

Table S1. Dietary data for breakfast and daily according to sex.

| | Total (n=852) | Girls (n=440) | Boys (n=412) |
|------------------------------------|--------------------------|----------------------|---------------------|
| Dietary intake at breakfast | | | |
| Fruits and juice(g/day) | 29.4±57.3 | 33.2±59.4 | 25.4±54.8* |
| Fruits (g/day) | 7.7±28.1 | 8.5±29.2 | 6.8±26.9 |
| Juices (g/day) | 21.7±50.6 | 24.7±53.3 | 18.6±47.3* |
| Dairy (g/day) | 201.6±68.5 | 199.1±69.2 | 204.3±67.7 |
| Cereals (g/day) | 15.3±18.3 | 15.9±18.1 | 14.6±18.5 |
| Olive oil (g/day) | 0.56±1.59 | 0.58±1.66 | 0.54±1.51 |
| Butter or margarine(g/day) | 1.98±4.08 | 1.98±3.97 | 1.98±4.20 |
| Butter (g/day) | 1.35±3.40 | 1.36±3.57 | 1.33±3.22 |
| Margarine (g/day) | 0.63±2.57 | 0.61±2.14 | 0.65±2.96 |
| Energy intake (kcal) | 371±138 | 362±130 | 381±147 |
| Energy intake (% kcal/day) | 17.7±5.8 | 17.5±5.8 | 17.8±5.9 |
| Proteins (% kcal/day) | 2.16±0.82 | 2.18±0.73 | 2.15±0.90 |
| Lipids (% kcal/day) | 6.4±2.9 | 6.3±2.9 | 6.6±2.9 |
| SFA (% kcal/day) | 3.1±1.3 | 3.0±1.3 | 3.2±1.3* |
| MUFA (% kcal/day) | 2.0±1.1 | 1.9±1.1 | 2.0±1.1 |
| PUFA (% kcal/day) | 0.49±0.41 | 0.49±0.38 | 0.49±0.44 |
| Carbohydrates (% kcal/day) | 8.9±3.2 | 9.0±3.2 | 8.8±3.2 |
| Simple sugar (% kcal/day) | 5.5±2.1 | 5.5±2.1 | 5.4±2.1 |
| Free sugar (% kcal/day) | 2.40±1.46 | 2.40±1.52 | 2.40±1.39 |
| Fibre (g/day) | 1.87±1.80 | 1.93±2.13 | 1.82±1.37 |
| Calcium(mg/day) | 322.1±105.5 | 317.4±106.5 | 327.1±104.3 |
| Daily dietary intake | | | |
| HEI-2015 (score) # | 59.1±8.5 | 60.3±8.5 | 57.9±8.4* |
| Energy intake (kcal/day) | 2105±350 | 2066±338 | 2146±358* |
| Underestimation (%) # | -1.8±22.8 | -10.7±22.8 | 7.8±18.6* |
| Proteins (% kcal/day) | 15.6±2.3 | 15.6±2.3 | 15.5±2.3 |
| Lipids (% kcal/day) | 41.8±4.8 | 41.8±4.7 | 41.8±4.9 |
| SFA (% kcal/day) | 14.4±2.1 | 14.2±2.1 | 14.6±2.2* |
| MUFA (% kcal/day) # | 16.9±2.7 | 16.9±2.8 | 16.9±2.7 |
| PUFA (% kcal/day) | 5.9±1.8 | 6.0±1.9 | 5.7±1.6* |
| Carbohydrates (% kcal/day) | 41.0±5.1 | 40.9±5.0 | 41.1±5.2 |
| Simple sugar (% kcal/day) # | 20.4±4.6 | 20.4±4.5 | 20.4±4.7 |
| Free sugar (% kcal/day) | 8.5±3.6 | 8.3±3.6 | 8.7±3.6 |
| Fibre (g/day) | 16.3±4.8 | 16.4±4.8 | 16.3±4.7 |
| Calcium(mg/day) # | 965.0±221.9 | 946.6±217.8 | 984.6±224.9* |

Data are shown as mean ± standard deviation. MUFA: monounsaturated fatty acids; PUFA: polyunsaturated; SFA: saturated fatty acids. HEI-2015: healthy eating index. Most variables follow a non-parametric distribution; variables with normal distribution were marked (#). For a comparison of means, the Mann–Whitney U-test was used if the distribution of variables was not normal, and Student's t-test for normal distributions. Differences between sexes are indicated by asterisks and bold type (*p<0.05).

Table S2. Anthropometric, biochemical and dietary data for breakfast, and daily according to BQI tertiles.

| | Total | | | Girls | | | Boys | | |
|------------------------------------|-------------------|-------------------|---------------------|------------------|-------------------|--------------------|------------------|-------------------|--------------------|
| | T1 (n=157) | T2 (n=347) | T3 (n=348) | T1 (n=73) | T2 (n=174) | T3 (n=193) | T1 (n=84) | T2 (n=173) | T3 (n=155) |
| Anthropometric data | | | | | | | | | |
| BMI (kg/m ²) | 18.8±2.8 | 18.9±3.0 | 19.0±3.3 | 18.9±2.8 | 18.9±2.9 | 18.9±3.1 | 18.7±2.7 | 19.0±3.2 | 19.2±3.6 |
| zBMI- S | 0.63±1.03 | 0.68±1.12 | 0.70±1.18# | 0.58±1.04 | 0.56±1.01 | 0.58±1.08# | 0.68±1.03 | 0.81±1.21 | 0.86±1.29 |
| Body fat (%) | 27.1±5.5 | 27.7±5.6 | 27.7±5.8 | 29.5±4.4 | 29.5±4.5 | 29.1±4.9# | 25.1±5.5 | 25.8±6.1 | 26.1±6.3 |
| Physical Activity | | | | | | | | | |
| Activity coefficient | 1.52±0.11 | 1.52±0.11 | 1.54±0.10 | 1.52±0.12 | 1.52±0.11 | 1.52±0.10# | 1.53±0.11 | 1.52±0.10 | 1.55±0.11b |
| Biochemical data | | | | | | | | | |
| Glucose (mg/dL) – S | 83.9±10.1 | 84.3±10.2 | 84.8±8.9 | 81.7±9.5 | 83.4±11.2 | 83.9±8.9 | 85.7±10.3 | 85.1±9.1 | 85.8±8.8 |
| Insulin (mcU/mL) – S | 6.4±4.7 | 6.3±4.3 | 6.2±4.3 | 6.9±5.5 | 7.1±4.5 | 7.1±4.8 | 5.9±3.9 | 5.6±3.8 | 5.2±3.2 |
| HOMA-IR – S | 1.35±1.13 | 1.33±0.93 | 1.31±0.92 | 1.45±1.37 | 1.48±1.00 | 1.49±1.04 | 1.27±0.88 | 1.18±0.84 | 1.09±0.70 |
| Dietary intake at breakfast | | | | | | | | | |
| Fruits and juice (g/day) -B | 7.9±38.0 | 20.5±51.0a | 48.0±64.6ab | 11.7±50.2 | 19.6±49.6 | 53.5±64.3ab | 4.5±22.4 | 21.4±52.5a | 41.2±64.4ab |
| Fruit (g/day) -B | 1.5±11.8 | 4.5±19.7 | 13.7±37.8ab | 1.6±14.0 | 3.4±14.2 | 15.7±40.1ab | 1.4±9.4 | 5.5±24.0 | 11.3±34.7ab |
| Juices (g/day) -B | 6.4±35.6 | 16.1±47.4 | 34.3±56.2ab | 10.0±48.6 | 16.2±47.6 | 37.9±57.0ab | 3.2±17.6 | 15.9±47.3 | 29.9±55.2ab |
| Dairy (g/day) -B | 186.5±94.1 | 201.3±61.9 | 208.8±59.6ab | 186.0±94.1 | 194.5±62.3 | 208.1±62.8b | 186.9±94.7 | 208.1±60.8 | 209.7±55.4 |
| Cereals (g/day) -B | 11.2±20.4 | 9.9±16.4 | 22.5±16.7ab | 9.7±15.9 | 11.2±17.7 | 22.5±17.2ab | 12.4±23.6 | 8.6±15.1 | 22.5±16.1ab |
| Olive oil(g/day) -B | 0.01±0.13 | 0.08±0.62 | 1.29±2.21ab | 0.00±0.00 | 0.10±0.69 | 1.23±2.25ab | 0.02±0.18 | 0.06±0.55 | 1.37±2.15ab |
| Butter or margarine (g/day) -B | 3.30±5.53 | 1.74±3.60a | 1.62±3.63a | 3.19±4.87 | 1.81±3.85 | 1.67±3.63a | 3.40±6.07 | 1.67±3.34 | 1.56±3.65a |
| Butter (g/day) | 1.86±4.26 | 1.30±3.28 | 1.16±3.06 | 1.93±4.51 | 1.26±3.50 | 1.24±3.23 | 1.80±4.06 | 1.35±3.06 | 1.05±2.85 |
| Margarine (g/day) -B | 1.45±4.22 | 0.43±1.74a | 0.46±2.19a | 1.26±2.87 | 0.55±1.92 | 0.43±1.95a | 1.61±5.12 | 0.32±1.54 | 0.51±2.46 |
| Energy intake (kcal/day) -SB | 383±186 | 342±123a | 394±122ab | 368±168 | 326±107 | 392±124b | 397±201 | 358±136 | 397±119b |
| (% kcal/day) -B | 18.4±7.2 | 16.4±5.4a | 18.7±5.3b | 17.7±6.9 | 16.1±5.2 | 18.7±5.6b | 19.1±7.5 | 16.6±5.5a | 18.6±5.0b |
| Proteins (% kcal/day) -B | 1.98±0.77 | 2.00±0.63 | 2.41±0.94ab | 1.99±0.74 | 2.00±0.65 | 2.41±0.74ab | 1.97±0.80 | 2.00±0.61 | 2.41±1.14ab |
| Lipids (% kcal/day) -B | 7.0±3.7 | 5.8±2.6a | 6.7±2.6b | 6.7±3.8 | 5.6±2.5a | 6.7±2.7b | 7.1±3.7 | 6.1±2.6a | 6.8±2.5# |
| SFA (% kcal/day) # | 3.3±1.8 | 3.0±1.3 | 3.0±1.2 | 3.2±1.8 | 2.8±1.2 | 3.0±1.2 | 3.4±1.8 | 3.1±1.3 | 3.1±1.1 |
| MUFA (% kcal/day) -B | 2.0±1.3 | 1.7±0.9a | 2.2±1.1ab | 2.0±1.4 | 1.7±0.9 | 2.2±1.2b | 2.0±1.3 | 1.8±0.9 | 2.2±1.0b |

| | Total | | | Girls | | | Boys | | |
|-------------------------------|--------------------|-------------------|---------------------|--------------------|-------------------|----------------------|------------------|---------------------|---------------------|
| | T1 (n=157) | T2 (n=347) | T3 (n=348) | T1 (n=73) | T2 (n=174) | T3 (n=193) | T1 (n=84) | T2 (n=173) | T3 (n=155) |
| PUFA (% kcal/day) | 0.52±0.50 | 0.45±0.39 | 0.51±0.38b | 0.51±0.47 | 0.44±0.35 | 0.52±0.36b | 0.52±0.52 | 0.45±0.44 | 0.50±0.40b |
| Carbohydrates (% kcal/day) -B | 9.4±3.7 | 8.3±3.1a | 9.3±3.1b | 9.2±3.3 | 8.3±3.1 | 9.5±3.2b | 9.6±3.9 | 8.3±3.1a | 9.1±2.9b |
| Simple sugar (% kcal/day) -B | 5.9±2.3 | 5.1±2.0a | 5.6±2.2ab | 5.9±1.8 | 5.1±2.0a | 5.7±2.2b | 5.9±2.6 | 5.1±1.9a | 5.3±2.1a |
| Free sugar (% kcal/day) -B | 3.1±1.5 | 2.3±1.4a | 2.1±1.4ab | 3.1±1.5 | 2.4±1.6a | 2.2±1.4a | 3.1±1.6 | 2.3±1.2a | 2.1±1.3a |
| Fibre (g/day) -B | 1.61±1.01 | 1.60±1.04 | 2.27±2.48ab | 1.58±0.91 | 1.54±0.94 | 2.41±2.97ab | 1.63±1.09 | 1.65±1.13a | 2.11±1.67b |
| Calcium(mg/day) -B | 305.5±137.9 | 316.3±93.9 | 335.4±98.1ab | 298.1±134.2 | 305.5±95.2 | 335.6±102.1ab | 312.0±141.6 | 327.1±91.5 | 335.3±93.1 |
| Daily dietary intake | | | | | | | | | |
| HEI-2015 (score) # -SB | 57.3±8.8 | 58.1±8.7 | 61.1±7.9ab | 58.4±8.9 | 59.1±9.0 | 62.2±7.5ab | 56.4±8.7 | 57.0±8.3 | 59.6±8.1ab |
| Energy intake (kcal/day) -SB | 2033±355 | 2115±369a | 2127±325 # a | 2004±326 | 2057±364 | 2098±317a | 2058±378 | 2173±366a | 2163±332# |
| Underestimation (%) - S | 2.4±20.4 | -1.6±22.6 | -3.8±23.9a | -5.9±19.5 | -9.8±23.3 | -13.2±23.3# | 9.7±18.4 | 6.6±18.6 | 8.0±18.8# |
| Proteins (% kcal/day) | 15.3±2.3 | 15.5±2.3 | 15.8±2.4a | 15.5±2.1 | 15.5±2.4 | 15.9±2.3 | 15.2±2.5 | 15.4±2.2 | 15.7±2.4 |
| Lipids (% kcal/day) | 42.2±5.4 | 41.6±4.8 | 41.9±4.5 | 42.2±4.6 | 41.8±5.0 | 41.7±4.4 | 42.1±6.0 | 41.5±4.5 | 42.0±4.6# |
| SFA (% kcal/day) | 14.4±2.5 | 14.5±2.1 | 14.3±2.0# | 14.4±2.3 | 14.2±2.2 | 14.2±1.9# | 14.4±2.6 | 14.7±2.0 | 14.5±2.0 |
| MUFA (% kcal/day) | 16.9±2.9 | 16.9±2.8 | 16.9±2.6# | 16.9±2.6 | 17.0±2.9 | 16.8±2.7 | 16.9±3.1 | 16.8±2.7 | 17.0±2.6# |
| PUFA (% kcal/day) -S | 5.9±1.7 | 5.8±1.8 | 5.9±1.7 | 6.1±1.8 | 6.1±1.9 | 6.0±1.8 | 5.8±1.7 | 5.5±1.6 | 5.8±1.6# |
| Carbohydrates (% kcal/day) | 41.0±5.6 | 41.3±5.2 | 40.7±4.7 | 40.8±4.6 | 41.1±5.6 | 40.7±4.4 | 41.3±6.4 | 41.5±4.8 | 40.6±5.0# |
| Simple sugar (% kcal/day) | 20.5±4.8 | 20.5±4.5 | 20.3±4.6 | 20.8±4.7 | 20.2±4.7 | 20.3±4.2 | 20.3±5.0 | 20.7±4.2 | 20.2±5.0 |
| Free sugar (% kcal/day) -B | 9.5±3.8 | 8.9±3.6 | 7.8±3.4ab | 9.3±3.5 | 8.9±3.8 | 7.5±3.4ab | 9.6±4.0 | 8.9±3.4 | 8.1±3.5ab |
| Fibre (g/day) -B | 15.2±4.5 | 16.3±4.7a | 16.9±4.8ab | 15.2±4.0 | 16.1±4.7 | 17.1±5.1ab | 15.2±4.9 | 16.5±4.8a | 16.6±4.4a |
| Calcium(mg/day) -SB | 904±225.9 | 967±224.8a | 991±212.4a | 889±227.1 | 930±206.2 | 983±218.8ab | 917±225.4 | 1.004±236.9a | 1000±204.5#a |

Data are shown as mean ± standard deviation. T1: <4 points, T2: 4 points and T3: >4 points. MUFA: monounsaturated fatty acids; PUFA: polyunsaturated; SFA: saturated fatty acids. HEI-2015: healthy eating index. Most variables follow a non-parametric distribution; variables with normal distribution were marked (#). For comparison of means, the Mann–Whitney U-test was used if the distribution of variables was not normal, and Student's t-test for normal distributions. Two-way ANOVA analysis: S: differences by sex; B: differences by BQI score. Significant differences are indicated by letters and bold type (a: differences with T1, b: differences with T2, p<0.05).

Table S3. Dietary data for breakfast and daily, according to sex and HOMA-IR.

| | Total | | Girls | | Boys | |
|------------------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|
| | HOMA-IR ≤3.16 (n=808) | HOMA-IR >3.16 (n=44) | HOMA-IR ≤3.16 (n=409) | HOMA-IR >3.16 (n=31) | HOMA-IR ≤3.16 (n=399) | HOMA-IR >3.16 (n=13) |
| Dietary intake at breakfast | | | | | | |
| Fruits and juice(g/day) – S | 29.0±57.4 | 38.0±56.0 | 31.9±59.1 | 49.5±61.6* | 25.9±55.4 | 10.7±24.9 |
| Fruit (g/day) | 7.9±28.8 | 3.4±10.7 | 8.8±30.1 | 4.6±12.6 | 7.1±27.3 | 0.5±1.7 |
| Juices (g/day) -S | 21.0±50.3 | 34.7±54.3* | 23.1±52.5 | 44.9±60.1* | 18.9±47.9 | 10.3±25.0 |
| Dairy (g/day) | 202.2±69.1 | 190.8±55.4 | 199.9±69.8 | 188.4±60.3 | 204.6±68.4 | 196.4±43.4 |
| Cereals (g/day) | 15.4±18.5 | 13.9±14.2 | 16.1±18.4 | 13.8±14.2 | 14.6±18.7 | 14.2±14.8 |
| Olive oil(g/day) -R | 0.54±1.49 | 0.91±2.83 | 0.53±1.45 | 1.23±3.32 | 0.55±1.53 | 0.16±0.47 |
| Butter or margarine(g/day) | 1.90±3.98 | 3.39±5.49* | 1.84±3.72 | 3.79±6.21 | 1.96±4.23 | 2.44±3.16 |
| Butter (g/day) – I | 1.26±3.24 | 2.96±5.44* | 1.20±3.24 | 3.50±6.28* | 1.32±3.25 | 1.67±2.26 |
| Margarine (g/day) | 0.64±2.62 | 0.43±1.38 | 0.64±2.19 | 0.28±1.11 | 0.65±2.99 | 0.77±1.88 |
| Energy intake (kcal/day) | 370±139 | 380±132 | 359±129 | 390±138 | 382±148 | 356±118 |
| Energy intake (% kcal/day) | 17.6±5.7 | 19.4±7.3 | 17.4±5.6 | 19.6±7.5 | 17.8±5.8 | 18.7±7.0 |
| Proteins (% kcal/day) | 2.16±0.82 | 2.22±0.76 | 2.18±0.73 | 2.21±0.78 | 2.14±0.91 | 2.25±0.73 |
| Lipids (% kcal/day) | 6.3±2.8 | 7.5±3.5 | 6.1±2.8 | 7.8±3.8* | 6.6±2.9 | 6.6±2.5 |
| SFA (% kcal/day) | 3.0±1.3 | 3.5±1.6 | 2.9±1.3 | 3.6±1.7* | 3.2±1.3 | 3.3±1.4 |
| MUFA (% kcal/day) -R | 1.9±1.1 | 2.4±1.6* | 1.9±1.0 | 2.6±1.8* | 2.0±1.1 | 1.9±0.8 |
| PUFA (% kcal/day) | 0.48±0.41 | 0.58±0.36* | 0.48±0.37 | 0.63±0.39* | 0.49±0.45 | 0.47±0.26 |
| Carbohydrates (% kcal/day) | 8.9±3.2 | 9.3±3.6 | 8.9±3.2 | 9.4±3.4 | 8.8±3.2 | 9.0±4.1 |
| Simple sugar (% kcal/day) | 5.4±2.1 | 5.7±2.2 | 5.5±2.1 | 5.7±2.1 | 5.4±2.1 | 5.6±2.6 |
| Free sugar (% kcal/day) | 2.4±1.5 | 2.4±1.5 | 2.4±1.5 | 2.3±1.6 | 2.4±1.4 | 2.5±1.4 |
| Fibre (g/day) – SR | 1.84±1.29 | 2.55±5.68 | 1.85±1.20 | 3.00±6.73 | 1.83±1.38 | 1.50±1.00 |
| Calcium(mg/day) | 322.7±106.6 | 312.0±83.6 | 317.8±107.6 | 312.7±92.4 | 327.6±105.4 | 310.2±61.0 |
| Daily dietary intake | | | | | | |
| HEI-2015 (score) | 59.2±8.5 | 57.3±8.6# | 60.5±8.4 | 57.8±9.4 | 57.9±8.5 | 56.1±6.4# |
| Energy intake (kcal/day) # | 2110±350 | 2004±334* | 2071±337 | 1998±361 | 2150±360 | 2019±270 |
| Underestimation (%) – SI | -2.1±22.8 | 5.0±22.2* | -11.4±22.7 | -1.4±22.0* | 7.4±18.6 | 20.1±14.6# * |

| | Total | | Girls | | Boys | |
|----------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|
| | HOMA-IR ≤3.16 (n=808) | HOMA-IR >3.16 (n=44) | HOMA-IR ≤3.16 (n=409) | HOMA-IR >3.16 (n=31) | HOMA-IR ≤3.16 (n=399) | HOMA-IR >3.16 (n=13) |
| Proteins (% kcal/day) | 15.6±2.3 | 15.7±2.3 | 15.6±2.3 | 15.6±2.1 | 15.5±2.3 | 15.9±2.9 |
| Lipids (% kcal/day) # | 41.8±4.8 | 42.1±5.2 | 41.8±4.7 | 42.1±4.4 | 41.8±4.8 | 42.1±6.8 |
| SFA (% kcal/day) | 14.4±2.1 | 14.7±2.2# | 14.2±2.1 | 14.7±2.2# | 14.6±2.1 | 14.9±2.5 |
| MUFA (% kcal/day) # | 16.9±2.7 | 17.1±3.0 | 16.9±2.8 | 17.2±2.7 | 16.9±2.7 | 16.7±3.7 |
| PUFA (% kcal/day) | 5.9±1.7 | 5.5±1.8 | 6.1±1.8 | 5.5±1.8# * | 5.7±1.6 | 5.6±1.8 |
| Carbohydrates (% kcal/day) | 41.0±5.1 | 40.5±4.9# | 40.9±5.0 | 40.6±4.4# | 41.2±5.2 | 40.4±6.3 |
| Simple sugar (% kcal/day) | 20.4±4.6 | 20.4±3.9 | 20.3±4.5 | 20.5±3.8 | 20.4±4.7 | 20.3±4.4# |
| Free sugar (% kcal/day) | 8.5±3.6 | 8.4±3.7 | 8.4±3.6 | 8.1±3.4 | 8.7±3.6 | 9.0±4.4# |
| Fibre (g/day) | 16.3±4.6 | 17.3±7.4 | 16.3±4.5 | 17.3±8.4 | 16.2±4.7 | 17.2±4.3 |
| Calcium(mg/day) | 964.0±224.3 | 983.5±174.4 | 943.9±220.7 | 981.8±173.0 | 984.5±226.3 | 987.4±184.5# |

Data are shown as mean ± standard deviation. MUFA: monounsaturated fatty acids; PUFA: polyunsaturated; SFA: saturated fatty acids. HEI-2015: healthy Eating Index. Most variables follow a non-parametric distribution; variables with normal distribution were marked (#). For comparison of means, the Mann–Whitney U-test was used if the distribution of variables was not normal, and Student's t-test for normal distributions. Two-way ANOVA analysis: S: differences according to sex; I: differences according to insulin resistance (IR) score; R: interaction between sex and IR. Differences according to HOMA-IR are indicated with an asterisk and bold type (*p<0.05).