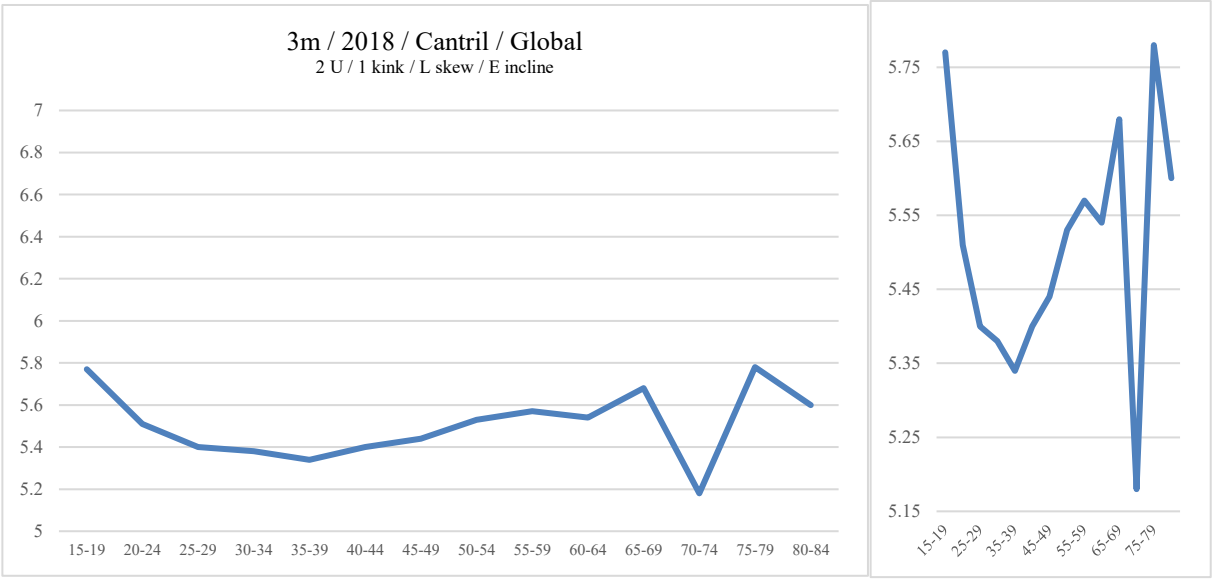

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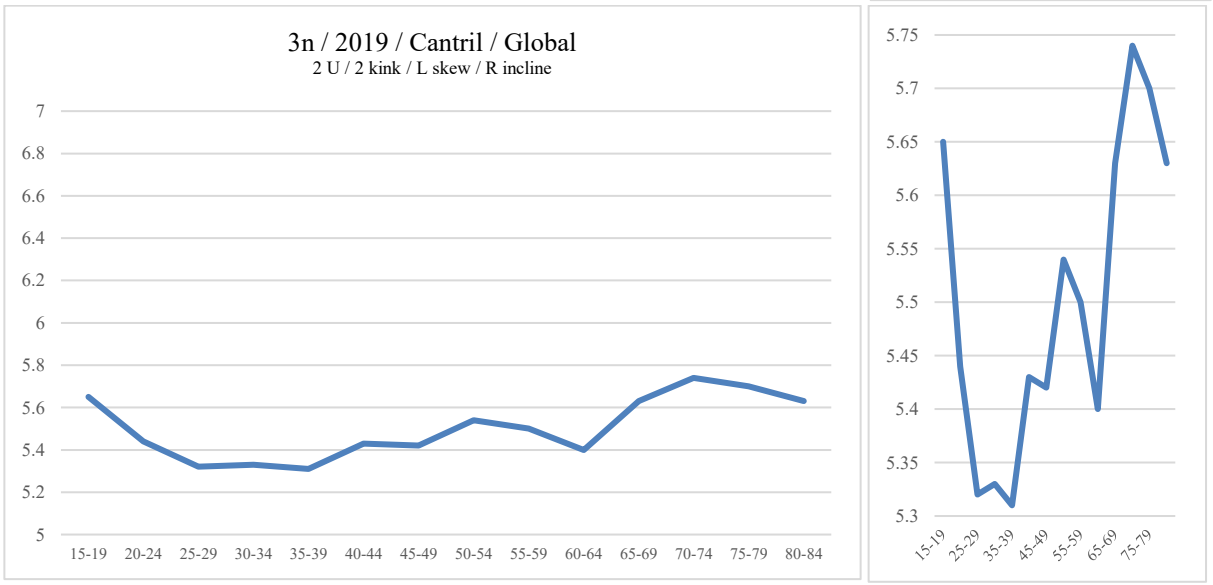

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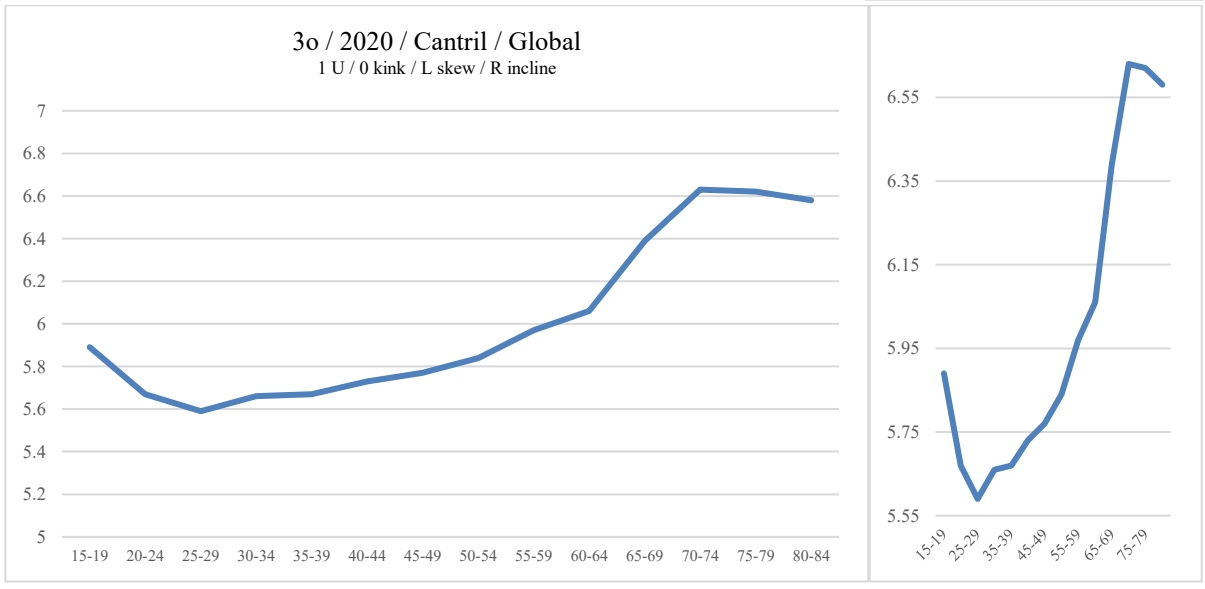

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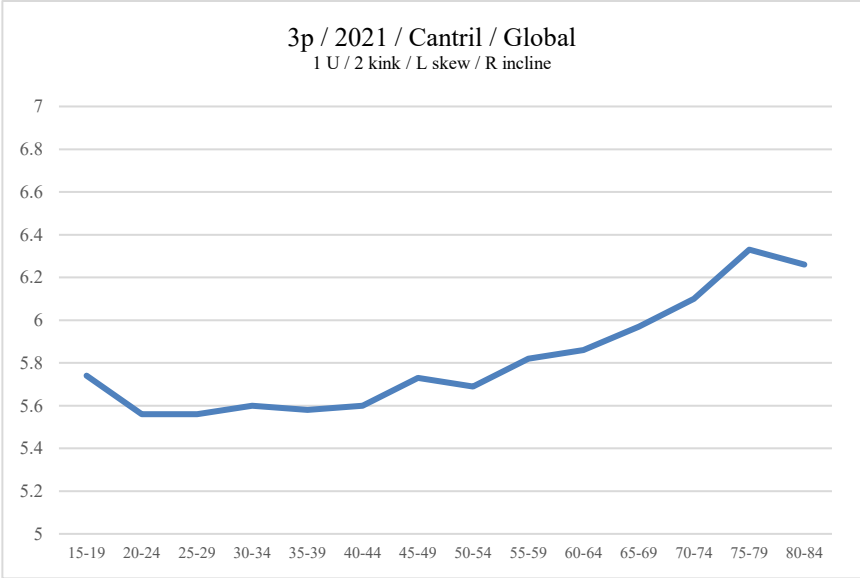

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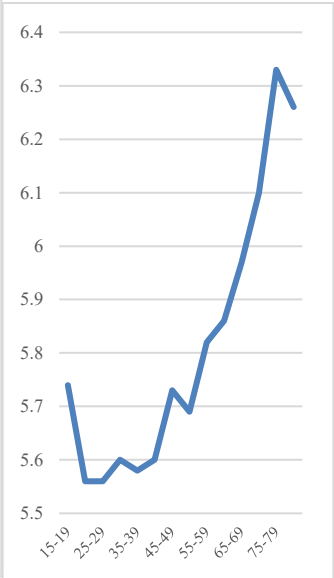

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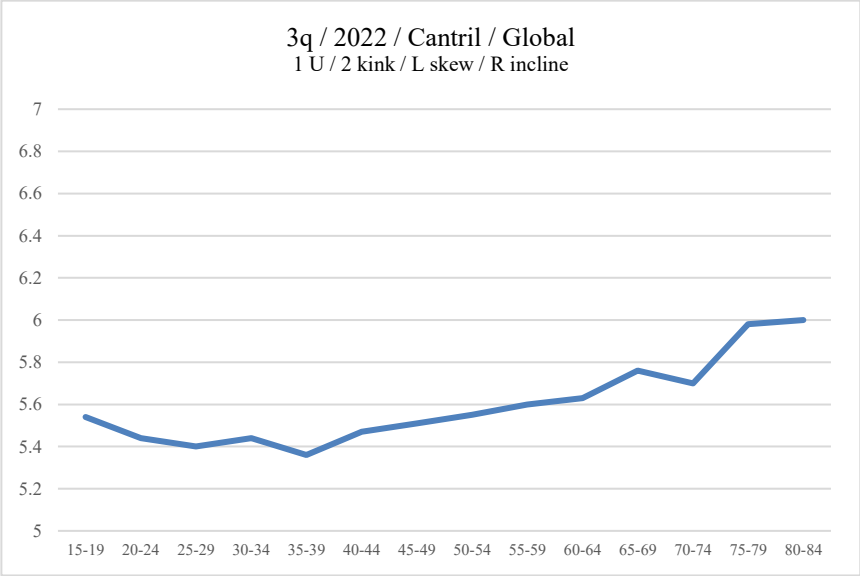

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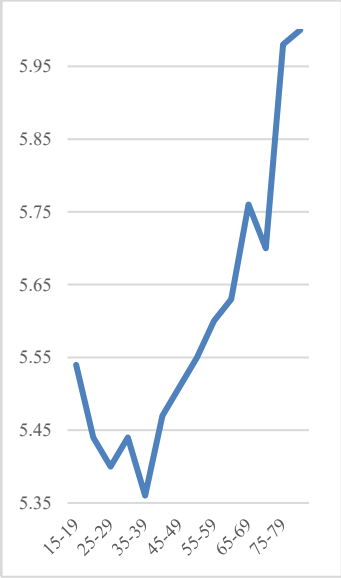

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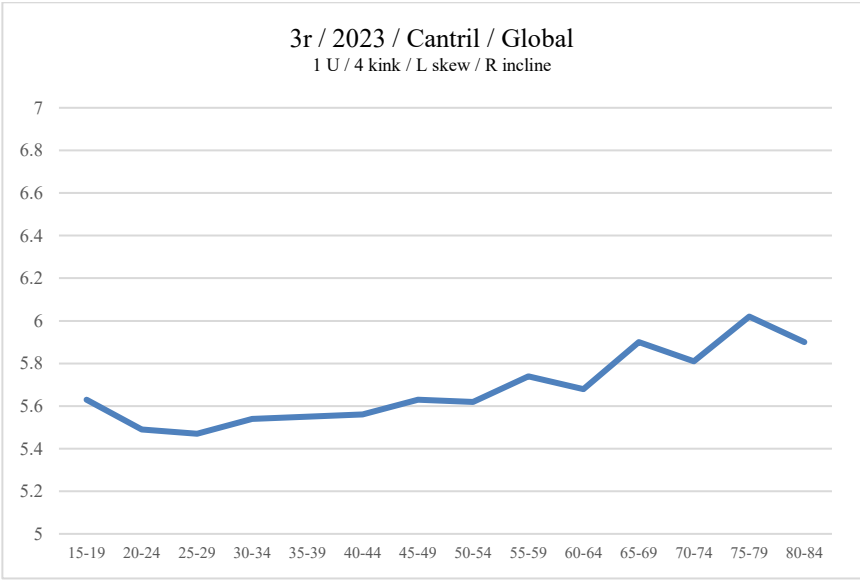

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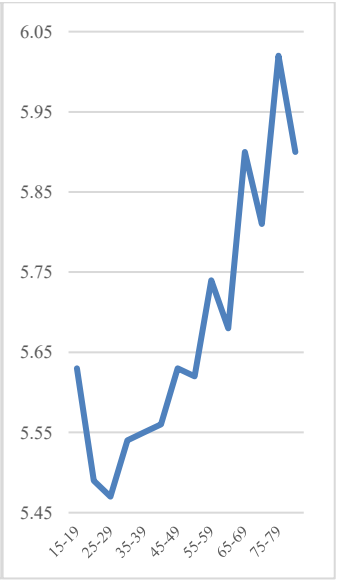

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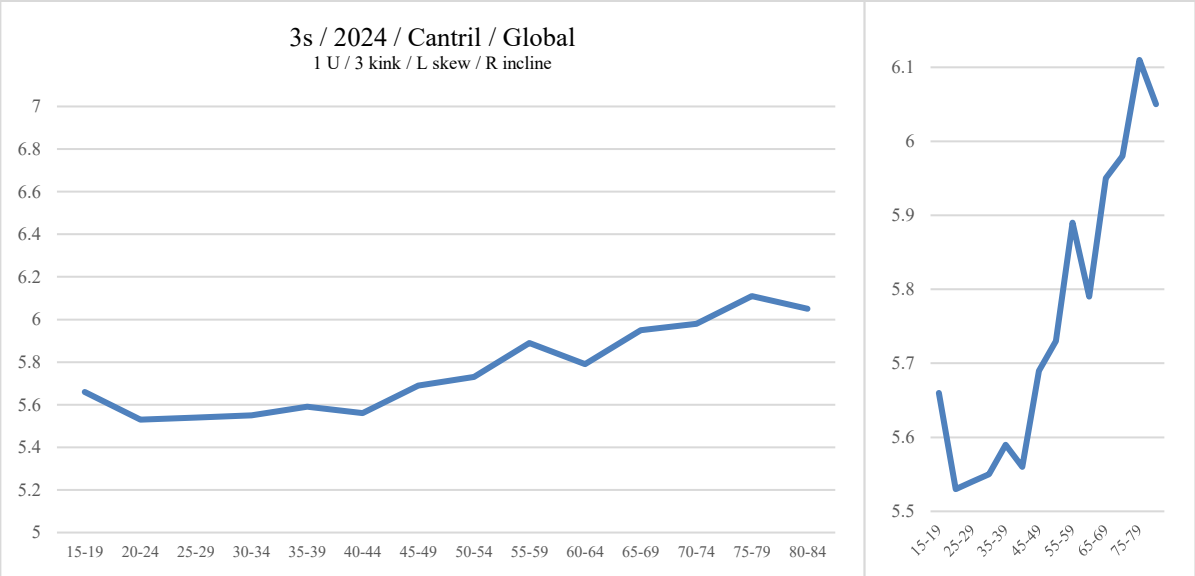

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Positive Experience Index

This second section shows the main global results for the PEI. It takes the same format as the CL section above, beginning with tables and then figures, and with the regional results in the Supplementary File. Beginning with the Tables, Table 7 provides the global PEI mean values from 2006-2024, separated into 14 age brackets, as well as in total. Again we shall not summarize the table here, as that is the purpose of the figures below, which illustrate the details in the table. Then, as per CL, Table 8 shows the changes in PEI scores over time, with participants clustered into three broad age ranges (younger, middle, and older) and the years into five batches. As per CL, if we compare mean scores between the first batch (2006-2009) and the most recent (2022-2024), there was also a general increase between the first and last batch of 2.69 (from 66.95 to 69.64), and once again this was smaller for younger people (2.14, from 69.98 to 72.12) than for the middle aged (2.59, from 66.37 to 68.96), with older people having the largest rise of all (3.14, from 62.64 to 65.78). Unlike in the CL section, there is no analyses of the figures in terms of U-shaped properties, since on inspecting the global Figures it became immediately apparent that almost none came close to a U-shaped pattern. Instead, most simply show a gradual decline with age, albeit interrupted by a slight uptick usually around 60-64, which could be described—if sticking with letter analogies—as a gently reclining S shape. There were a few vague exceptions; 2020 (Figure 6o), for instance, has a slight U-shaped pattern, though it tails off again into the older brackets. Overall though, most figures took the form of a reclining S.

Table 7. Global Positive Experience mean values, 2006-2024, separated by age

Age	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Mean
15-19	74.14	73.21	73.69	75.70	77.02	75.40	74.74	75.11	75.20	75.71	75.72	75.89	76.54	74.99	76.55	75.71	75.36	74.91	76.28	75.36
20-24	70.03	69.67	70.19	71.81	72.60	71.55	71.13	72.17	72.25	73.12	72.46	72.28	72.84	72.21	73.88	72.96	72.67	72.67	73.78	72.12
25-29	68.79	69.21	68.95	69.90	70.57	69.38	69.02	69.82	70.55	70.59	70.66	69.78	70.85	70.12	72.64	71.29	71.41	71.46	72.90	70.42
30-34	68.20	68.14	68.29	68.96	69.84	68.59	67.79	68.50	69.10	69.74	69.54	69.22	69.71	69.10	71.69	70.18	70.27	70.45	71.51	69.41
35-39	67.80	67.93	67.44	67.57	68.32	67.81	67.36	67.69	68.53	68.43	68.15	68.19	68.58	67.92	70.76	69.27	69.08	68.72	70.38	68.42
40-44	67.05	67.12	67.15	67.20	67.65	66.99	67.30	67.45	67.62	67.91	68.64	67.58	67.68	68.32	70.87	69.32	68.82	68.61	69.96	68.06
45-49	65.82	65.95	67.11	66.39	66.70	66.64	66.96	67.42	67.74	67.57	67.93	66.49	67.45	67.30	70.14	69.20	68.80	68.57	70.07	67.59
50-54	65.50	65.81	66.39	64.82	66.49	65.67	66.24	65.90	66.97	67.04	67.46	66.43	67.68	67.50	70.79	69.36	68.16	68.34	69.73	67.17
55-59	66.94	66.21	67.56	64.97	65.80	65.60	66.49	66.00	66.64	67.22	67.16	65.95	66.89	66.46	70.06	69.18	68.25	67.89	70.29	67.13
60-64	66.57	67.53	68.00	65.23	66.94	67.24	67.38	66.70	66.74	66.68	67.11	66.23	66.48	66.63	71.07	68.81	68.24	67.82	69.38	67.41
65-69	65.29	64.51	67.48	63.99	65.60	66.85	68.27	65.85	67.07	67.54	67.61	67.29	67.61	66.88	72.39	70.39	67.85	69.13	69.72	67.44
70-74	64.19	64.31	66.24	60.97	63.12	64.95	67.08	63.72	64.60	66.40	66.91	66.79	66.59	66.50	72.33	69.29	67.05	67.84	68.56	66.18
75-79	63.55	63.58	66.32	59.38	63.21	64.18	66.22	62.16	64.45	63.40	65.55	64.46	65.62	65.64	71.83	70.24	67.18	67.10	68.29	65.39
80-84	62.24	63.03	64.78	60.51	61.59	64.41	65.76	63.09	62.90	62.56	64.53	64.06	64.97	62.68	70.27	67.17	65.47	65.51	66.37	64.31
85-89	65.03	65.29	66.28	60.81	62.00	63.93	65.00	61.19	60.34	63.09	64.86	62.74	63.17	63.34	70.80	66.93	65.16	65.51	66.63	64.32
90-94	65.30	63.14	68.89	65.30	63.50	59.74	62.59	61.18	61.41	63.61	60.32	61.17	65.16	61.89	65.50	67.70	64.60	67.85	65.22	63.90
Total	66.65	66.54	67.80	65.84	66.93	66.81	67.46	66.50	67.01	67.54	67.79	67.16	67.99	67.34	71.35	69.81	68.65	68.90	69.94	67.79

Table 8. Change in global PEI mean values, 2006-2024, separated by age and clustered into years

Age	06-09	10-13	14-17	18-21	22-24	06-09 – 22-24 diff.
15-19	74.19	75.57	75.63	75.95	75.52	1.33
20-24	70.43	71.86	72.53	72.97	73.04	2.61
25-29	69.21	69.70	70.40	71.23	71.92	2.71
30-34	68.40	68.68	69.40	70.17	70.74	2.34
35-39	67.69	67.80	68.33	69.13	69.39	1.70
Younger	69.98	70.72	71.26	71.89	72.12	2.14
40-44	67.13	67.35	67.94	69.05	69.13	2.00

45-49	66.32	66.93	67.43	68.52	69.15	2.83
50-54	65.63	66.08	66.98	68.83	68.74	3.11
55-59	66.42	65.97	66.74	68.15	68.81	2.39
Middle	66.37	66.58	67.27	68.64	68.96	2.59
60-64	66.83	67.07	66.69	68.25	68.48	1.65
65-69	65.32	66.64	67.38	69.32	68.90	3.58
70-74	63.93	64.72	66.18	68.68	67.82	3.89
75-79	63.21	63.94	64.47	68.33	67.52	4.31
80-84	62.64	63.71	63.51	66.27	65.78	3.14
Older	64.39	65.22	65.64	68.17	67.70	3.31
Total	66.95	67.57	68.11	69.63	69.64	2.69

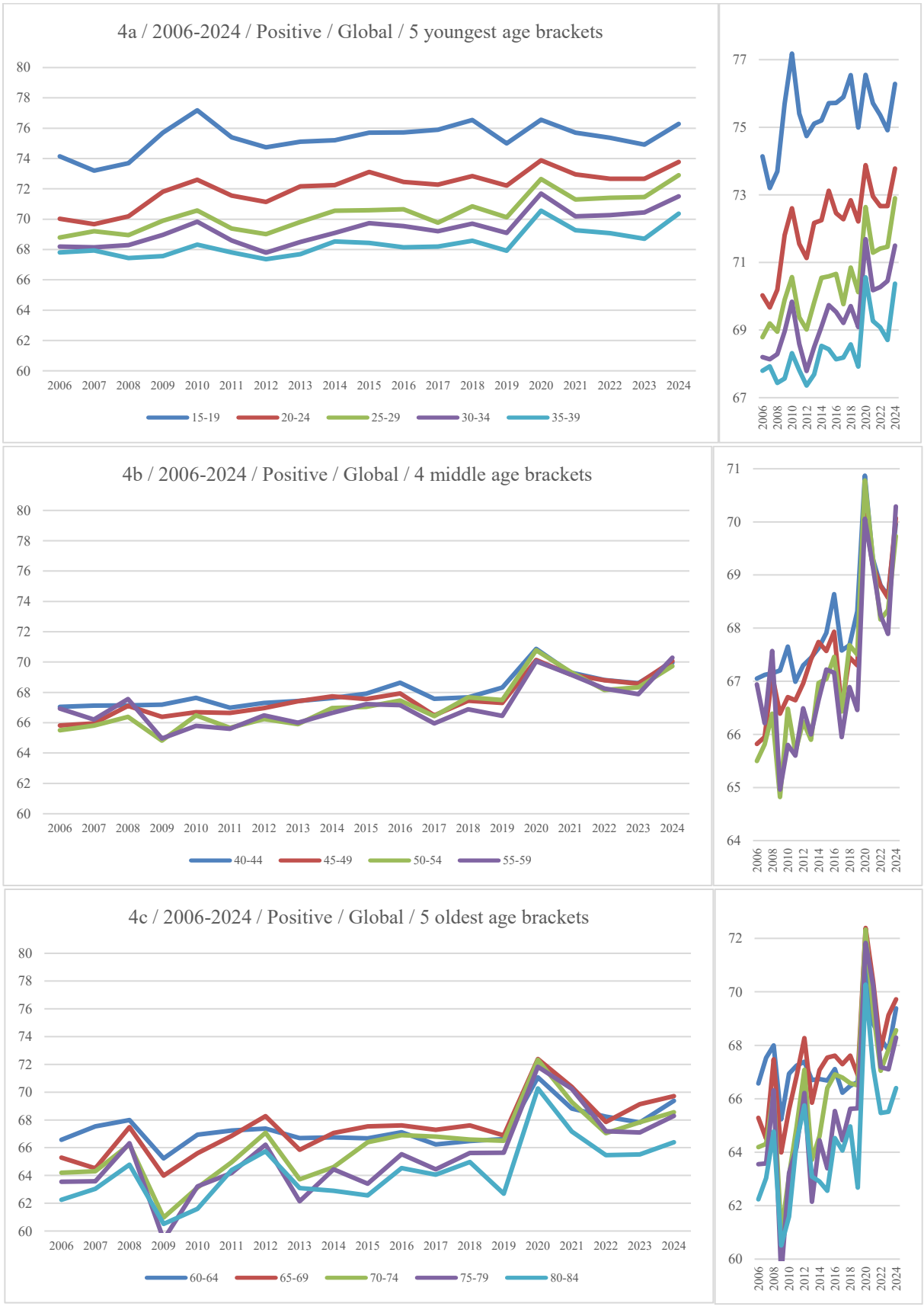
Figures

Turning now to the PEI Figures, we begin again with three Figures (4a-c) showing the PEI means (*y* axis) for each age bracket (the lines) across all 19 GWP waves (*x* axis), grouped in terms of the youngest five brackets (a), middle 4 (b), and oldest 5 (c). Note that, again, for each figure, on the left-hand side we have a standard figure, involving a set *y* axis which is shared in common across all PEI figures, which in the main Results is from 60 to 80 on the 100 point scale (while in the Supplementary Files the range is 40 to 90, since the regional variability is greater). To the right-hand side we again have a smaller figure that zooms in on the pertinent range of outcome values to provide a more distinct, exaggerated shape. Overall, as detailed in Table 8, as with CL there was a gradual rise over time for most age brackets, and especially for older participants, and again there was a notable spike in 2020. Regional variation was also observed, as shown in the Supplementary Files, in which Figures S23-34 show the PEI means for each region in 2006, 2015, and 2024, once again with a separate figure for the youngest five brackets (a), middle 4 (b), and oldest 5 (c). There we see, for example, that some regions saw a fall over time in many brackets (e.g., Australia and New Zealand), while others had more complicated patterns (e.g., North America had more of a "V-shaped" pattern, with lower scores in 2015).

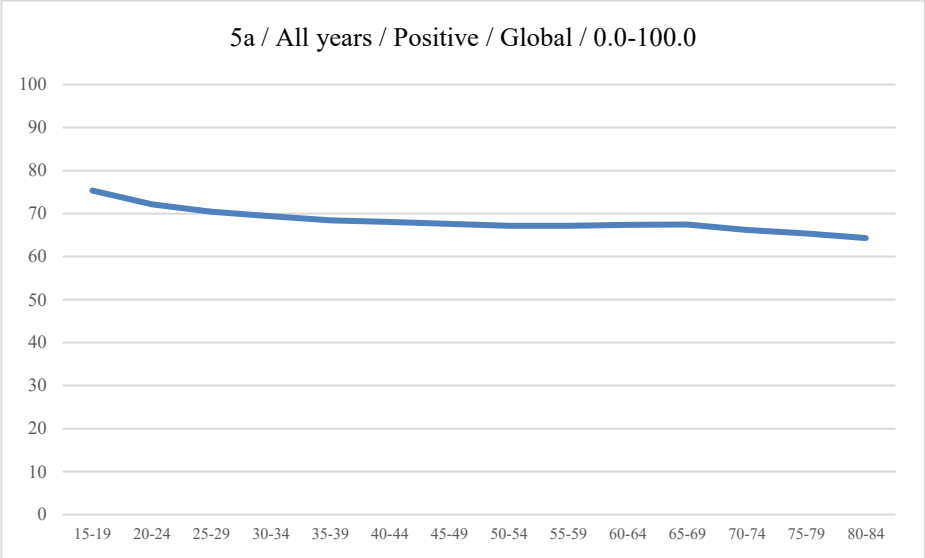
The next set of PEI figures look at the age-related shape profile. We begin in Figures 4a-c by looking collectively at all years together, again with three figures to illustrate the effect of manipulating the *y* axis (showing the outcome variable). Figure 5a shows the *y* scale in its entirety which—similar to 2a above—shows that while an apparently steep decline can be obtained when zooming in, in the context of the entire 100 point scale the line is actually relatively flat. Nevertheless, even with that caveat in mind, we *are* again still interested in the shape of the line. Thus, Figure 2b zooms in on the salient portion of the *y* axis to highlight and exaggerate the shape, just as the images to the right hand side of most figures do. Finally,

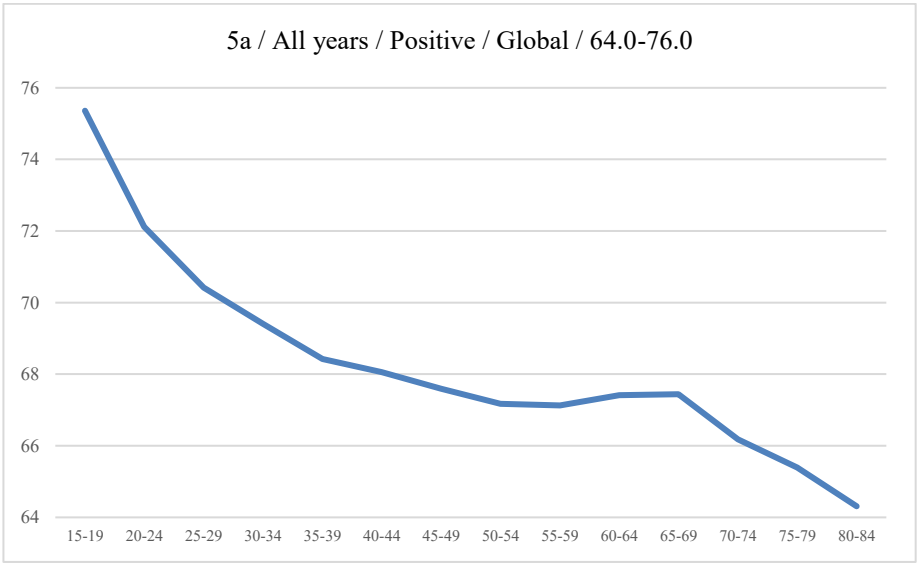
Figure 3b shows the trend line using the *y* axis frame which we use consistently through the main CL Results section, namely 60 to 80. Following these, Figures 6a-s show the global PEI means for each wave, with one figure per year, from 2006 (Figure 6a) to 2024 (Figure 6s).

Figure 4a-c. Global Positive Experience means from 2006-2024



Figures 5a-c. Global Positive Experience means from 2006-2024 (all years combined)





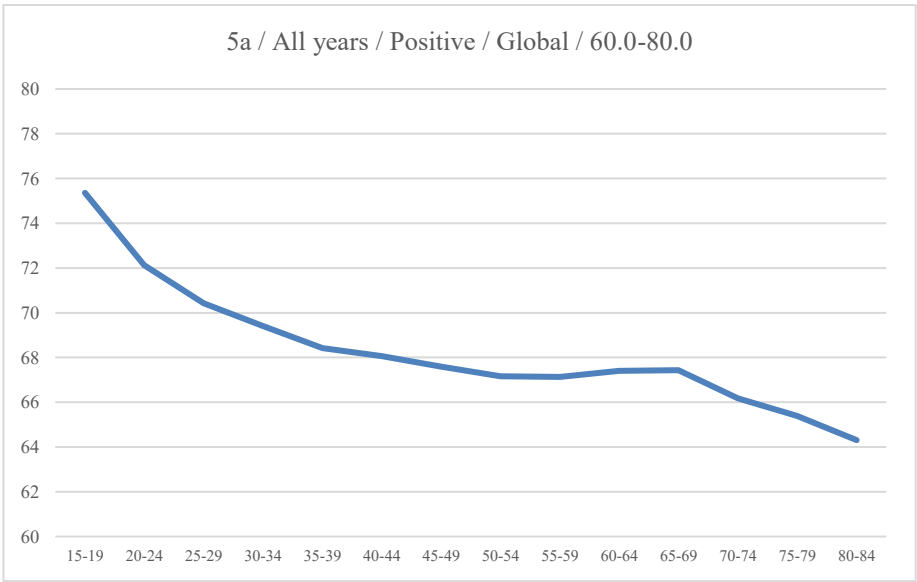
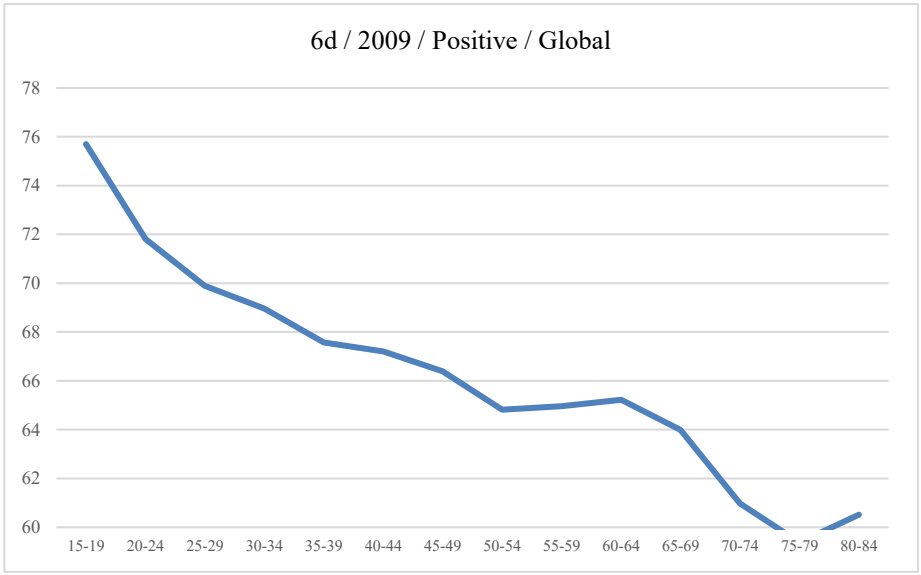
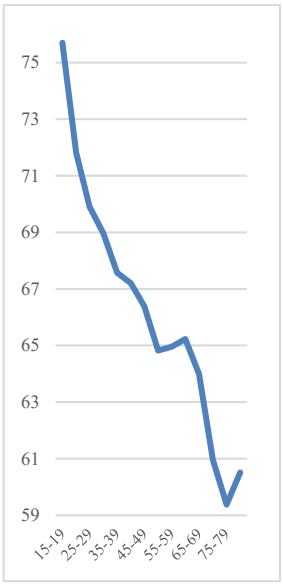
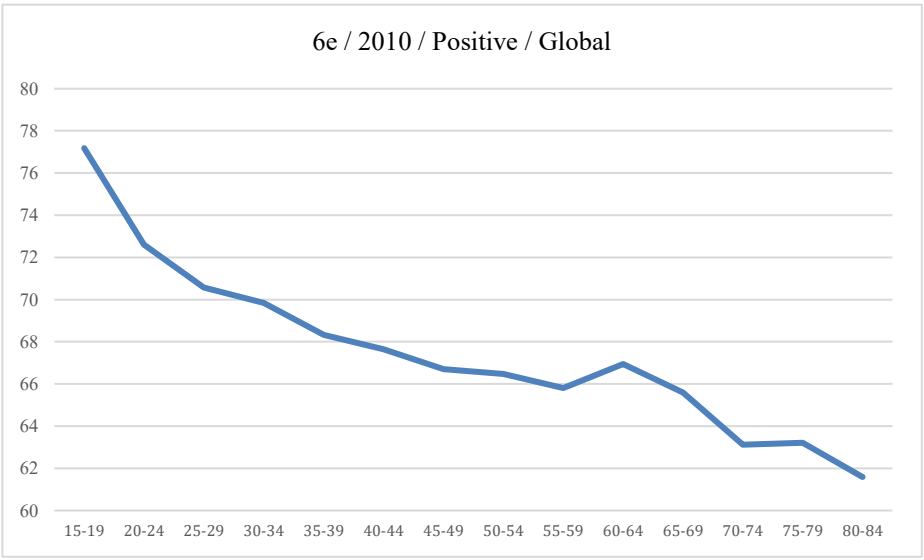


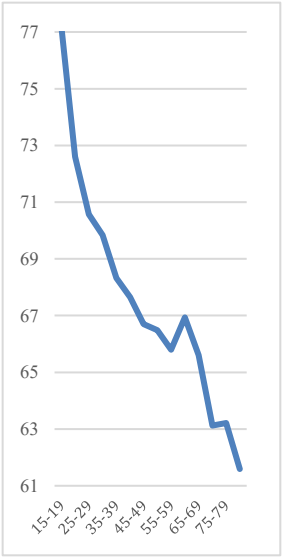
Figure 6a-s. Global Positive Experience means from 2006-2024 (one figure per year)

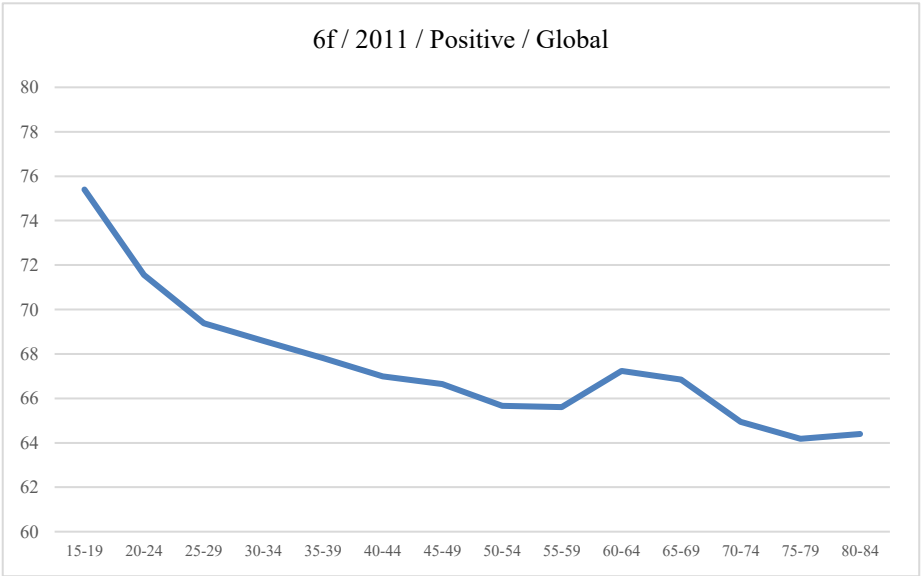


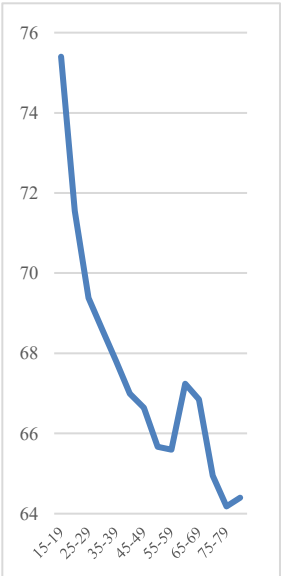

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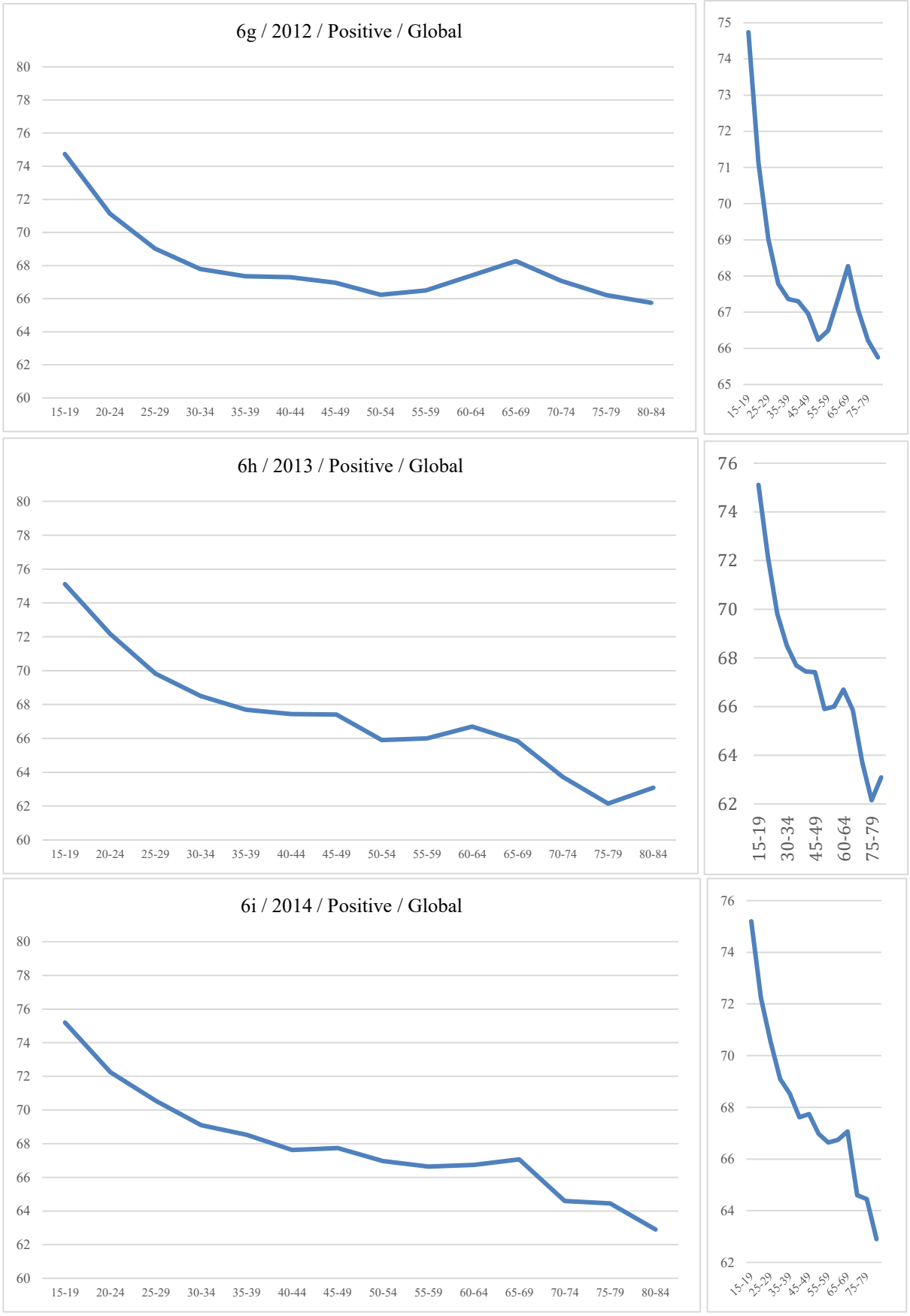

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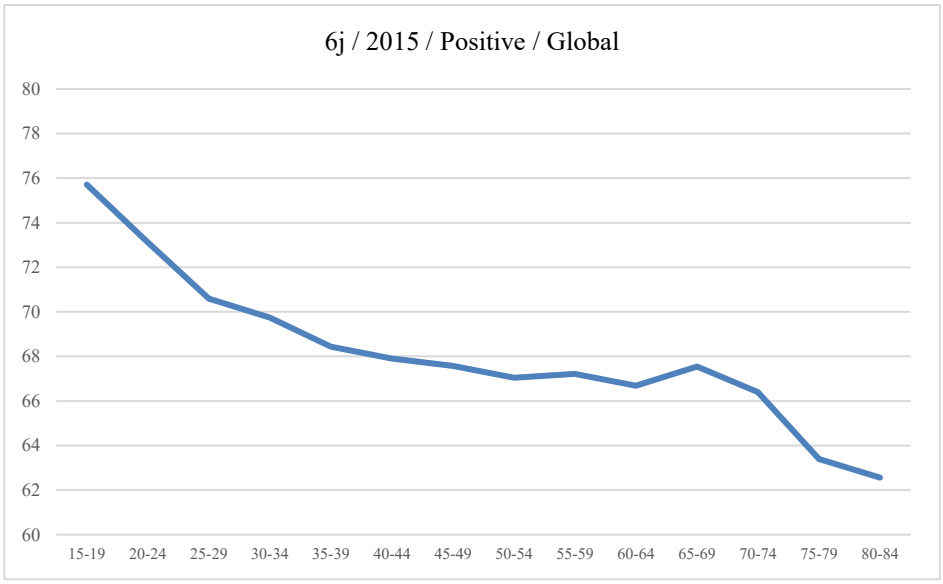

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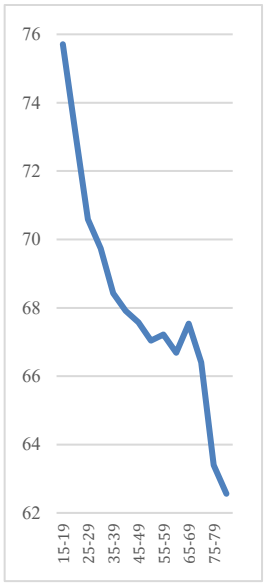

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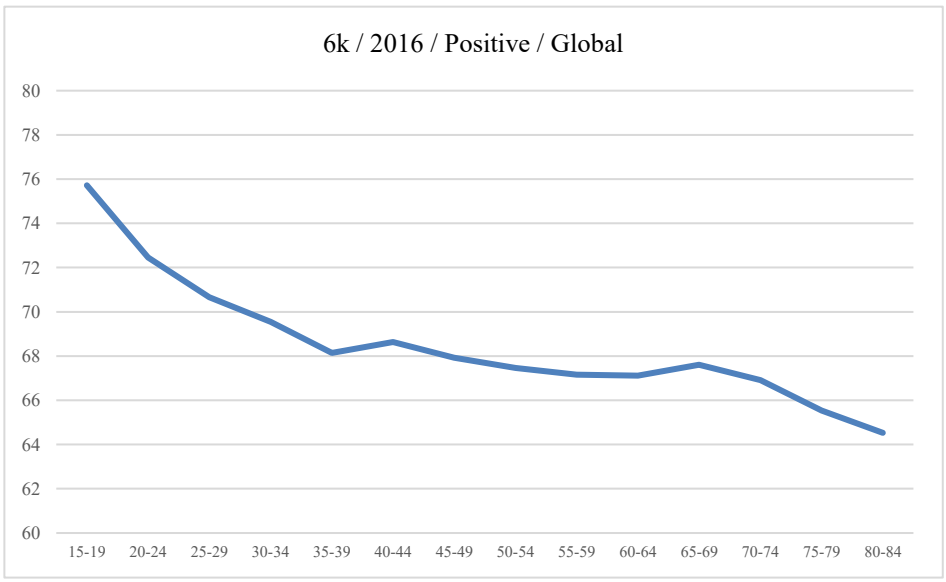

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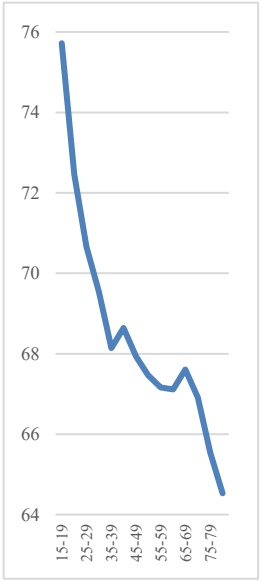

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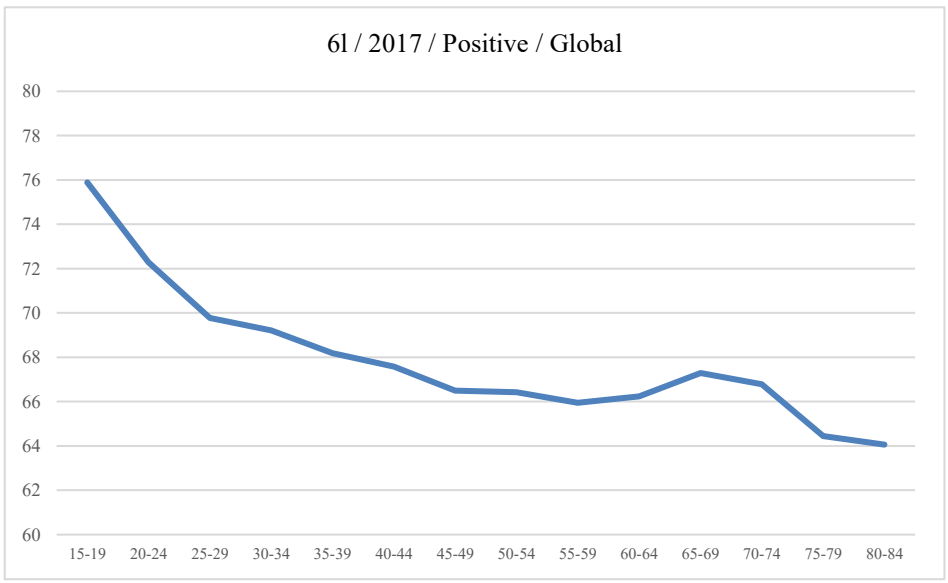

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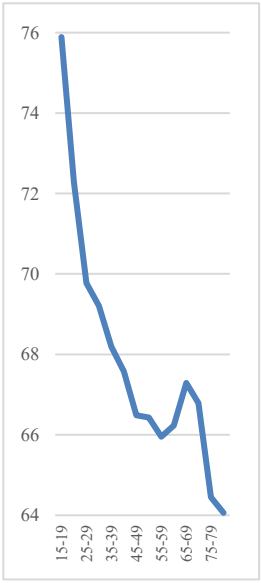

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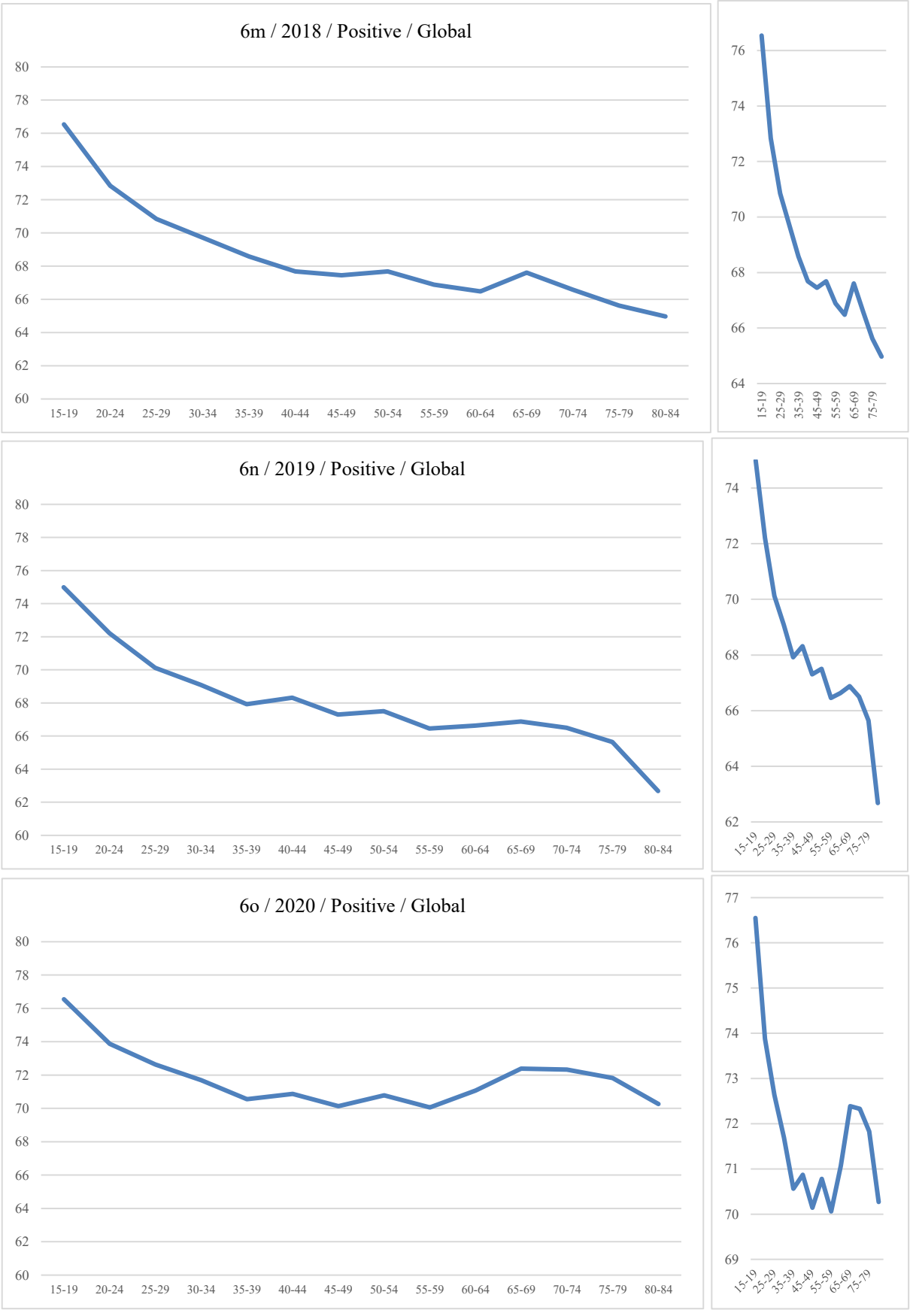

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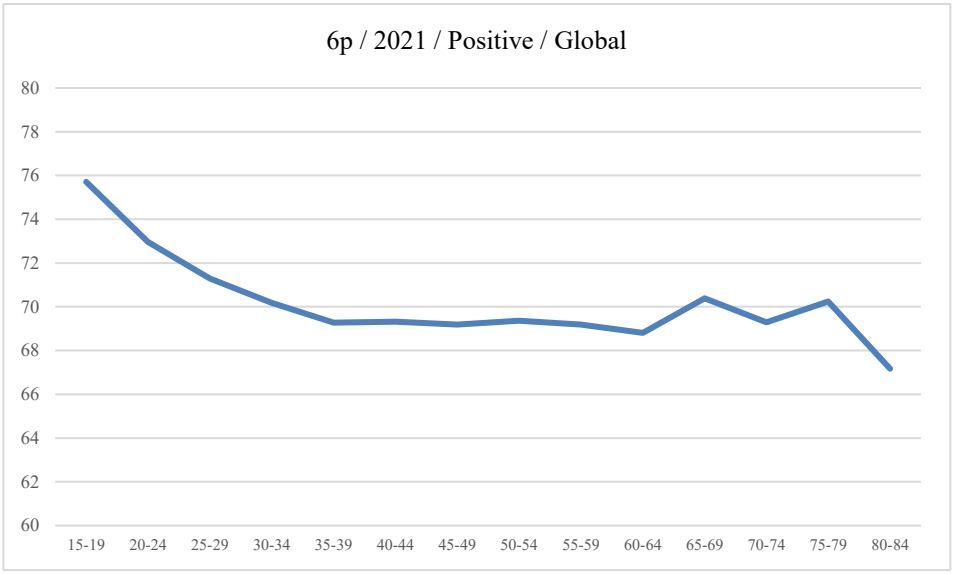

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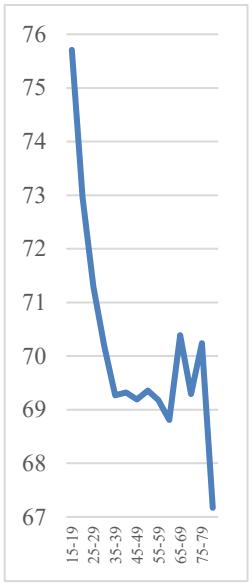

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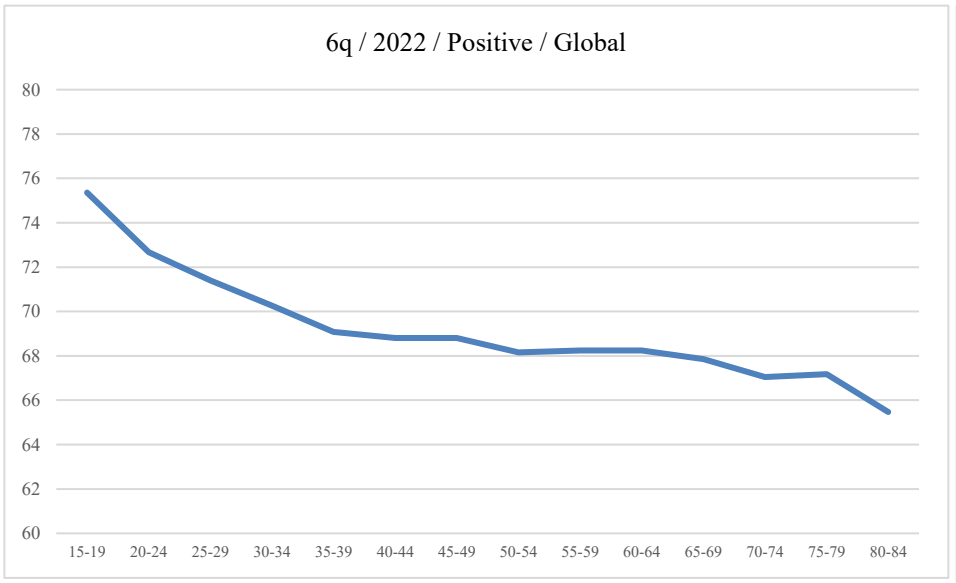

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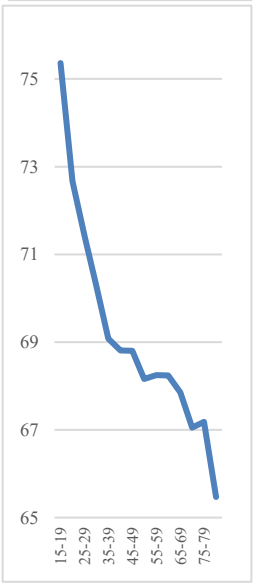

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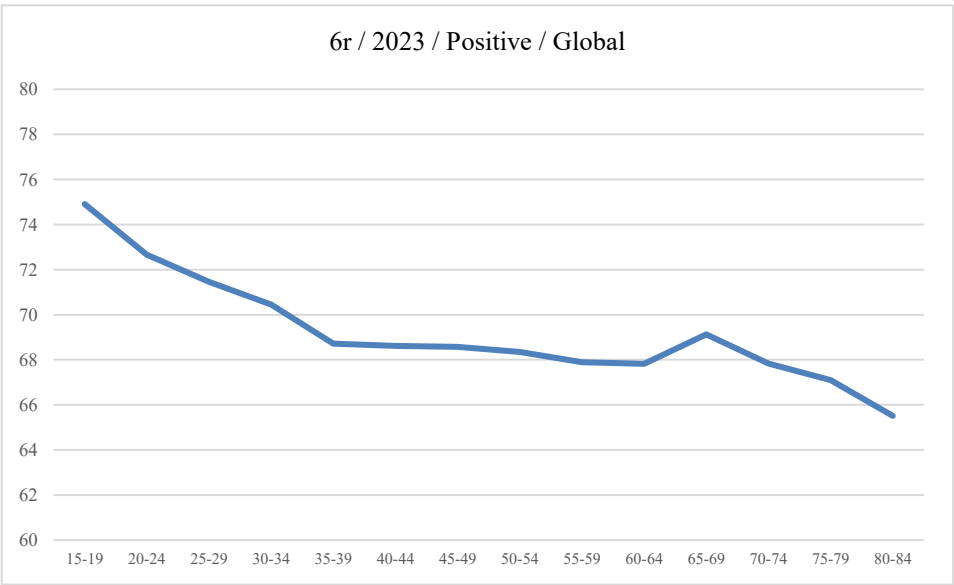

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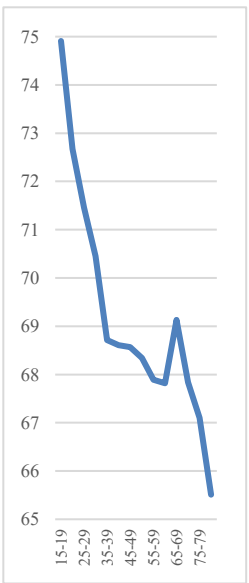

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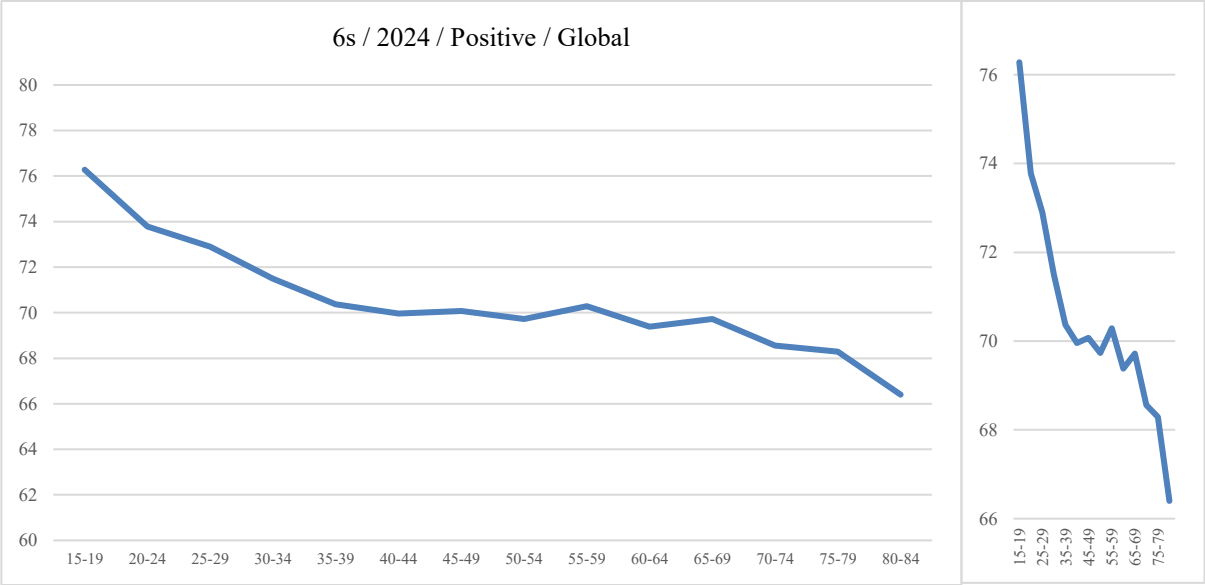

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Discussion

This paper was motivated by one overarching research question: is wellbeing U-shaped over the life span? In response, the answer depends on what one means by "is," "wellbeing" and "U-shaped." In short, under a specific set of meanings of these terms, the answer is yes, but even then only a rather slight and tentative one. The further one then departs from these specific meanings, the more the answer turns to a definite no. In brief, regarding the "is" part of the question, if one aggregates all years and regions together, as shown in Figures 2a-c, and zooms out and squints, then a rough U-shape pattern is indeed discernible. But when one breaks down the data into specific years (as in Figures 3a-s) and/or regions (Figures S12-22), then U-shapes are rarely observed, even imperfect ones (e.g., only seven of the 19 years had a single U by our interpretative criteria). Then, regarding "wellbeing," a vague U-shape pattern was only observed for the CL data, which pertains to *E*-SWB. By contrast, for the PEI, which approximates more to *A*-SWB, the standard pattern was a decline with age (albeit interrupted by a slight uptick usually around 60-64). So even if some forms of wellbeing are vaguely U-shaped, this does not apply to all forms. Third, regarding the "U-shape" question, while one could not expect any figure to conform to a "perfect" U—per the actual letter—few came close to even being very roughly U-shaped, and many departed from this significantly, as gauged by the negative scores on our rating rubric. The structural U- and J-beauty scores and the associated dominance metric reinforce this interpretation, indicating that even when a visual U-pattern is present under aggregation, geometric coherence is often weak or context-dependent at finer levels of analysis. We now address this overarching question through the prism of our subsidiary questions: (1) are all forms of SWB U-shaped, and if so which ones? (2) if some forms are U-shaped, is this shape observed over all the years, or has it changed over time? and (3) is this shape observed globally, or is there regional variation? Let's address these in turn.

Are All Forms of SWB U-Shaped?

First, to the extent that some vague U-shapes were observed, these only pertained to *E*-SWB (i.e., CL) rather than A-SWB. In terms of A-SWB, our findings mostly aligned with previous work suggesting this tends to more simply decline with age. Here we must emphasize that this assessment is only based on the PEI (an index of five "yesterday" positive experiences), and we cannot definitively extrapolate from this to A-SWB as a whole: it is not a general positive affect scale, it omits negative affect, and also excludes low-arousal affect (such as calmness,[43] which notably was added by Gallup in 2020 into its daily experiences module—albeit not into the PEI itself—in recognition of this omission, as discussed further below). As such, we cannot conclusively make the inferential leap from "PEI declines" to "A-SWB declines." However, in this Discussion we *shall* tentatively draw broader conclusions about A-SWB based on the PEI scores (even while we would encourage readers to bear these caveats in mind). Part of our confidence in doing so is that our PEI findings do align with previous work exploring other facets of A-SWB. Above we cited a meta-analysis of 14 longitudinal studies, for example, which found that "positive affect remained stable across most of the younger and middle-aged adult lifespan, before starting its descent in later middle-aged adulthood and continuing to decline throughout older adulthood."[24] Our data corroborate that broad conclusion to some extent, although specifics of the decline here were noticeably different. Consistent with this distinction, the structural metrics reinforce the dimensional contrast. E-SWB exhibits comparatively higher U-beauty and positive dominance values, indicating episodic interior-trough coherence, whereas A-SWB profiles are generally characterized by weak U-coherence and low or mildly negative dominance, consistent with predominantly monotonic age gradients rather than midlife dips.

Overall, taking all years combined (Figures 5a-c), rather than the PEI remaining stable into middle age and then falling, it began declining immediately from a high among those 15-

19, reaching a low point among those 55-59, having a slight uptick until 65-69, and thereafter declining again. Moreover, this pattern held across most individual years, although there was some variation in the details (e.g., in the positioning of the mid-later life uptick). The uptick itself is interesting, and perhaps relates to factors such as retirement, with previous work linking it to a potential SWB boon, even if the association is complex.[44] But whereas E-SWB tends to remain high post-retirement, and even to increase into older ages (hence the vague U-shape), A-SWB appears to drop off soon after the uptick, which perhaps speaks to the experiential challenges associated with aging. With E-SWB, one can appreciate how, even amidst such challenges, an older person might look over their life as a whole and appraise it with satisfaction (e.g., as a life well lived). But when it comes to their immediate affective experiences, one can see how these would be adversely affective by the challenges of aging (from health issues to losses of relationships). Overall then, when exploring the potential U-shaped nature of SWB, we encourage researchers to be precise about whether they are referring to E-SWB or A-SWB, since the patterns appear quite different.

We would also note that even SWB in its entirety (i.e., E-SWB *and* A-SWB) does not cover all of wellbeing, such as the set of qualities and experiences referred to as "eudaimonic" wellbeing.[45] This concept is inspired by the classical Greek notion of eudaimonia, celebrated by Aristotle as the "activity of the soul in accordance with virtue," who viewed it qualitatively as deeper and better than mere hedonic pleasures.[46] Such ideas are captured in Ryff's model of "psychological wellbeing,"[47] for example, with its six dimensions of self-acceptance, relationship, autonomy, environmental mastery, purpose in life, and personal growth. More relevantly, such work sits atop an extensive body of scholarship on personal development over the lifespan, including in terms of qualities or processes such as psychosocial stages,[48] values,[49] worldviews,[50] morals,[51] and spirituality/faith.[52] There are also frameworks that synthesize these various developmental trajectories into overall schemas of personal growth,

like Wilber's Integral Framework[53] and Spiral Dynamics.[54] At the heart of such work is the insight that while aging does bring challenges (hence the decline in A-SWB), it can also bring maturity vis-à-vis eudaimonic qualities, such as wisdom. For such reasons, although Western cultures now tend to regard old age negatively as a general period of decline, other cultures have still maintained an attitude of respect and even reverence to old age and to one's "elders" (e.g., as a source of wisdom).[55] Even in Western-centric academia there is now a movement towards becoming more appreciative of the benefits of age in the "positive aging" paradigm.[56] As such, even if E-SWB is ambiguously U-shaped, and A-SWB mostly a picture of decline, there may be other forms of wellbeing that—in a reversal of A-SWB—instead improve over time. The latter possibility merits more attention, since it has received far less investigation than E-SWB or even A-SWB trajectories, not least because items pertaining to eudaimonia are far less frequently included in endeavours like the GWP. At the very least though, one must be careful not to simply refer to "wellbeing" as being potentially U-shaped, and instead to be more precise in the form referred to.

Have SWB Patterns Changed Over Time?

We suggested above that E-SWB could potentially be regarded as somewhat U-shaped if one aggregates all years and regions together (Figures 2a-c). This partial endorsement of the thesis is a far distance from some claims in the literature, like Blanchflower and Graham's suggestion that the U-shape is "one of the most robust patterns in the data in social science."[7] It also differs in the specifics of the shape. The narrative in the literature is that the nadir usually falls around middle age—perhaps relating to the combined demands of parenting, work, and caring for older parents—but in our data across all years the low point was in fact among those aged 25-29. One perhaps wonders whether this may relate to the emergent notion of a "quarter-life crisis"—as examined in a systematic review whose authors describe it as being seen in people in their 20s "making the transition from a comfortable existence to

one that is grounded in reality, which commonly causes worry and concern about the future"[57]—though this is merely speculative and requires substantiating though future work. Aside from the specifics of the distribution though, let us grant that the notion of a vague overall U-shape for E-SWB has some validity. In that respect, our second research question is whether the shape has *changed* over time. We saw above that even Blanchflower suggests it has, with his 2025 paper strikingly claiming a "gradual vanishing" of the curve.[8] The *reasons* for that are perhaps complex though: analysing 21 Western European countries, he suggested that in 13 Northern European countries the shape has been replaced by life satisfaction rising with age, whereas in six Southern European it has *declined* with age. Other work though has often emphasized the former, involving the left-hand side flattening, with younger people faring worse compared to people of similar age in earlier eras.[9,10] As a result, VanderWeele and colleagues—analysing data from the Global Flourishing Study—suggest the curve is thus becoming more "J-shaped."[39,40]

To help answer this second research question, rather than simply forming subjective impressions of whether a given figure was indeed U-shaped, we sought to construct a more precise and quasi-objective schema—albeit one that is *still* somewhat subjective—for making that assessment, one which moreover might allow some *comparison* between figures, and thereby assessment of changes over time. For this, we identified four criteria: (a) the number of Us, (b) the number of kinks, (c) the skew, and (d) the incline. We then used these to grade each figure on its prototypical "U-ness." While a "perfect" U—precisely matching the shape of the actual letter—is not realistically attainable, we would deem a figure fully U-shaped if it had, (a) one U, (b) no kinks, (c), a medium skew (i.e., a low point in the middle), and (d) an equal incline (i.e., high points on either side being roughly equal). We would then subtract from each figure one point for every departure from these criteria (except in the case of a figure having *no* Us, e.g., instead just a general decline, since we deemed that so undermining

of the U principle as to merit subtracting *five* points). This scoring system, while imperfect, allows some comparison of figures across different years, as shown in Tables 3 (global) and 4 (regional). In these Tables we also grouped the waves into five batches (2006-2009, 2010-2013, 2014-2017, 2018-2021, and 2022-2024), averaging the scores across each batch to explore whether there has been a general change in U-ness over time. Overall, the heuristic scores indicate temporal instability rather than a consistent monotonic decline, with an average score of −3.5 across 2006–2009, falling to −3.8 in 2010–2013 and then −4.7 in 2014–2017, rising back to −3.7 in 2018–2021, and falling again to −5.7 in 2022–2024. There are some exceptions to this trend (and indeed considerable variability generally), with year with the best U-shaped score for instance being 2020 (with a score of -2, produced by having one U, no kinks, a left skew and a right incline). Similarly, in the system we also developed for statistically assessing structural U-shaped scores by quantifying the geometric coherence of age–wellbeing profiles, the strongest interior-trough coherence, as measured by U-beauty, occurred in 2018 and 2019, which lie in the upper tail of the U-beauty distribution and reflect relatively deep and coherent midlife troughs. One could nevertheless still make a case for the general distribution becoming somewhat less U-shaped over the years.

More specifically, there was supporting evidence for the suggestion, raised above, that the curve has become more "J-shaped": still with a low point around the middle of the figure, but with the left-hand side considerably lower than the right-hand side, as seen especially over the past few years (i.e., 2020-2024, as shown in Figures 3p-s), a pattern reflected in the reduced and in some years near-neutral dominance values. However, in terms of *reasons* for this change, our results challenged the idea, mooted above, that it is due to younger people faring worse compared to people of similar age in earlier eras.[9,10] In fact, in our data, the E-SWB of younger people *improved* slightly over time, but there was nevertheless a movement towards a J-shape, as reflected in the dominance index, due to older people having an even

greater improvement, as illustrated in Figures 1a-c and detailed in Tables 2 and 3. Table 3, for example, clusters participants into three age categories of younger (15-39), middle (40-59), and older (60-84), and the years into five batches. If we compare the mean scores between the first batch (2006-2009) and the most recent (2022-2024), while there was a general rise of 0.21 (from 5.47 to 5.58), the youngest participants only saw a slight increase of 0.06 (from 5.46 to 5.52), while the mean rose 0.19 for the middle aged (5.44 to 5.63) and 0.37 for older participants (from 5.51 to 5.88). We might also note, for context, that the PEI also showed a general increase between the first and last batch of 2.69 (from 66.95 to 69.64), and once again the rise was smaller for younger people (2.14, from 69.98 to 72.12) than for the middle aged (2.59, from 66.37 to 68.96) and especially older people (3.14, from 62.64 to 65.78).

There does therefore seem to be evidence for a general rise in SWB, including both evaluative and affective forms, over the past two decades. This may seem surprising, since one often encounters a narrative that the world is getting worse in myriad ways, from geopolitical hostilities[58] to the environmental crisis.[59] Without denying the reality of such trends though, maybe there is also truth to the argument, advanced, for example, by Pinker,[60] that overall the world is, on balance and in a net sense, getting better. This does not mean of course that it is improving for *everyone*, or on *everything*, as we consider in the next section, but it does seem to be the case on average for aspects of SWB. Our data do suggest that, at least insofar as SWB provides a gauge of people's overall perception of their lives, and perhaps also of the state of the world more broadly, there has been a general improvement. However, to return to the issue of the shape changing from a vague U into more of a J, these gains may be unevenly spread across the ages, with older people benefitting more than younger people, which manifests structurally as reduced U-dominance in recent years. There are no doubt numerous explanations for such trends, but at least some are likely socio-economic. Older people are more likely to benefit from established securities, from retirement

plans to home ownership, while conversely these goals—and indeed the employment situation more generally—has become notoriously more precarious for younger people.[61] As such, a general improvement over time in SWB should not occlude the fact that younger people are indeed doing worse—in relative terms compared to older people—compared to those in earlier eras, as reflected in the move towards the J shape.

Are SWB Patterns Observed Worldwide?

The third main research question is whether the trends observed above—such that there are any—are observed universally. The short answer is no. This is especially so with E-SWB (which has considerable variation overall, depending on the year, as illustrated above), but even applies to A-SWB (where the general global pattern of age-related decline is found much more consistently across the years). Figures S34-44 in the Supplementary Files show the PEI means for each of the 11 global regions in 2006, 2015, and 2016. There we can see the general trend of an age-related decline (interrupted by a slight uptick around age 60) *is* found across many regions, including in all three years for the EU (S34), Europe other (S35), Independent states (S36), South Asia (S39), East Asia (S40), Middle East and North Africa (S43) and Sub-Saharan Africa, and for two of the three years in South East Asia (S38) and Latin America (S41). But the two striking exceptions are Australia and New Zealand (S37) and North America (S42), where in fact *U-shaped* patterns are actually observed. This pattern is also reflected in comparatively higher U-beauty and positive dominance values for these regions in the benchmark years. One thus wonders whether the kinds of securities enjoyed by many older people, as discussed above—such as retirement plans and home ownership—may be particularly robust in these places compared to elsewhere. So too might be other structures that help support A-SWB in older age, most notably healthcare provisions. While people in general can lead very different lives in different places, perhaps such differences are magnified in older age, since older people are more vulnerable to issues such as health, and

hence more affected by structural variation in how these issues are addressed and cared for? We might also note that the outlier status of these two regions regarding A-SWB provides a further argument for redressing the Western-centricity of fields like psychology and conducting more cross-cultural research.[62] There is a tendency in psychology to mainly study participants in places described by Henrich and colleagues as relatively WEIRD (Western, Educated, Industrialised, Rich, and Democratic),[63] especially the US, and then to generalize to the rest of the world. However, our data show the folly of such generalizations, since with regard to A-SWB at least the US is an exception with regard to global trends.

Considerable regional variation was also observed for E-SWB, except this time North America was not a particular outlier but instead the EU was, especially in terms of the U-ness of the age distribution. The regional CL age-related profiles are shown in Figures S12-22 in the Supplementary Files, and with the U-shape rating scores recorded above in Table 5. There we see, for instance, that the region with the most U-like distribution over the three waves is South East Asia (a mean of -3.3), followed by East Asia (-3.5), Europe other (-3.7), Latin America (-4.2), Australia and New Zealand (-4.3), Middle East and North Africa (also -4.3), South Asia (-4.5), North America (-5.8), Sub-Saharan Africa (-6.7), Independent states (-7.3), and lastly the EU (-10.7). The reason for the EU's especially low score is that it was judged, in all three years, to not have any *U*-shape pattern in the figures (which meant it was had five points subtracted for each year, and hence in the overall mean). Instead, there was simply a general decline (similar to the pattern observed for *A*-SWB globally). For context, only two other regions also had an absence of a U, and even then not in all years (Independent states in 2006 and 2024, and Sub-Saharan Africa in 2016). By contrast, across all other figures, there was at least a one U (in 13 out of 33 Figures), and in many cases more than one. It is difficult to know *why* the EU is such an outlier in that regard, such that older people do much worse on E-SWB—not in absolute terms, but relative to their younger compatriots—compared to older

people elsewhere. As such, more research will be needed to explain these trends. But the outlier status of the EU again points to the risk of generalizing from relatively WEIRD societies to the rest of the world. Above we cited for example Blanchflower's assertion that the U-shape was gradually "vanishing."[8] However, that was just based on an analysis of Western European countries, and our data show one must be careful in extrapolating from this region to the rest of the world—a concern which is relevant generally across all outcomes but would seem to apply especially to E-SWB. This caution is further supported by the structural dominance results, which indicate that EU profiles are weakly U-coherent or non-U-dominant relative to other regions. Taken together, both heuristic and structural analyses underscore that age–wellbeing trajectories are not globally uniform but vary systematically across institutional and cultural contexts.

Limitations and Future Directions

There are inevitably limitations to our analysis. However, we regard and offer the paper more as a foundation and impetus for further work on this topic, rather than the definitive answer to the questions studied here. As such, these limitations can also be configured as specific recommendations for future research to pursue and explore. Our paper is already extensive and detailed enough, perhaps even overly so, which is why we have not acted ourselves on these future recommendations here (as to do so would easily double its length). But we hope this final section helps others to build further on the foundations provided here (and of course the foundations already established by others who have previously published on this topic), and to that end we conclude by offering a fairly specific and detailed roadmap for how to take our findings forward and further advance our understanding of this topic.

First, although we have examined longitudinal trends, the GWP data is still cross-sectional rather than a panel study tracking individuals over time. As such, cross-sectional composition effects remain unresolved. A core debate in this literature is whether cross-

sectional U-shapes reflect aging per se versus cohort/composition, but the present analysis does not allow that, nor does it formally separate age, cohort, and period. As valuable as the GWP dataset is then, it is important to also study age-related trends using panel studies. One such opportunity lies with the aforementioned Global Flourishing Study, a research endeavour covering over 200,000 people (in its first wave) across 22 countries, which is anticipated to last at least five years.[39,64] It's first wave was in 2023, with its third wave of data (collected in 2025) available in early 2026, so it is already starting to yield longitudinal insights. Moreover, the data are publicly available through the Centre for Open Science (https://www.cos.io/gfs-access-data), and we would encourage scholars to make use of this data to further interrogate the U-shape thesis and more generally explore longitudinal wellbeing trends. Even so, the relatively few panel studies that exist looking at E-SWB have also tended to challenge the U-shape notion, and our findings are not necessarily out of line with their conclusions. For example, a recent meta-analysis analyzed longitudinal data from 460,902 participants and found that life satisfaction decreased from ages 9 to 16 ($d = -0.56$), increased slightly until age 70 ($d = 0.16$), and then decreased again until age 96 ($d = -0.24$).[65] Other panel studies have likewise challenged the U-shape narrative and reached similar conclusions. [66,67,68,69]

A second potential limitation, from the perspective of some, is that we did not employ controls. To reiterate our position though, we believe there is often inadequate justification given for using controls. We suggested above that Blanchflower's[34] smoking analogy used to justify his use of controls is misleading, as the logic of controlling for diet and income in assessing the risk of smoking to health is that smoking has an independent effect on health, which can in principle be isolated from that of diet and income, but the relationship between age and SWB isn't obviously like that. Some of the most plausible explanations of a mid-life decline in SWB are that the transition from youth to middle-age often brings with it changes related to work or family life which are causally related to declining E-SWB, and whose

recession as one ages toward retirement explain the subsequent rise in E-SWB. If correct, then by controlling for factors like marriage, children, or employment, one would actually control for important potential mediators of the effect of age on E-SWB. Moreover, certain regular "control" variables can themselves be affected by SWB. Nevertheless, future work might still look into the merits of at least including *some* controls, but more clearly articulate the estimand towards which such analyses are aiming. The present consensus in the literature recognizes that controls change the estimand, therefore should be chosen based on the question—causal, descriptive, or otherwise—at hand. If SWB depends on some key variables that systematically vary with age, then logic suggests not the use or not of linear control variables, but instead the testing of interaction terms. For example, if life evaluations depend on the degree of trust in the workplace, and if employment is concentrated in the middle years, then the U-shape will appear for workers in low-trust workplaces more than in high trust ones.[70] Our recommendations going forward are thus to define two estimands explicitly, namely descriptive age profile (no controls) versus conditional association (selected controls), and state which is primary and what the latter is aiming at and why it is of interest. Other directions to explore might include (1) a structured sensitivity ladder in GWP microdata, involving no controls → demographics → socioeconomic → marital/employment → health, thereby showing how the turning point, curvature, and age-group gaps move; and (2) using DAG-style reasoning to justify why particular controls are or are not appropriate given plausible bidirectionality between SWB and marital/employment status.

A third limitation concerns the measures explored in the analysis. While themselves the items are reliable and extensively used, they only offer a partial assessment of wellbeing in its fullness. Not only do they not cover forms of wellbeing outside the prism of SWB, such as eudaimonic forms, they may not even offer a full representation of SWB itself. With E-SWB, for instance, an analysis of the Global Flourishing Study compared CL data with two

other E-SWB items,[40] one on life satisfaction and a measure of happiness, and found that CL had the weakest correlations with VanderWeele's flourishing index[71] at the heart of the study. As such, while CL does still offer a good gauge of E-SWB, the authors suggested that life satisfaction and happiness perhaps provided better ones, but also that the best way to assess E-SWB would be to deploy all three (or at least two) and to combine the results. Similarly, while the PEI provides a decent approximation of A-SWB, it does not cover the entirety of the affective terrain, as it only focuses on positive and not negative affect, and also only experiences yesterday. Moreover, it also does not even capture all of *positive* affect, as highlighted by the Global Wellbeing Initiative, a collaboration between Gallup and a Japanese foundation called Wellbeing for Planet Earth. It is founded on the premise that the metrics in the GWP could be considered Western-centric—as is wellbeing research more broadly—and so has focused on developing new items for the GWP that reflect perspectives on wellbeing associated with non-Western cultures, especially Eastern ones.[72] Most relevantly here, these include items around *low arousal* A-SWB, such as calmness[43] and inner peace,[73] with the former actually added by Gallup into its daily emotions module from 2020 onwards. However, given its addition was so recent, it does not feature in the PEI, which does represent a lack.

Additionally, our PEI analysis assessed the module as a whole, rather than also looking more granularly at its component parts (since the analysis and paper were already voluminous enough, so also assessing PEI items individually would be overwhelming). We therefore encourage researchers to look separately at different aspects of A-SWB to explore age-related variation among the items. Finally, we also encourage people to look beyond SWB to investigate other forms of wellbeing, such as its eudaimonic varieties. Eudaimonic wellbeing has not really been covered in the GWP, hence its omission here, but is well represented in the Global Flourishing Study, which includes questions around meaning and

purpose for example, and studying longitudinal age-related trends around such topics would be a valuable complement to the work on SWB presented here.

A fourth limitation concerns the rubric used to evaluate the U-ness of the distribution. Its value is that it avoids purely impressionistic judgments about whether curves are U-shaped, proposing a four-criterion rubric. We would argue that this transparency about the problem (shape judgments are often subjective) is welcome, and the attempt to formalize "U-ness" shows methodological initiative. It also operationalizes multiple "failure modes" of the U-shape claim (multiple minima, asymmetry, monotonicity), which is conceptually useful for communicating heterogeneity. At the same time, the rubric remains partly subjective and currently unvalidated. Ideally, one would have a separate paper devoted entirely to validating the rubric itself, which indeed is something our team has planned. In the absence of such validation, its use here should be regarded as a structured but provisional device for comparative interpretation. Importantly, however, the spline-based structural U- and J-beauty scores and the associated dominance metric complement this rubric by providing a continuous, model-based characterization of geometric coherence that does not rely on coder-based classification. Thus, while the rubric offers a transparent benchmark for assessing symmetry, the structural framework supplies a parallel quantitative assessment of interior-trough and monotonic regimes. Nevertheless, potential limitations of the rubric remain. The criteria (e.g., "kinks," "number of Us," what counts as "medium skew," how "equal incline" is judged) retain elements of coder dependence, and the penalty scheme could be considered ad hoc. Without inter-rater reliability, preregistered scoring rules, and robustness checks, the "U-ness" metric risks replacing one subjectivity (eyeballing plots) with another (hand-scoring plots). Moreover, heuristic scores are presented as point assessments and do not incorporate formal uncertainty quantification, even though sampling error differs across regions, years, and age categories.

The broader literature offers established alternatives for characterizing age–SWB profiles, including quadratic models, nonparametric fits, splines/GAMs, model comparison, and explicit testing of turning points. Much of the age–SWB debate hinges on whether one imposes a quadratic functional form and which controls are included. In this respect, our spline-based structural framework aligns with nonparametric approaches, but further refinement remains possible. In particular, future work could further formalize statistical inference around spline-based shape estimation, including explicit turning-point uncertainty, bootstrap or Bayesian propagation of curvature estimates, and comparison with alternative constrained specifications. Accordingly, we recommend future work to: (1) validate the heuristic rubric using a preregistered scoring guide, blinded multi-rater scoring, and correlation with model-based curvature metrics; (2) deepen formal inference around spline-based structural estimation, including uncertainty quantification and explicit turning-point testing; and (3) quantify practical significance by defining what magnitude of curvature (e.g., in CL points) constitutes a substantively meaningful U-shape.

Fifth, the analysis relied in part on qualitative inference from the shape of the various figures. One issue with such figures is that the age pattern magnitudes appear small, with potential "visual amplification," and that when the full y-scale is shown, CL age differences are relatively flat and become "U-like" mainly under zoomed axes. (The spline-based structural U- and J-beauty scores and the associated dominance metric do partially mitigate this concern though by evaluating curvature and monotonicity directly from the estimated age profiles rather than relying solely on visual inspection.) This issue is compounded when trying to ascertain changes to shapes over time. Time change is not identified cleanly without an APC structure. Year-by-year cross-sectional means confound period shocks (e.g., financial crisis, pandemic), cohort replacement, and changing country composition of the "global" sample. Without explicit decomposition, the conclusion that the "U-shape is vanishing"

cannot be attributed to time trends in aging patterns rather than sample composition. While our country-level dominance analysis reduces the likelihood that observed shifts are driven purely by aggregation effects, it does not fully disentangle age, period, and cohort dynamics.

Relatedly, other inferences made—such as the "quarter-life crisis" explanation for the CL nadir being among those 25-29—are speculative and not tightly linked to the presented data, and require external corroboration with age-specific stress/worry indicators in the same dataset. Overall, Deaton's[36] work using Gallup data shows that SWB dimensions behave differently with age and across contexts, and emphasizes that evaluative and affective forms respond differently to circumstances. This supports the manuscript's multidimensional stance but also underscores the need for further dimension-specific, model-based time trend tests. As such, recommendations for future work include: (1) adjusting for changing country composition, such as presenting results for a balanced panel of countries (countries observed in all/most waves), and compare to the full sample; (2) introducing APC-aware modelling (even if imperfect), such as cohort-by-age profiles within a stable set of countries, or hierarchical models with country random effects and interactions; and (3) testing time-change formally through age spline × period interactions, such as comparing 2006–2012 vs 2013–2018 vs 2019–2024 with pre-specified contrasts.

A sixth issue concerns our treatment of regional differences. Our attention to regional heterogeneity is a major value-add of the paper, providing a corrective to narratives that treat the U-shape as universal. However, regional aggregation may still mask country-level diversity and compositional artifacts. While we now provide country-level structural summaries to assess dominance patterns across nations, the regional analysis—harnessing the standard Gallup groupings—remains a simplification that may obscure additional within-region heterogeneity, combining countries with different welfare regimes, age structures, and survey response patterns. The claim that EU is uniquely non-U-shaped, for example, would

ideally be decomposed into country patterns, and moreover ideally replicated with alternative European datasets, before making strong interpretive claims. Relatedly, the mechanisms for heterogeneity are underspecified here. We have suggested that more research is needed to explain the EU pattern, but it would be beyond the scope here to offer a more structured set of candidate mechanisms and tests with available covariates (health, income, social support, etc.). So in terms of future recommendations, these are to: (1) disaggregate regional groupings, thereby providing country-level plots (or at least summary curvature/turning point estimates) and show whether overall regional patterns (e.g., "EU decline") are broad-based or driven by subsets; (2) triangulate with other datasets (e.g., in the case of the EU, with the ESS and Eurobarometer), as is consistent with the literature's concern about data-source dependence; and (3) conduct mechanism probes within GWP, in which age-profile differences are correlated with country-level indicators (GDP per capita, inequality, welfare spending proxies, social support items, health limitations), using multilevel models.

Conclusion

Despite the limitations of our analysis, as elucidated above, one can nevertheless draw several conclusions, albeit ones caveated by the need for future research to fully substantiate them. To that point, the section above has provided a detailed roadmap for such research. Even as it stands though, we can tentatively say that, with E-SWB (at least as indexed by Cantril's ladder specifically), although a vague U-shape was evident when combining all years and regions, when analyzed individually, few years or regions came close to a simple U-shape pattern (as rated by a schema for ascertaining "U-ness"), although some did bear some resemblance. The structural U- and J-beauty scores and associated dominance metric further indicate that even where a visual U-pattern appears under aggregation, geometric coherence is often weak and varies across years and contexts. As for *A*-SWB (as gauged imperfectly but still usefully by Gallup's PEI), this instead tended to just simply decline with age, albeit with

a slight uptick around age 60. But any general patterns were subject to considerable variation, both in terms of year and region. Country-level structural summaries further indicate that this instability is not solely an artifact of global aggregation, but is observable within nations themselves, albeit with considerable heterogeneity in the strength and direction of dominance. With the year, there was a general trend of both outcomes improving over time, but especially for older people, meaning that the general U-shape curve (vague and imperfect as it was) was becoming more "J-shaped." This shift corresponds to declining U-dominance and a relative strengthening of J-oriented patterns in recent years, rather than the disappearance of midlife dips altogether. And with regions, there were striking outliers to the general trends, such as the EU with respect to Cantril (with a simple decline with age), and North America with regard to positive experiences (which actually had a U-shape, with older people doing as well as younger people).

Finally then, even while emphasizing the need for future research to substantiate these conclusions along the lines outlined above, let us conclude by offering some modest policy recommendations. A first and central policy implication of this analysis is that age–wellbeing profiles should not be treated as universal facts on which to base generic "midlife crisis" or "healthy aging" policies. The evidence suggests that the shape of SWB over the life course depends critically on the dimension of wellbeing being measured (e.g., evaluative versus affective), on regional and institutional context, and on historical period. Policies premised on a presumed universal U-shape—such as targeting mental-health resources primarily at middle-aged adults on the assumption that this is the global nadir of wellbeing—risk substantial misallocation. In many regions, and especially for affective wellbeing, the lowest levels may occur earlier in adulthood or decline steadily with age. This reinforces calls in the wellbeing policy literature to disaggregate wellbeing metrics and to align interventions with the specific components of wellbeing they are intended to improve.[74] Second, the finding that

young adulthood often emerges as a relative low point in evaluative wellbeing, rather than midlife, has direct implications for education, labour-market, and housing policy. If wellbeing shortfalls are increasingly concentrated among people in their 20s and early 30s, this points toward structural pressures—precarious employment, student debt, housing affordability, and delayed economic security—rather than purely psychological life-cycle effects. Policy responses would therefore emphasize economic and social institutions that reduce early-adulthood insecurity, such as improved school-to-work transitions, active labour-market policies, and affordable housing supply, rather than individual-level resilience interventions alone. This interpretation is consistent with recent work showing cohort- and context-specific declines in young people's life evaluations in several high-income countries.[75]

Third, the strong regional heterogeneity documented in the analysis cautions against exporting wellbeing policies developed in Western Europe or other WEIRD contexts to the rest of the world without adaptation. The apparent distinctiveness of European age–wellbeing profiles suggests that welfare-state institutions, health systems, and social protection arrangements shape how wellbeing evolves with age. For policymakers, this implies that international wellbeing dashboards and global development frameworks should allow for region-specific benchmarks rather than relying on a single "expected" age trajectory. More broadly, it supports the argument that wellbeing policy must be institutionally grounded: the same age-targeted intervention may have very different effects depending on labour markets, family systems, and public provision.[36,76] Finally, the analysis underscores the importance of measurement choices for policy evaluation. Because evaluative and affective wellbeing can move in different directions with age, policies evaluated solely on life satisfaction metrics may overlook deteriorations (or improvements) in emotional experience, and vice versa. Governments increasingly incorporating wellbeing into policy appraisal—such as through wellbeing budgets or cost–benefit analyses—should therefore track multiple wellbeing

dimensions and be explicit about which dimensions policy is intended to influence. Failure to do so risks drawing misleading conclusions about who is benefiting from policy and at what stages of life.[13,74]

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