Supplementary Information

Sixteen-year trends in adolescent consumption of sugar-sweetened soda in six European countries with a soda tax and comparison countries: a repeated cross-sectional survey analysis.

Chatelan et al.

**Table of content**

Additional file 1 Response rates.

Additional file 2 Key demographic, economic and nutritional characteristics of the studied countries.

Additional file 3 Data collection months and mean temperature during data collection.

Additional file 4 Flowchart showing causes of participants’ exclusion from analyses.

Additional file 5 National sample size and description.

Additional file 6 Trends/slopes in the proportion of daily, weekly, and occasional soda consumption before and after tax implementation.

Additional file 7 Trends in prevalence of daily, weekly, and occasional consumption of soda.

Additional file 8 Relevant information regarding ethical issues.

Table S1. Response rates a,b at school and pupil levels (only for 2018), by country, and by survey year

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 2001/02 | 2005/06 | 2009/10 | 2013/14 | 2017/2018 |  |
| Countries | School level | School level | School level | School level | School level | Pupil level c |
| Latvia | NA | 99% | 96% | 93% | NA | 74% |
| Lithuania | NA | 100% | 100% | 100% | 83% | 81% |
| Finland | NA | 89% | 74% | 67% | 47% | 60% |
| Sweden | NA | 90% | 88% | 77% | 47% | NA |
| Hungary | NA | 98% | 98% | 91% | 81% | 86% |
| Poland | NA | 100% | 89% | 94% | 94% | 95% |
| France | NA | 80% | 95% | 89% | 88% | 87% |
| Germany | 50% | 46% | 89% | 25% | 16% | 54% |
| Italy | NA | 95% | NA | 93% | 89% | 96% |
| Belgium | Flemish: NA  French: NA | Flemish: 50%  French: NA | Flemish: 33%  French: 60% | Flemish: 26%  French: 21% | Flemish: 22%  French: 25% | Flemish: 71%  French: 82% |
| Netherlands | NA | 50% | 50% | 49% | 38% | 94% |
| Portugal | NA | 92% | 86% | 97% | 51% | NA |
| Spain | NA | 86% | 79% | 59% | 69% | NA |

NA = Not available

a Response rates apply to all age categories of HBSC study participants (11-, 13-, and 15-year-olds). Therefore, response rates of the 13- and 15-year-olds included in this study may vary slightly.

b Reference: HBSC International Coordinating Centre 2021. Health Behaviour in School-aged Children (HBSC). Publications: International Reports. Access to reports: <http://www.hbsc.org/publications/international/>

c Pupil response rates are based on (estimated) pupils enrolled at the participating schools.

Table S2. Key demographic, economic and nutritional characteristics of the studied countries

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Countries | Geographical location within Europe a | National languages b | Total population in 2019 (millions) c | | Life expectancy at birth in 2018 (years) d | | Gross national income per capita in 2002 (2017 PPP $) e | | Gross national income per capita in 2018 (2017 PPP $) e | | Human Development Index in 2018 d | | Gini Index (most recent data) f | | | Dietary risks in 2019 (death rates/100,000) g | | Prevalence of adult obesity in 2013 (%) h | |
| Latvia | Baltic | Latvian | | 1.9 | | 75.2 | | 15,083 | | 29,622 | | 0.854 | | 35.6 | 346 | | 25 | |
| Lithuania | Baltic | Lithuanian | | 2.8 | | 75.7 | | 18,885 i | | 34,452 | | 0.869 | | 37.3 | 343 | | 28 | |
| Finland | Northern | Finnish, Swedish | | 5.5 | | 81.7 | | 41,604 | | 48,456 | | 0.925 | | 27.4 | 183 | | 23 | |
| Sweden | Northern | Swedish | | 10.0 | | 82.7 | | 42,128 | | 53,442 | | 0.937 | | 28.8 | 138 | | 19 | |
| Hungary | Central | Hungarian | | 9.7 | | 76.7 | | 21,903 i | | 30,080 | | 0.845 | | 30.6 | 325 | | 28 | |
| Poland | Central | Polish | | 37.9 | | 78.5 | | 16,770 | | 30,463 | | 0.872 | | 29.7 | 211 | | 25 | |
| France | Western | French | | 65.1 | | 82.5 | | 40,939 | | 46,491 | | 0.891 | | 31.6 | 100 | | 18 | |
| Germany | Western | German | | 83.5 | | 81.2 | | 42,836 | | 54,878 | | 0.939 | | 31.9 | 163 | | 25 | |
| Italy | Southern | Italian | | 60.6 | | 83.4 | | 43,856 | | 42,647 | | 0.883 | | 35.9 | 144 | | 20 | |
| Belgium | Western | Dutch, French, German | | 11.5 | | 81.5 | | 44,814 | | 51,776 | | 0.919 | | 27.4 | 112 | | 22 | |
| Netherlands | Western | Dutch | | 17.1 | | 82.1 | | 47,981 | | 56,880 | | 0.933 | | 28.5 | 97 | | 19 | |
| Portugal | Southern | Portugese | | 10.2 | | 81.9 | | 30,468 | | 33,317 | | 0.850 | | 33.8 | 125 | | 24 | |
| Spain | Southern | Spanish | | 46.7 | | 83.4 | | 36,044 | | 40,515 | | 0.893 | | 34.7 | 93 | | 27 | |

a Reference: Publications Office of the European Union. EU Vocabularies. Access to the Thesaurus: <https://op.europa.eu/en/web/eu-vocabularies/concept-scheme/-/resource?uri=http://eurovoc.europa.eu/100277>.

b Reference: Wikipedia, the free encyclopedia (e.g., access for Latvia: <https://en.wikipedia.org/wiki/Latvia>).

c Reference: Human Development Report 2020 from the United Nations Development Programme. Access to Table 7: <http://hdr.undp.org/en/content/download-data>

d Reference: United Nations Development Programme. 2019. Human Development Report 2019. Beyond income, beyond averages, beyond today: Inequalities in human development in the 21st century. New York. Access to the report: <http://hdr.undp.org/en/content/human-development-report-2019>.

e Reference: World Bank. Access to 2002 and 2018 data: <https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.KD>.

f Reference: World Bank. Access to data: <https://data.worldbank.org/indicator/SI.POV.GINI/>.

g Reference: Global Burden of Diseases. Access to data: <https://vizhub.healthdata.org/gbd-compare/> (selected options: map, risk, any dietary risks, deaths, year 2019, all ages, both sexes, rate, rate of change: off, detail: 2).

h Reference: WHO Regional Office for Europe. Country profiles on nutrition, physical activity, and obesity. Access to monitoring and surveillance indicators: <https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/country-work> (obesity = BMI≥30, both sexes, >15-25 years). https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/country-work

i Data for 2004 (no previous data found).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Months of data collection | | | | | Mean temperature degree (in °C) | | | | |
| Countries | 2001/02 | 2005/06 | 2009/10 | 2013/14 | 2017/2018 | 2001/02 | 2005/06 | 2009/10 | 2013/14 | 2017/2018 |
| Latvia | Nov (56.6%) Dec (43.4%) | Mar (8.8%) Apr (90.6%) May (0.6%) | Nov (0.8%) Dec (33.9%) Jan (59.3%) Feb (6.0%) | Jan (6.6%) Feb (60.4%) Mar (33.0%) | Dec (11.4%) Jan (83.1%) Feb (6.5%) | -2.5 | 5.4 | -7.4 | 1.0 | -2.3 |
| Lithuania | Mar (74.7%) Apr (25.3%) | Mar (77.0%) Apr (23.0%) | Feb (2.7%) Mar (84.8%) Apr (12.5%) | Mar (20.1%) Apr (54.3%) May (24.8%) Jun (0.8%) | Apr (15.0%) May (81.4%) Jun (3.6%) | 4.0 | -1.2 | 1.0 | 9.3 | 15.1 |
| Finland | Mar (39.8%) Apr (59.3%) May (0.9%) | Mar (30.4%) Apr (64.0%) May (4.4%) Jun (1.2%) | Mar (98.1%) Apr (1.6%) May (0.3%) | Mar (0.4%) Apr (89.2%) May (10.4%) | Apr (16.9%) May (83.1%) | 1.3 | -0.6 | -4.5 | 4.3 | 11.9 |
| Sweden | Dec (100.0%) | Nov (100.0%) | Dec (100.0%) | Jan (100.0%) | Oct (0.6%) Nov (65.0%) Dec (34.4%) | -3.5 | 4.1 | -1.4 | -3.0 | 4.5 |
| Hungary | Apr (94.1%) May (5.9%) | Mar (23.0%) Apr (70.6%) May (6.1%) Jun (0.3%) | Feb (5.0%) Mar (70.2%) Apr (19.0%) May (5.8%) | Apr (74.1%) May (25.9%) | Apr (11.2%) May (79.8%) Jun (9.0%) | 11.9 | 11.5 | 7.9 | 14.2 | 19.8 |
| Poland | Mar (41.9%) Apr (58.1%) | Feb (20.5%) Mar (66.3%) Apr (13.2%) | Feb (3.5%) Mar (96.4%) Apr (0.1%) | Oct (36.1%) Nov (12.0%) Dec (3.0%) Feb (3.4%) Mar (3.2%) Apr (25.9%) May (15.2%) Jun (1.1%) | Nov (7.4%) Dec (20.3%) Jan (13.9%) Feb (23.4%) Mar (11.5%) Apr (18.4%) May (5.1%) | 4.1 | 0.1 | 3.7 | 10.0 | 3.8 |
| France | Mar (37.9%) Apr (38.6%) May (21.9%) Jun (1.6%) | Mar (8.2%) Apr (67.5%) May (19.8%) Jun (4.5%) | Apr (4.4%) May (83.5%) Jun (12.1%) | Apr (26.6%) May (51.8%) Jun (21.6%) | Apr (18.3%) May (71.9%) Jun (9.8%) | 11.1 | 11.4 | 13.6 | 14.3 | 16.1 |
| Germany | Feb (12.0%) Mar (2.5%) Apr (2.7%) May (61.6%) Jun (21.3%) | Jan (13.2%) Feb (23.9%) Mar (42.2%) Apr (13.8%) May (3.6%) Jun (3.3%) | Feb (3.5%) Mar (15.1%) Apr (32.4%) May (34.0%) Jun (13.3%) Jul (1.7%) | Oct (0.1%) Nov (6.4%) Dec (1.2%) Jan (3.2%) Feb (8.9%) Mar (19.2%) Apr (18.6%) May (16.4%) Jun (11.2%) Jul (13.1%) Aug (1.4%) | Apr (7.2%) May (8.4%) Jun (33.5%) Jul (38.7%) Aug (2.8%) Sep (9.4%) | 14.6 | 2.7 | 10.7 | 12.1 | 19.9 |
| Italy | Apr (52.6%) May (47.4%) | May (100%) | Nov (31.3%) Dec (65.0%) Feb (0.9%) Mar (2.8%) | Apr (10.1%) May (85.0%) Jun (4.9%) | May (99.0%) Jun (1.0%) | 15.0 | 17.9 | 8.5 | 16.1 | 17.6 |

Table S3. Data collection months (% interviewed adolescents) and mean temperature during data collection a, by country, and by survey year

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table S3 (continued) | | | | | |  | | | | |
|  | Months of data collection | | | | | Mean temperature degree (in °C) | | | | |
| Countries | 2001/02 | 2005/06 | 2009/10 | 2013/14 | 2017/2018 | 2001/02 | 2005/06 | 2009/10 | 2013/14 | 2017/2018 |
| Belgium | Mar (6.0%) Apr (27.5%) May (61.5%) Jun (5.0%) | Mar (4.2%) Apr (17.8%) May (72.8%) Jun (5.2%) | Mar (28.4%) Apr (11.6%) May (55.2%) Jun (4.8%) | Jan (<0.1%) Feb (16.8%) Mar (15.7%) Apr (7.5%) May (60.0%) | Feb (0.1%) Mar (16.5%) Apr (20.3%) May (61.3%) Jun (1.9%) | 12.4 | 12.3 | 9.5 | 11.5 | 13.9 |
| Netherlands | Sep (1.2%) Oct (22.1%) Nov (54.6%) Dec (14.8%) Jan (6.7%) Feb (0.6%) | Oct (31.9%) Nov (67.6%) Dec (0.4%) | Oct (30.2%) Nov (68.1%) Dec (1.7%) | Oct (38.5%) Nov (55.0%) Dec (6.5%) | Oct (35.4%) Nov (62.7%) Dec (1.9%) | 7.9 | 8.9 | 9.7 | 8.8 | 9.6 |
| Portugal | Mar (100.0%) | Jan (100.0%) | Nov (64.2%) Jan (35.8%) | Jan (4.8%) Feb (90.8%) Mar (4.4%) | Jan (100.0%) | 14.9 | 10.2 | 14.3 | 12.1 | 12.1 |
| Spain | May (100%) | May (100%) | Mar (6.5%) Apr (31.0%) May (59.0%) Jun (3.5%) | Mar (1.1%) Apr (9.0%) May (19.9%) Jun (16.2%) Jul (0.1%) Sep (0.1%) Oct (13.4%) Nov (30.2%) Dec (9.9%) | Feb (33.5%) Mar (28.8%) Apr (17.8%) May (19.9%) | 14.8 | 19.7 | 14.8 | 15.3 | 10.1 |

a Reference: Monthly temperature during the month of data collection was extracted from U.S. National Centers for Environmental Information (former National Climatic Data Center), which published monthly climatic data for the world. One land-based station (if possible, close to the capital city) was selected as follows: Latvia: Vilnius (no data for Latvia), Lithuania: Vilnius, Finland: Jyvaskyla, Sweden: Karlstad Flygplats, Hungary: Budapest, Poland: Warszawa, France: Paris-Orly, Germany: Berlin-Tempelhof, Italy: Pisa, Belgium: Uccle (Brussels), Netherlands: De Bilt, Portugal: Lisboa/Geof, Spain: Madrid/Barajas.

Une image contenant table

Description générée automatiquement

**Figure S4.** Flowchart showing causes of participants’ exclusion from analyses, by survey year (HBSC, Health Behaviour School-aged Children).

Table S5. National sample size and description, by country, and by survey year

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2001/02 | | | | | 2005/06 | | | | | 2009/10 | | | | | |
| Countries | n | % Girls | Mean age | % Daily consumers | % Occasional consumers | n | % Girls | Mean age | % Daily consumers | % Occasional consumers | n | % Girls | Mean age | % Daily consumers | % Occasional consumers |
| Latvia | 2 199 | 53.9 | 14.5 | 17.8 | 32.2 | 2 788 | 52.9 | 14.8 | 13.5 | 32.6 | 2 752 | 51.9 | 14.6 | 8.7 | 42.2 |
| Lithuania | 3 767 | 48.8 | 14.7 | 10.1 | 35.7 | 3 746 | 48.4 | 14.6 | 14.4 | 37.0 | 3 491 | 48.5 | 14.7 | 8.7 | 57.1 |
| Finland | 3 462 | 49.6 | 14.8 | 8.6 | 22.4 | 3 401 | 52.5 | 14.8 | 6.0 | 28.4 | 4 261 | 51.8 | 14.7 | 4.7 | 30.3 |
| Sweden | 2 400 | 49.6 | 14.5 | 15.0 | 15.9 | 2 842 | 51.3 | 14.5 | 7.9 | 24.6 | 4 318 | 50.3 | 14.4 | 7.7 | 23.1 |
| Hungary | 2 732 | 58.0 | 14.4 | 33.3 | 22.7 | 2 387 | 52.6 | 14.5 | 33.1 | 29.0 | 3 304 | 53.2 | 14.5 | 30.0 | 29.0 |
| Poland | 4 214 | 50.4 | 14.7 | 25.4 | 25.7 | 3 925 | 52.0 | 14.9 | 27.7 | 23.9 | 2 830 | 51.9 | 14.7 | 28.5 | 20.8 |
| France | 5 432 | 50.8 | 14.1 | 29.6 | 28.7 | 4 616 | 50.8 | 14.5 | 28.9 | 18.1 | 3 944 | 50.6 | 14.4 | 29.7 | 24.6 |
| Germany | 3 532 | 51.5 | 14.6 | 31.7 | 22.8 | 4 963 | 49.9 | 14.4 | 21.9 | 31.2 | 3 261 | 52.7 | 14.4 | 22.7 | 28.9 |
| Italy | 2 817 | 53.2 | 14.7 | 24.8 | 21.5 | 2 667 | 50.1 | 14.8 | 28.8 | 21.0 | 3 220 | 50.3 | 14.4 | 20.6 | 29.5 |
| Belgium | 7 005 | 52.4 | 14.5 | 41.4 | 19.0 | 6 009 | 48.6 | 14.5 | 38.1 | 20.2 | 5 380 | 49.7 | 14.4 | 33.2 | 23.4 |
| Netherlands | 2 778 | 49.2 | 14.4 | 47.1 | 8.5 | 2 865 | 49.6 | 14.4 | 40.7 | 11.9 | 3 023 | 49.8 | 14.4 | 35.5 | 11.6 |
| Portugal | 1 784 | 52.7 | 14.8 | 32.9 | 17.5 | 2 695 | 53.6 | 14.6 | 26.0 | 24.1 | 2 832 | 54.3 | 14.5 | 23.6 | 22.8 |
| Spain | 3 712 | 51.3 | 14.5 | 31.6 | 16.8 | 5 885 | 50.0 | 14.5 | 25.7 | 20.7 | 3 774 | 51.7 | 14.5 | 23.9 | 19.0 |

Table S5 (continued)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2013/14 | | | | | 2017/18 | | | | |
| Countries | n | % Girls | Mean age | % Daily consumers | % Occasional consumers | n | % Girls | Mean age | % Daily consumers | % Occasional consumers |
| Latvia | 3 679 | 52.3 | 14.6 | 6.7 | 41.5 | 2 852 | 49.9 | 14.5 | 6.1 | 42.6 |
| Lithuania | 3 703 | 48.9 | 14.6 | 11.0 | 43.5 | 2 437 | 49.3 | 14.7 | 12.6 | 33.2 |
| Finland | 3 843 | 50.7 | 14.8 | 2.9 | 33.2 | 2 187 | 50.3 | 14.8 | 4.6 | 35.8 |
| Sweden | 5 006 | 50.6 | 14.7 | 5.6 | 26.2 | 2 966 | 51.2 | 14.5 | 5.6 | 31.8 |
| Hungary | 2 428 | 50.0 | 14.5 | 32.2 | 24.8 | 2 499 | 54.3 | 14.5 | 24.8 | 29.6 |
| Poland | 3 002 | 51.3 | 14.6 | 24.3 | 25.1 | 3 494 | 51.8 | 14.6 | 15.9 | 38.0 |
| France | 3 891 | 49.8 | 14.4 | 28.4 | 24.7 | 5 940 | 51.0 | 14.2 | 24.4 | 29.7 |
| Germany | 4 146 | 49.0 | 14.4 | 21.4 | 30.6 | 2 896 | 54.0 | 14.4 | 15.1 | 35.8 |
| Italy | 2 665 | 49.4 | 14.6 | 15.7 | 30.9 | 2 741 | 52.5 | 14.6 | 12.4 | 35.2 |
| Belgium | 6 788 | 47.7 | 14.6 | 35.6 | 22.7 | 4 437 | 50.1 | 14.5 | 28.5 | 25.7 |
| Netherlands | 2 874 | 51.1 | 14.4 | 30.1 | 14.6 | 3 204 | 51.4 | 14.4 | 20.3 | 22.1 |
| Portugal | 3 300 | 51.8 | 14.4 | 18.5 | 28.6 | 3 555 | 53.4 | 14.3 | 15.7 | 38.8 |
| Spain | 7 953 | 51.7 | 14.4 | 21.6 | 25.2 | 3 124 | 51.6 | 14.4 | 14.4 | 33.0 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table S6. Trends/slopes (beta (95% CI) a, b) in the proportion of daily, weekly, and occasional soda consumption from 2001/02 to 2009/10 (before tax introduction/update) and from 2009/10 to 2017/18 (after tax introduction/update), and differences in trends/slopes (interaction c, d) compared to the comparison country, for three countries (Finland, Hungary, France) that introduced/updated a tax between 2009/10 and 2013/2014.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Countries | Daily (≥1x/day) | | Weekly (1-6x/week) | | Occasional (<1x/week) | | |  | **Pre-tax**  **2001/02 – 2009/10** | **Post-tax**  **2009/10 – 2017/18** | **Pre-tax**  2001/02 – 2009/10 | **Post-tax**  **2009/10 – 2017/18** | **Pre-tax**  2001/02 – 2009/10 | **Post-tax**  **2009/10 – 2017/18** | | Finland a,b | -0.38 (-0.50, -0.27) \*\*\* | -0.07 (-0.28, 0.14) | -0.09 (-0.15, -0.03) \*\*\* | -0.07 (-0.17, 0.03) | 0.23 (0.16, 0.29) \*\*\* | 0.08 (-0.04, 0.19) | | Sweden a,b | -0.41 (-0.52, -0.29) \*\*\* | -0.14 (-0.27, -0.02) \* | 0.03 (-0.04, 0.09) | -0.11 (-0.17, -0.05) \*\*\* | 0.20 (0.12, 0.27) \*\*\* | 0.15 (0.08, 0.21) \*\*\* | | Interaction c,d | -0.01 (-0.17, 0.15) | 0.13 (-0.08, 0.34) | -0.13 (-0.21, -0.05) \*\* | 0.08 (-0.01, 0.18) | 0.05 (-0.04, 0.15) | -0.16 (-0.26, -0.05) \*\*\* | | Hungary a,b | -0.02 (-0.14, 0.11) | -0.20 (-0.38, -0.02) \* | -0.09 (-0.17, -0.02) \*\* | 0.20 (0.08, 0.31) \*\*\* | 0.16 (0.06, 0.26) \*\*\* | -0.09 (-0.24, 0.06) | | Poland a,b | 0.11 (0.05, 0.18) \*\*\* | -0.41 (-0.48, -0.34) \*\*\* | 0.04 (-0.01, 0.09) | -0.09 (-0.14, -0.04) \*\*\* | -0.17 (-0.23, -0.11) \*\*\* | 0.45 (0.39, 0.51) \*\*\* | | Interaction c,d | -0.14 (-0.26, -0.02) \* | 0.22 (0.09, 0.35) \*\*\* | -0.10 (-0.18, -0.02) \*\* | 0.19 (0.10, 0.27) \*\*\* | 0.30 (0.19, 0.41) \*\*\* | -0.42 (-0.53, -0.31) \*\*\* | | France a,b | 0.01 (-0.06, 0.07) | -0.16 (-0.22, -0.10) \*\*\* | 0.10 (0.06, 0.15) \*\*\* | -0.06 (-0.10, -0.01) \*\* | -0.14 (-0.20, -0.09) \*\*\* | 0.24 (0.18, 0.30) \*\*\* | | Germany a,b | -0.20 (-0.27, -0.12) \*\*\* | -0.18 (-0.27, -0.09) \*\*\* | 0.07 (0.02, 0.12) \*\* | -0.02 (-0.08, 0.04) | 0.10 (0.04, 0.17) \*\* | 0.16 (0.08, 0.23) \*\*\* | | Interaction c,d | 0.21 (0.11, 0.30) \*\*\* | 0.04 (-0.06, 0.14) | 0.03 (-0.04, 0.09) | -0.06 (-0.13, 0.01) | -0.25 (-0.33, -0.16) \*\*\* | 0.09 (0.00, 0.18) \* | | Italy a,b | -0.06 (-0.16, 0.04) | -0.48 (-0.59, -0.36) \*\*\* | -0.07 (-0.13, 0.00) \* | 0.07 (0.00, 0.14) | 0.16 (0.07, 0.24) \*\*\* | 0.25 (0.16, 0.34) \*\*\* | | Interaction c,d | 0.09 (-0.02, 0.21) | 0.27 (0.16, 0.38) \*\*\* | 0.17 (0.09, 0.25) \*\*\* | -0.14 (-0.21, -0.07) \*\*\* | -0.33 (-0.43, -0.23) \*\*\* | 0.04 (-0.05, 0.13) | |

Green colour indicates positive changes in terms of public health (decrease in daily consumers and increase in occasional consumers; red colour: negative changes)

a Beta < 0 (negative) = reduction in daily, weekly and occasional soda consumption; beta > 0 (positive) = increase in daily, weekly and occasional soda consumption

b Betas of the periods between 2001/02 and 2009/10 and between 2009/10 and 2017/18 (time trends) were modelled using multilevel two-piecewise linear spline logistic models (dependent variable: daily, weekly and occasional consumption: 0/1), adjusted for sex, age group, and temperature at the time of data collection, \*P≤0.05, \*\*P≤0.01, \*\*\*P≤0.001).

c Beta < 0 (negative) = more reduction in the country with the tax compared to the comparison country, beta > 0 (positive) = more increase in the country with the tax compared to the comparison country.

d Betas of the interactions between 2001/02 and 2009/10 and between 2009/10 and 2017/18 (one for each time period: time1\*country and time2\*country) were modelled using multilevel two-piecewise linear spline logistic models (dependent variable: daily, weekly and occasional consumption: 0/1), adjusted for sex, age group, temperature at the time of data collection, country, \*P≤0.05, \*\*P≤0.01, \*\*\*P≤0.001).

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Daily (≥1x/day)** | **Weekly (1-6x/week)** | **Occasional (<1x/week)** |
| Finland (■)  Sweden (●) |  |  |  |
| Hungary (■)  Poland (●) |  |  |  |
| France (■)  Germany (●)  Italy (▲) |  |  |  |

**Figure S7.** Trends in prevalence of daily, weekly and occasional consumption of soda. Trends in prevalence (95% CIs) are presented between 2001/02 and 2009/10 and between 2009/10 and 2013/14 in country that introduced/updated a tax (in orange, plain line) and in the comparison country (in blue or violet, dashed line). The arrows after pre- and post-tax trends indicate that the country with a tax had a reduction (↓), stagnation (→) or increase (↑) in the pre- and post-tax. The signs after the arrow indicate whether this long-term change was larger (+), similar (=) or smaller (−) than in the comparison country. Green colour indicates positive changes in terms of public health (red colour = negative changes). Cut-off point for arrows and signs is P≤0.05. G: Germany; I: Italy.

Table S8. Relevant information regarding ethical issues, by country

|  |  |
| --- | --- |
| Countries | Information regarding ethical issues |
| Latvia | Approved by the Ministry of Education and the Local Education Authorities |
| Lithuania | Ethical approval by the Kaunas Bioethics Committee |
| Finland | Ethical approval by the Finnish Teachers' Union and the Finnish National Board of Education |
| Sweden | Ethical clearance not needed (Privacy Act of The Swedish Data Protection Authority) |
| Hungary | Approved by the State Ministry of Public Education |
| Poland | Ethical approval by the Committee of the Institute of Mother and Child |
| France | Ethical clearance not needed (French Control of electronical data sets with personal information) |
| Germany | Ethical approvals by the Committee of the General Medical Council Hamburg and the Federal State Ministries of Culture and Education |
| Italy | Ethical approvals by the Committee of the 'Istituto Superiore di Sanità' and the University of Torino |
| Belgium | Flemish: Ethical approval by the Committee of the University Hospital Ghent  French: Ethical approval by the Committee of the Faculty of Psychology of the ‘Université libre de Bruxelles’ |
| Netherlands | Ethical approval by the Committee of the University of Utrecht |
| Portugal | Ethical approval by the Committee of the São João Universitary Hospital and the National Commission for Individual Data Protection |
| Spain | Ethical approval by the Committee of the University of Seville |

IMPORTANT NOTE: Information regarding ethical issues is often related to most recent survey years. Information for older survey years may not be similar but this information is often absent in the international HBSC database. Of note, data were collected with anonymous questionnaires.