Supplementary Information

Comparing Countries Is Not Following Them: When Can a Cross-National Well-Being Decomposition Describe Change?
Applied Research in Quality of Life. Author details withheld for double-anonymous review.

This file documents the data, the audit of the published series, the construction of the harmonized panel, and results that the main text summarizes. Every number is produced by the replication code in Online Resource 3 (ESM_3), which writes all values to output/results.json. Data and results tables are also provided in Online Resource 2 (ESM_2).

S1 Data sources

Table S1 Input files

File	Content	Source
WHR26_Data_Figure_2.1.xlsx	World Happiness Report 2026, data for Figure 2.1 (country-year series)	files.worldhappiness.report
WHR25_Data_Figure_2.1v3.xlsx	World Happiness Report 2025, same series	files.worldhappiness.report
WHR20_Data_Figure_2.1.xls	World Happiness Report 2020, data for Figure 2.1 (2019 decomposition, with factor values)	files.worldhappiness.report
WHR21_Data_Figure_2.1.xls	World Happiness Report 2021, data for Figure 2.1 (2020 decomposition, with factor values)	files.worldhappiness.report
WHR23_Data_Figure_2.1.xls	World Happiness Report 2023, data for Figure 2.1 (2022 decomposition, with factor values)	files.worldhappiness.report
edition_coefficients.csv	Coefficients transcribed from each edition's statistical appendix (see S2)	compiled
WDI_NY.GDP.PCAP.PP.KD.json	GDP per capita, PPP, constant 2021 international dollars; last updated 2026-10-08	api.worldbank.org
WDI_SP.DYN.LE00.IN.json	Life expectancy at birth, total; last updated 2026-10-08	api.worldbank.org
WB_country_metadata.json	World Bank region and income group of each economy	api.worldbank.org

All files were downloaded on 29 October 2026 from https://www.worldhappiness.report/data-sharing/ and the World Bank API; SHA-256 checksums are recorded in results.json and README.md. No registration is required for any file.

S2 Audit of the published country-year series

S2.1 Each year is the decomposition of its own edition

For the three years whose original edition files report the factor values as well as the contributions, the rows of the 2026 file were compared with the original files. The maximum absolute difference in any contribution or life evaluation is 0.0000 for 2019 (140 countries), 0.0005 for 2020 (138) and 0.0005 for 2022 (126), which is rounding to three decimals. The 2025 file repeats the 2026 values exactly for all 868 overlapping country-years. In each original file, each contribution is an exact linear function of the corresponding factor (absolute correlation equal to one to six decimals), so the slope of that function is the coefficient the edition used and its root is the Dystopia reference value.

S2.2 Coefficients and reference values by edition

Table S2 Coefficients applied to each year of the published series

Year	Edition	Income	Social support	Healthy life exp.	Freedom	Generosity	Corruption
2019	WHR 2020	0.3099	2.3619	0.0360	1.1985	0.6614	−0.6456
2020	WHR 2021	0.3494	2.2529	0.0315	1.2168	0.6523	−0.6377
2021	WHR 2022	0.3600	2.4200	0.0290	1.3050	0.5830	−0.7040
2022	WHR 2023	0.3586	2.5260	0.0272	1.3307	0.5365	−0.7163
2023	WHR 2024	0.3490	2.5630	0.0280	1.3780	0.4870	−0.7330
2024	WHR 2025	0.3280	2.6860	0.0320	1.5180	0.3820	−0.6690
2025	WHR 2026	0.2970	2.8200	0.0350	1.5460	0.3390	−0.6620

Source of each row: 2019: implied exactly by WHR20_Data_Figure_2.1.xls (computed in code); 2020: WHR 2021 Statistical Appendix 1, Table 11, column 1 (also implied exactly by WHR21_Data_Figure_2.1.xls); 2021: WHR 2022 Statistical Appendix, Table 8, column 1; 2022: WHR 2023 Statistical Appendix, Table 8, column 1 (also implied exactly by WHR23_Data_Figure_2.1.xls); 2023: WHR 2024 Statistical Appendix, Table 8, column 1; 2024: WHR 2025 Chapter 2 Appendix B, Table 8, column 1; 2025: WHR 2026 Statistical Appendix, Table 8, column 1. Appendix page numbers (PDF pages): 2021 edition, Statistical Appendix 1, p. 19; 2022, p. 18; 2023, p. 18; 2024, p. 45; 2025, Chapter 2 Appendix B, p. 32; 2026, p. 18. Appendix values agree with the implied values for 2020 and 2022 to within 0.0006.

Table S3 Dystopia reference values implied by the original edition files

Year	Income	Social support	Healthy life exp.	Freedom	Generosity	Corruption
2019	6.493	0.319	45.200	0.397	−0.301	0.936
2020	6.635	0.463	48.478	0.382	−0.288	0.939
2022	5.527	0.341	51.530	0.382	−0.254	0.929

A change in a reference value shifts every country’s contribution by the same amount in that year and is absorbed by year effects.

S2.3 Decomposition of the change in each published contribution

For a factor with edition coefficients b19 and b25 and value x measured from each edition’s reference value, the change in the published contribution between 2019 and 2025 is b25(x25 − x19) + (b25 − b19)x19 plus a constant common to all countries. The first term is change in the data; the second is change in the coefficient. Table S4 reports the cross-country variance of each term.

Table S4 Variance of the change in published contributions, 2019 to 2025, by source

Factor	n	Total	Data term	Coefficient term	Twice covariance	Coefficient ratio, 2025 to 2019
Income (log GDP per capita)	141	0.0202	0.0197	0.0002	0.0003	0.958
Social support	141	0.0230	0.0178	0.0025	0.0027	1.194
Healthy life expectancy	141	0.0230	0.0226	0.0000	0.0004	0.972
Freedom to make life choices	141	0.0113	0.0121	0.0016	−0.0024	1.290
Generosity	141	0.0036	0.0007	0.0024	0.0005	0.513
Perceptions of corruption	141	0.0020	0.0020	0.0000	−0.0001	1.025

Variances in squared ladder points. Total equals data term plus coefficient term plus twice their covariance.

S2.4 Breaks in the income and health series

The original 2020, 2021 and 2023 edition files report the level of each factor, so changes between them can be computed without reference values. From the 2020 to the 2021 edition (data years 2019 and 2020) the median change in the logarithm of income per capita is 0.108 (standard deviation across countries 0.146); in the World Bank series for the same windows it is −0.002 (0.029). From the 2021 to the 2023 edition (data years 2020 and 2022) the standard deviation of the change in healthy life expectancy is 1.82 years, against 0.68 years for World Bank life expectancy. Correlations of the recovered levels between adjacent years show the same blocks (Table S5).

Table S5 Correlation across countries of recovered factor levels in adjacent years

Years	Income	Healthy life expectancy
2019-2020	0.992	0.999
2020-2021	0.966	0.966
2021-2022	0.998	0.999
2022-2023	1.000	0.999
2023-2024	0.995	0.914
2024-2025	0.994	0.987

Levels recovered as contribution divided by edition coefficient. Values well below 0.99 between adjacent years of a slowly moving variable indicate a change of source or price base.

S3 Variables and the harmonized panel

Life evaluation: national mean of the Cantril ladder (0 to 10), averaged over three survey years, as published. Income: natural logarithm of GDP per capita at purchasing power parity in constant 2021 international dollars from the World Development Indicators, averaged over the same three calendar years. Life expectancy: life expectancy at birth in years from the same source, averaged likewise (life expectancy for the 2025 wave averages 2023, 2024). Social support: national share answering yes to having relatives or friends to count on. Freedom: share satisfied with freedom to choose what to do with one’s life. Generosity: residual of the national share who donated to charity in the past month regressed on income per capita, as constructed by the report in each edition. Perceptions of corruption: average of two binary items on corruption in government and in business. The four survey factors are recovered by dividing each published contribution by its edition coefficient (Table S2); they are measured from the edition’s reference value, which year effects absorb.

Share of variance (net of year effects) that lies between countries, 2019 to 2025: income 99.8 per cent; social support 95.7 per cent; life expectancy 99.5 per cent; freedom to make life choices 92.9 per cent; generosity 93.7 per cent; perceptions of corruption 96.9 per cent; life evaluation 96.7 per cent.

Countries not covered by the World Development Indicators: North Cyprus, Taiwan Province of China. Income groups are the World Bank classification current at download.

S4 The published object: shares of variance tracked by the six contributions

The main text does not rely on shares of variance, because they mix the strength of a relationship with how much each factor moves. For completeness, Table S6 reports the share of the variance of life evaluation (between countries) and of its change (within countries) that is tracked by the sum of the six contributions, in the published series and with one coefficient vector applied to all years.

Table S6 Share of variance tracked by the sum of the six contributions

Comparison	Series	n	Variance of outcome	Variance of sum of contributions	Share tracked
Between countries, 2019	published	153	1.237	0.953	0.743
Between countries, 2020	published	149	1.153	0.874	0.749
Between countries, 2021	published	146	1.181	0.887	0.758
Between countries, 2022	published	136	1.306	0.990	0.806
Between countries, 2023	published	140	1.395	1.007	0.795
Between countries, 2024	published	144	1.362	1.035	0.801
Between countries, 2025	published	145	1.307	1.022	0.793
Within countries, 2019 to 2022	published	136	0.153	0.055	0.278
Within countries, 2019 to 2022	harmonized	136	0.153	0.054	0.274
Within countries, 2022 to 2025	published	135	0.093	0.042	0.079
Within countries, 2022 to 2025	harmonized	135	0.093	0.043	0.048
Within countries, 2019 to 2025	published	141	0.172	0.084	0.132
Within countries, 2019 to 2025	harmonized	141	0.172	0.084	0.083

Share tracked is the squared correlation between the outcome and the sum of contributions. Variances in squared ladder points.

S5 Pooled and within-country slopes: annual panel

Table S7 Between-country and within-country slopes, all seven years

Factor	Pooled	Within	Difference	p
Income (log GDP per capita)	0.27 (0.09)	0.75 (0.29)	−0.49 (0.31)	0.113
Social support	3.53 (0.55)	4.13 (0.53)	−0.64 (0.85)	0.454
Life expectancy	0.014 (0.013)	0.023 (0.018)	−0.010 (0.023)	0.658
Freedom to make life choices	2.28 (0.41)	0.72 (0.35)	1.61 (0.58)	0.005
Generosity	0.20 (0.29)	0.18 (0.27)	−0.04 (0.40)	0.912
Perceptions of corruption	−0.66 (0.26)	−0.92 (0.35)	0.19 (0.44)	0.667
Joint test			$\chi^2(6) = 10.73$	0.097; bootstrap 0.204
Sample	152 countries, 986 observations	150 countries with two or more years		

As Table 3 of the main text, using every year from 2019 to 2025. Adjacent years share survey data; standard errors clustered by country. Within-country R-squared (within-transformed regression, factors and year effects) 0.435; pooled R-squared 0.789. The three-wave values are 0.466 and 0.788.

With the report's own spliced income and healthy life expectancy series in place of the World Bank series, the three-wave within-country slope for income is −0.07 (0.12) and for healthy life expectancy −0.014 (0.005), against pooled slopes of 0.22 and 0.024. The splice is sufficient to make both appear unrelated or negatively related to change in life evaluation.

S6 Temporal invariance

Table S8 Cross-sectional slopes by year

Year	n	Income	Social support	Life exp.	Freedom	Generosity	Corruption	R-squared
2019	148	0.32 (0.10)	2.76 (0.85)	0.017 (0.014)	1.69 (0.47)	0.38 (0.38)	−0.70 (0.35)	0.743
2020	145	0.29 (0.10)	2.79 (0.75)	0.020 (0.014)	2.01 (0.49)	0.28 (0.35)	−0.65 (0.34)	0.752
2021	142	0.27 (0.10)	3.32 (0.75)	0.021 (0.014)	2.14 (0.57)	0.55 (0.38)	−0.48 (0.30)	0.771
2022	134	0.32 (0.10)	3.67 (0.60)	0.001 (0.015)	2.48 (0.49)	0.15 (0.34)	−0.74 (0.26)	0.829
2023	137	0.24 (0.11)	3.89 (0.64)	0.012 (0.015)	2.54 (0.47)	0.20 (0.31)	−0.76 (0.28)	0.817
2024	141	0.23 (0.11)	4.05 (0.55)	0.010 (0.015)	2.70 (0.42)	−0.09 (0.27)	−0.80 (0.25)	0.827
2025	139	0.18 (0.11)	3.89 (0.55)	0.022 (0.014)	2.30 (0.46)	−0.05 (0.28)	−0.68 (0.26)	0.801

Heteroskedasticity-robust standard errors. Joint test that slopes are equal in all seven years: $\chi^2(36) = 66.83$, asymptotic p 0.001, wild bootstrap p 0.107. Three non-overlapping waves: $\chi^2(12) = 22.36$, asymptotic p 0.034, bootstrap p 0.080.

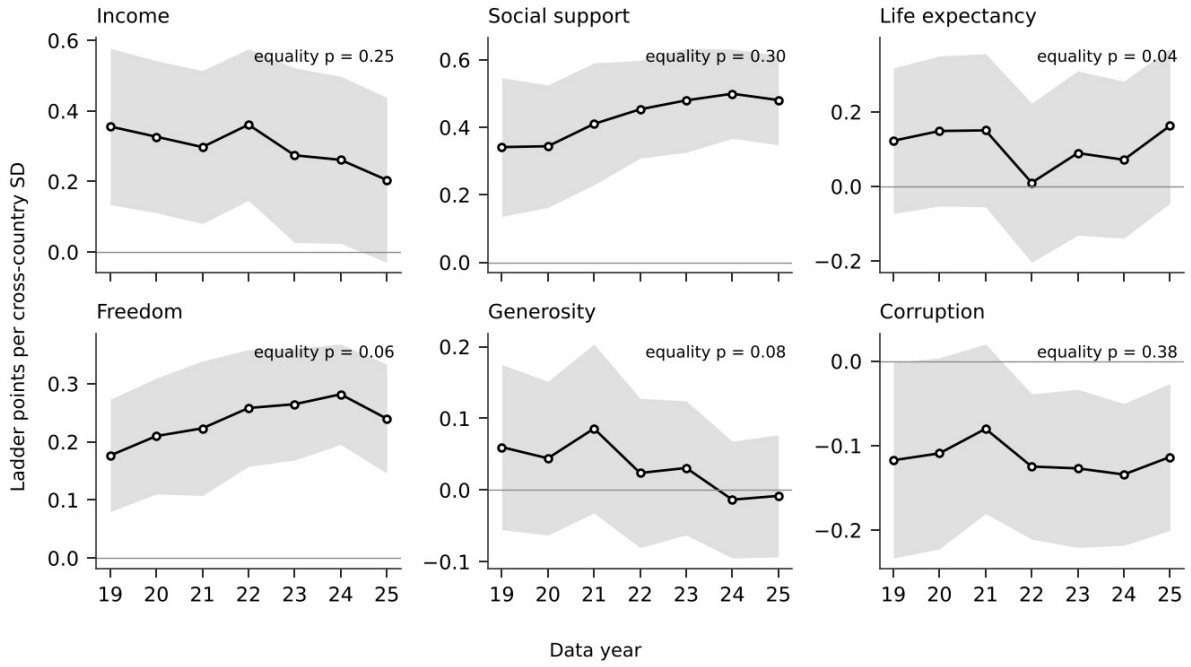


Fig. S1 Cross-sectional slopes by year, multiplied by the cross-country standard deviation of each factor in 2025, with 95 per cent confidence intervals. The p value in each panel tests equality across the seven years for that factor (asymptotic).

Table S9 Within-country slopes estimated from changes over each window

Window	n	Income	Social support	Life exp.	Freedom	Generosity	Corruption	R-squared
2019 to 2022	134	0.19 (0.43)	4.76 (0.81)	0.034 (0.029)	0.83 (0.49)	0.71 (0.41)	−0.70 (0.56)	0.511
2022 to 2025	130	1.69 (0.40)	2.51 (0.62)	0.057 (0.021)	0.21 (0.52)	−0.28 (0.40)	−0.40 (0.43)	0.378
2019 to 2025	135	0.61 (0.37)	3.98 (0.60)	0.012 (0.029)	0.50 (0.52)	0.31 (0.39)	−1.33 (0.48)	0.381

Regressions of the change in life evaluation on the changes in the six factors, with a constant. Robust standard errors. Equality of slopes between the two adjacent windows: $\chi^2(6) = 22.31$, asymptotic p 0.001, wild bootstrap p 0.008.

S7 Further checks

S7.1 Sampling error in the outcome

Table S10 Sampling variance as a share of the observed variance of change in life evaluation

Window	n	Observed variance of change	Mean sampling variance	Share
2019 to 2022	136	0.153	0.0076	0.049
2022 to 2025	135	0.093	0.0078	0.084
2019 to 2025	141	0.172	0.0063	0.037

Standard errors derived from the published 95 per cent confidence intervals; endpoint windows share no survey year, so the sampling variance of a change is the sum of the two squared standard errors.

S7.2 Sampling error shared by the outcome and the survey factors

The covariance of two national means computed from the same respondents equals the individual-level covariance divided by the sample size. Writing it as rho times the squared standard error of the ladder mean times the ratio of the item and ladder standard deviations, and taking rho = 0.5, an item standard deviation of 0.5 (the maximum for a binary item) and a ladder standard deviation of 1.8 (the low end of within-country values), gives, under these assumptions, an upper bound on the bias of a slope estimated from changes between 2019 and 2025 of 0.399 for social support, 0.181 for freedom and 0.195 for perceptions of corruption, in ladder points per unit. These are small relative to the slopes in Table S9 for social support and do not affect the conclusion for freedom, whose within-country slope is already small.

S7.3 Survey mode, income groups and heterogeneity

Table S11 Within-country slopes from changes between 2019 and 2025, by World Bank income group

Factor	High income	Other
Income (log GDP per capita)	1.45 (0.53)	0.35 (0.42)
Social support	1.27 (1.44)	4.40 (0.70)
Life expectancy	0.153 (0.049)	−0.044 (0.031)
Freedom to make life choices	0.78 (0.60)	0.29 (0.59)
Generosity	−0.02 (0.45)	0.47 (0.50)
Perceptions of corruption	−1.64 (0.45)	−1.20 (0.64)
Countries	49	86

Robust standard errors. Joint test of equal slopes across the two groups: 2019 to 2025 p 0.007; 2019 to 2022 p 0.522; 2022 to 2025 p 0.092. The 2019 and 2025 waves average survey years 2017 to 2019 and 2023 to 2025, so neither includes 2020 and 2021, when many countries normally interviewed face to face were interviewed by telephone.

Three-wave fixed effects estimates by group give the same pattern: within-country slopes for income of 1.24 (0.49) in high-income countries and 0.57 (0.36) elsewhere, and for freedom of 1.47 (0.47) and 0.19 (0.49).

S7.4 Regression toward the mean and timing

Adding the starting level of life evaluation to the change regressions gives coefficients on the starting level of 2019 to 2022: −0.037 (0.019); 2022 to 2025: −0.012 (0.018); 2019 to 2025: −0.100 (0.026).

The income, social support and freedom slopes change little. The life expectancy slope moves from positive to negative over the long window, a shift of about two standard errors (results.json, key checks.baseline).
Regressing the change in life evaluation between 2022 and 2025 on the changes in the factors between 2019 and 2022 gives: income 0.71 (0.47); social support −1.10 (0.56); life expectancy −0.116 (0.023); freedom to make life choices −0.37 (0.45); generosity 0.20 (0.36); perceptions of corruption 0.21 (0.45); n = 130; joint $p < 0.001$.

S7.5 The report's income series within one apparent price base

Between 2022 and 2025, the change in the report's income series correlates 0.34 with the change in the World Bank series. In a two-wave fixed effects regression on 2022 and 2025, the income slope is 0.03 (0.22) with the report's series and 1.69 (0.40) with the World Bank series.

S8 Ranking by level and by change

Table S12 The 16 countries whose positions differ most between the ranking by level and the ranking by change (the fifteen largest differences, with ties)

Country	Life evaluation, 2025	Change, 2019 to 2025	Rank on level	Rank on change	Difference
Switzerland	7.018	−0.542	10	133	+123
Lesotho	4.375	0.722	121	8	−113
Austria	6.845	−0.449	19	129	+110
India	4.536	0.963	112	2	−110
New Zealand	6.995	−0.305	11	119	+108
Norway	7.242	−0.246	6	114	+108
Canada	6.741	−0.491	25	131	+106
Netherlands	7.223	−0.226	7	113	+106
Australia	6.916	−0.307	15	120	+105
United Kingdom	6.694	−0.470	28	130	+102
Luxembourg	7.063	−0.174	9	109	+100
Tanzania	3.902	0.426	132	33	−99
Denmark	7.539	−0.107	3	101	+98
Sweden	7.255	−0.099	5	100	+95
Finland	7.764	−0.045	1	95	+94
Ireland	6.928	−0.166	13	107	+94

Ranks over the 141 countries observed in both years (1 = highest level or largest increase). Difference = rank on change minus rank on level. Spearman correlation of level and change 0.20; mean absolute rank difference 39.5; share of countries whose life evaluation fell 37.6 per cent. The full table is in Online Resource 2, sheet Rankings.

S9 Software

Python 3.13.18, pandas 3.0.5, NumPy 2.5.3, statsmodels 0.15.0, matplotlib for figures. The bootstrap uses a fixed seed (20261029).