**Supplementary materials**

### Association between sleep timing and meal and snack patterns in schoolchildren in southern Brazil

Short title: Sleep and meal and snack patterns in schoolchildren

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**Supplementary Figure 1.** Flow chart of selecting the study participants.

Diagrama

Descrição gerada automaticamente

Supplementary Table 1. Median of sleep variables according to age.

|  |  |  |  |
| --- | --- | --- | --- |
| **Sleep variables** | **7-10 years**  **n= 782** | **11-14 years**  **n= 551** | **p\*** |
|  | median (p25; p75) | median (p25; p75) |  |
| **Sleep duration (h)** |  |  |  |
| Total | 10.00 (9.39; 10.71) | 9.43 (8.86; 10.17) | <0.001 |
| Weekday | 10.00 (9.00; 10.67) | 9.00 (8.50; 10.00) | <0.001 |
| Weekend | 10.50 (10.00; 11.00) | 10.16 (9.50; 11.00) | 0.144 |
| **Bedtime (local time)** |  |  |  |
| Weekday | 10:00 (9:30; 10:30) | 10:15 (9:43; 11:00) | <0.001 |
| Weekend | 11:00 (10:00; 11:30) | 11:30 (11:00; 0:00) | <0.001 |
| **Wake-up time (local time)** | |  |  |
| Weekday | 7:30 (6:45;9.00) | 6:50 (6:30; 7:30) | <0.001 |
| Weekend | 9:10 (8:30; 10:00) | 10.00 (9:00;10:30) | <0.001 |
| **MSF** | 4:00 (3:15; 4:50) | 4:30 (4:00; 5:15) | <0.001 |
| **MSF corrected** | 3.89 (3:09; 4:34) | 4:01 (3:23; 4:45) | <0.001 |

\*Mann witney test

Supplementary Table 2. Percentage of schoolchildren consuming food items in each eating event.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Food item | % Consumption frequency | | | | | |
| **Breakfast**  **n=1114** | **Mid-morning snack n=753** | **Lunch**  **n=1293** | **Mid-afternoon snack**  **n=1115** | **Dinner**  **n=1218** | **Evening snack n=738** |
| **% (95% CI)** | **% (95% CI)** | **% (95% CI)** | **% (95% CI)** | **% (95% CI)** | **% (95% CI)** |
| Water | 17.2 (13.9- 21.0) | 22.2 (18.2- 27.5) | 19.5 (14.6- 25.6) | 15.6 (11.7- 20.5) | 18.9 (14.7- 24.0) | 32.9 (26.0- 40.6) |
| Rice | 1.2 (0.7- 2.0) | 2.4 (0.8- 7.0) | 65.2 (61.6- 68.6) | 0.9 (0.2- 3.4) | 40.0 (32.3- 39.8) | 2.3 (1.0- 5.1) |
| Vegetables | 0.5 (0.2- 1.2) | 1.4 (0.6- 3.2) | 20.4 (16.6- 24.9) | 0.5 (0.1- 1.6) | 9.7 (8.0- 11.7) | 0.6 (0.2- 1.9) |
| Green leaves | 0.2 (0.05- 0.7) | 1.5 (0.4- 5.2) | 19.9 (13.9- 27.7) | 0.3 (0.07- 1.2) | 8.5 (6.7- 10.7) | 0.2 (0.03- 1.2) |
| Vegetable soup | 0.09 (0.01- 0.8) | 0.6 (0.02- 2.0) | 2.1 (1.2- 3.5) | 0.8 (0.3- 2.2) | 5.6 (3.8- 8.2) | 0.7 (0.2- 2.3) |
| Beans | 1.3 (0.9- 1.9) | 2.7 (1.2- 5.9) | 49.1 (46.6- 51.6) | 0.8 (0.2- 3.1) | 21.5 (17.3- 26.4) | 2.8 (1.5- 5.2) |
| Manioc flour | 0.2 (0.06- 0.8) | 0.6 (0.2- 1.9) | 13.7 (11.1- 16.7) | 0.3 (0.05- 1.3) | 5.2 (3.5- 7.8) | 1.6 (0.9- 3.0) |
| Corn/maize | - | 1.3 (0.7- 2.5) | 7.7 (6.5- 9.0) | 1.3 (0.5- 3.4) | 5.1 (4.7- 5.5) | 1.1 (0.7- 1.7) |
| Pasta | 0.2 (0.06- 0.9) | 1.4 (0.6- 3.3) | 17.8 (14.4- 21.8) | 1.2 (0.7- 2.0) | 11.4 (9.0- 14.3) | 0.6 (0.2- 2.0) |
| Instant pasta | 0.5 (0.1- 2.0) | 0.9 (0.3- 2.3) | 3.3 (2.5- 4.2) | 0.5 (0.1- 2.2) | 4.3 (2.8- 6.6) | 1.5 (1.1- 2.1) |
| French fries | 0.7 (0.2- 2.6) | 1.2 (0.8- 1.9) | 7.0 (3.8- 12.6) | 2.8 (1.3- 6.0) | 4.8 (3.7- 6.1) | 2.5 (1.4- 4.4) |
| Beef/poultry | 1.6 (1.1- 2.4) | 3.2 (1.3- 7.6) | 54.7 (51.3- 58.0) | 1.9 (1.2- 3.1) | 32.0 (28.4- 36.0) | 1.9 (0.8- 4.7) |
| Sausages | 3.1 (1.9- 4.9) | 1.2 (0.5- 3.0) | 7.2 (5.8- 9.0) | 2.0 (0.8- 4.5) | 6.6 (4.0- 10.7) | 0.8 (0.3- 2.2) |
| Eggs | 5.0 (3.8- 6.5) | 2.1 (1.5- 3.1) | 7.0 (4.2- 11.5) | 2.0 (1.2- 3.3) | 8.0 (6.5- 9.8) | 1.6 (0.7- 3.6) |
| Fish/seafood | 0.5 (0.2- 1.3) | 0.5 (0.07- 3.0) | 5.9 (3.7- 9.3) | 0.2 (0.04- 0.7) | 4.5 (2.4- 8.4) | 0.4 (0.1- 1.3) |
| Fruits | 17.7 (12.7- 24.1) | 22.5 (19.4- 26.0) | 3.0 (2.0- 4.6) | 17.7 (15.6- 19.9) | 2.8 (1.9- 4.2) | 20.7 (17.3- 24.7) |
| Breads | 49.6 (45.9- 53.3) | 21.6 (16.0- 28.6) | 0.6 (0.2- 1.9) | 31.2 (27.9- 34.7) | 11.2 (8.3- 14.9) | 7.8 (6.5- 9.2) |
| Cheese bread | 2.6 (1.5- 4.4) | 4.3 (2.8- 6.6) | 0.2 (0.05- 1.0) | 5.7 (4.2- 7.7) | 2.3 (1.3- 3.8) | 2.0 (0.8- 0.5) |
| Cream cookies | 9.4 (7.0- 12.5) | 16.6 (13.1- 20.8) | 0.6 (0.3- 1.0) | 20.5 (19.3- 21.7) | 1.0 (0.3- 2.7) | 6.0 (3.4- 10.5) |
| Breakfast cereal | 7.2 (5.9- 8.7) | 3.6 (2.2- 5.9) | 0.2 (0.02- 0.8) | 3.7 (2.1- 6.6) | 0.7 (0.6- 1.0) | 4.8 (3.1- 7.3) |
| Cheese | 6.4 (4.5- 9.0) | 4.0 (2.0- 7.8) | 0.6 (0.1- 2.2) | 2.8 (1.6- 4.8) | 3.4 (2.4- 4.7) | 0.8 (0.2- 3.9) |
| Coffee with milk | 24.1 (19.1- 29.8) | 1.8 (0.4- 7.0) | 0.1 (0.03- 0.6) | 7.7 (5.2- 11.2) | 2.0 (1.3- 3.1) | 5.0 (3.1- 8.0) |
| Milk | 13.8 (11.5- 16.4) | 2.7 (2.0- 4.1) | 0.2 (0.05- 0.7) | 4.1 (2.7- 6.1) | 1.6 (0.4- 6.2) | 5.4 (3.2- 9.2) |
| Yogurt | 9.8 (7.7- 12.4) | 7.5 (5.2- 10.8) | 0.4 (0.1- 1.1) | 8.1 (6.3- 10.5) | 1.2 (0.6- 2.2) | 6.6 (4.1- 10.4) |
| Chocolate milk | 22.0 (19.3- 24.7) | 7.0 (4.8- 10.0) | 0.1 (0.02- 0.6) | 11.0 (9.6- 12.4) | 2.3 (1.6- 3.2) | 8.4 (7.1- 10.3) |
| Fruit juice | 7.5 (6.2- 9.0) | 14.8 (11.0- 19.6) | 17.4 (15.2- 20.0) | 16.8 (12.6- 22.1) | 16.7 (14.2- 20.0) | 6.9 (3.4- 13.6) |
| Soda | 0.9 (0.3- 3.1) | 2.1 (0.7- 5.5) | 9.0 (6.5- 12.4) | 3.4 (1.3- 8.5) | 10.1 (7.1- 14.1) | 3.4 (2.0- 5.7) |
| Sweets | 3.6 (2.3- 5.6) | 6.0 (3.4- 10.2) | 1.7 (0.4- 7.0) | 15.1 (11.2- 20.0) | 3.4 (2.8- 4.0) | 11.4 (8.4- 15.3) |
| Chips | 0.7 (0.5- 1.1) | 5.1 (3.3- 7.8) | 0.07 (0.01- 0.4) | 4.2 (3.2- 5.4) | 0.8 (0.3- 1.9) | 3.7 (2.6- 5.3) |
| Pizza/hotdog/ hamburger | 1.0 (0.5- 2.2) | 5.6 (3.9- 8.0) | 2.1 (1.5- 3.1) | 5.2 (3.3- 8.1) | 13.4 (10.6- 16.8) | 3.0 (1.4- 6.3) |
| Cake | 6.2 (4.7- 8.1) | 6.0 (4.2- 8.5) | 0.1 (0.02- 0.1) | 10.2 (7.1- 14.3) | 1.2 (0.6- 2.5) | 2.1 (0.9- 5.0) |

- No consumption reported.

Supplementary Table 3. Model fit indices used to select the number of latent classes.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Number of latent classes** | **AIC** | **SS-BIC** | **Entropy** | **LMR prob** | **% of children in each latent class** | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** |
| **Breakfast** |  |  |  |  |  |  |  |  |  |  |
| 2 | 12972 | 13084 | 0.686 | 0.035 | 13.8 | 86.2 | - | - | - | - |
| 3 | 12779 | 12948 | 0.747 | 0.012 | 34.7 | 20.0 | 45.2 | - | - | - |
| 4 | 12650 | 12876 | 0.776 | 0.026 | 35.4 | 42.0 | 2.9 | 19.7 | - | - |
| 5 | 12557 | 12840 | 0.862 | 0.000 | 33.4 | 17.4 | 23.5 | 23.3 | 2.4 | - |
| 6 | 12525 | 12865 | 0.854 | 0.322 | 23.6 | 17.6 | 22.5 | 1.5 | 32.1 | 2.6 |
| **Mid-morning snack** | | | | | | | | | |  |
| 2 | 8738 | 8829 | 0.970 | 0.000 | 93.2 | 6.8 | - | - | - | - |
| 3 | 8577 | 8714 | 0.955 | 0.000 | 23.9 | 69.3 | 6.8 | - | - | - |
| 4 | 8525 | 8709 | 0.920 | 0.001 | 16.5 | 7.3 | 21.7 | 54.6 | - | - |
| 5 | 8503 | 8733 | 0.945 | 0.004 | 4.5 | 21.2 | 16.5 | 6.2 | 51.5 |  |
| 6 | 8482 | 8759 | 0.830 | 0.017 | 5.9 | 20.1 | 21.8 | 14.3 | 4.3 | 33.6 |
| **Lunch** |  |  |  |  |  |  |  |  |  |  |
| 2 | 17542 | 17668 | 0.833 | 0.000 | 68.0 | 32.0 | - | - | - | - |
| 3 | 17404 | 17592 | 0.845 | 0.000 | 31.1 | 40.7 | 28.2 | - | - | - |
| 4 | 17301 | 17554 | 0.874 | 0.000 | 11.3 | 40.9 | 19.0 | 28.8 | - | - |
| 5 | 17263 | 17579 | 0.804 | 0.331 | 12.7 | 37.1 | 9.8 | 28.0 | 13.0 | - |
| 6 | 17229 | 17609 | 0.839 | 0.185 | 26.1 | 38.7 | 9.8 | 11.9 | 3.8 | 9.7 |
| **Mid-afternoon snack** | | | | | | | | | |  |
| 2 | 13767 | 13883 | 0.947 | 0.000 | 30.6 | 69.4 | - | - | - | - |
| 3 | 13499 | 13674 | 0.940 | 0.000 | 3.3 | 30.5 | 66.1 | - | - | - |
| 4 | 13408 | 13642 | 0.938 | 0.000 | 14.6 | 30.4 | 3.3 | 51.6 | - | - |
| 5 | 13322 | 13614 | 0.804 | 0.210 | 30.9 | 3.2 | 25.2 | 26.2 | 14.4 | - |
| 6 | 13320 | 13671 | 0.791 | 0.059 | 14.3 | 21.8 | 2.8 | 5.7 | 28.9 | 26.6 |
| **Dinner** |  |  |  |  |  |  |  |  |  |  |
| 2 | 17411 | 17532 | 0.885 | 0.000 | 42.5 | 57.5 | - | - | - | - |
| 3 | 17124 | 17308 | 0.932 | 0.000 | 41.3 | 12.2 | 46.5 | - | - | - |
| 4 | 16978 | 17223 | 0.898 | 0.000 | 34.2 | 12.2 | 13.1 | 41.0 | - | - |
| 5 | 16899 | 17206 | 0.902 | 0.609 | 23.5 | 12.2 | 13.6 | 33.3 | 17.3 | - |
| 6 | 16840 | 17208 | 0.900 | 0.012 | 8.7 | 39.8 | 15.4 | 12.2 | 6.7 | 17.2 |
| **Evening snack** | |  |  |  |  |  |  |  |  |  |
| 2 | 8052 | 8142 | 0.890 | 0.000 | 10.3 | 89.7 | - | - | - | - |
| 3 | 7942 | 8078 | 0.947 | 0.000 | 64.1 | 8.5 | 27.4 | - | - | - |
| 4 | 7886 | 8068 | 0.806 | 0.000 | 19.7 | 26.0 | 45.1 | 9.2 | - | - |
| 5 | 7839 | 8066 | 0.905 | 0.013 | 10.1 | 23.8 | 43.0 | 8.1 | 14.9 | - |
| 6 | 7838 | 8111 | 0.836 | 0.718 | 11.6 | 7.2 | 23.5 | 17.1 | 13.5 | 27.2 |

Abbreviations: AIC. Akaike information criterion- SS-BIC. sample size-adjusted Bayesian information criterion- LMR-prob. Lo-Mendell-Rubin test probability- -. not available

Supplementary Table 4. Relative frequency of food items for breakfast patterns derived by latent class analysis of 7–14-year-old schoolchildren. (n=1118)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Breakfast | | | | | | | | | |
| Food item |  | Coffee with milk, bread and cheese (45%) | | | Mixed  (35%) | | | Chocolate milk  (20%) | | |
| OAFC | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI |
| Water | 0.16 | 0.13 | 0.81 | (0.63- 1.01) | 0.26 | **1.63** | **(1.36- 1.92)** | 0.05 | 0.34 | (0.18- 0.59) |
| Rice | 0.02 | 0.00 | 0.00 | (0.00- 0.46) | 0.05 | **2.91** | **(1.73- 4.56)** | 0.00 | 0.00 | (0.00- 1.03) |
| Vegetables | 0.01 | 0.00 | 0.25 | (0.01- 1.38) | 0.02 | **2.58** | **(1.11- 5.04)** | 0.00 | 0.00 | (0.00- 2.05) |
| Green leaves | 0.00 | 0.00 | 0.00 | (0.00- 1.62) | 0.01 | 2.87 | (0.93- 6.62) | 0.00 | 0.00 | (0.00- 3.64) |
| Vegetable soup | 0.00 | 0.00 | 0.73 | (0.02- 4.07) | 0.01 | 1.93 | (0.23- 6.85) | 0.00 | 0.00 | (0.00- 6.07) |
| Beans | 0.01 | 0.00 | 0.00 | (0.00- 0.54) | 0.04 | **2.87** | **(1.61- 4.67)** | 0.00 | 0.00 | (0.00- 1.21) |
| Manioc flour | 0.00 | 0.00 | 0.00 | (0.00- 2.03) | 0.01 | 2.78 | (0.78- 7.31) | 0.00 | 0.00 | (0.00- 4.56) |
| Pasta | 0.01 | 0.00 | 0.37 | (0.01- 2.04) | 0.01 | 2.39 | (0.78- 5.52) | 0.00 | 0.00 | (0.00- 3.04) |
| Instant pasta | 0.01 | 0.00 | 0.00 | (0.00- 0.68) | 0.03 | **2.88** | **(1.49- 4.97)** | 0.00 | 0.00 | (0.00- 1.52) |
| French fries | 0.01 | 0.00 | 0.00 | (0.00- 1.16) | 0.02 | **2.87** | **(1.16- 5.86)** | 0.00 | 0.00 | (0.00- 2.60) |
| Beef/poultry | 0.02 | 0.00 | 0.00 | (0.00- 0.49) | 0.04 | **2.93** | **(1.72- 4.63)** | 0.00 | 0.00 | (0.00- 1.09) |
| Sausages | 0.02 | 0.03 | 1.38 | (0.79- 2.22) | 0.01 | 0.56 | (0.18- 1.30) | 0.02 | 0.97 | (0.32- 2.24) |
| Eggs | 0.04 | 0.04 | 0.85 | (0.51- 1.33) | 0.05 | 1.17 | (0.71- 1.80) | 0.04 | 1.07 | (0.52- 1.93) |
| Fish/seafood | 0.00 | 0.00 | 0.55 | (0.01- 3.06) | 0.01 | 2.15 | (0.44- 6.24) | 0.00 | 0.00 | (0.00- 4.56) |
| Fruits | 0.15 | 0.11 | 0.70 | (0.53- 0.90) | 0.28 | **1.81** | **(1.52- 2.12)** | 0.04 | 0.26 | (0.12- 0.49) |
| Breads | 0.51 | 0.83 | **1.63** | **(1.56- 1.69)** | 0.07 | 0.15 | (0.10- 0.21) | 0.53 | 1.05 | (0.91- 1.18) |
| Cheese bread | 0.03 | 0.01 | 0.18 | (0.04- 0.54) | 0.08 | **2.42** | **(1.66- 3.38)** | 0.01 | 0.42 | (0.08- 1.21) |
| Cream cookies | 0.11 | 0.08 | 0.76 | (0.55- 1.01) | 0.14 | **1.32** | **(1.01- 1.67)** | 0.12 | 1.06 | (0.71- 1.51) |
| Breakfast cereal | 0.08 | 0.02 | 0.20 | (0.09- 0.39) | 0.18 | **2.27** | **(1.80- 2.79)** | 0.05 | 0.61 | (0.31- 1.08) |
| Cheese | 0.05 | 0.08 | **1.67** | **(1.22- 2.22)** | 0.01 | 0.16 | (0.03- 0.45) | 0.05 | 0.98 | (0.50- 1.73) |
| Coffee with milk | 0.25 | 0.52 | **2.11** | **(1.93- 2.29)** | 0.03 | 0.14 | (0.07- 0.23) | 0.00 | 0.00 | (0.00- 0.07) |
| Milk | 0.13 | 0.15 | 1.12 | (0.89- 1.38) | 0.15 | 1.11 | (0.85- 1.40) | 0.07 | 0.54 | (0.32- 0.86) |
| Yogurt | 0.09 | 0.06 | 0.70 | (0.47- 0.97) | 0.17 | **1.89** | **(1.48- 2.35)** | 0.02 | 0.20 | (0.06- 0.51) |
| Chocolate milk | 0.22 | 0.01 | 0.04 | (0.01- 0.09) | 0.04 | 0.16 | (0.09- 0.27) | 1.00 | **4.55** | **(4.47- 4.55)** |
| Fruit juice | 0.07 | 0.06 | 0.81 | (0.54- 1.15) | 0.13 | **1.83** | **(1.38- 2.38)** | 0.00 | 0.00 | (0.00- 0.24) |
| Soda | 0.02 | 0.01 | 0.35 | (0.07- 1.02) | 0.04 | **2.43** | **(1.40- 3.88)** | 0.00 | 0.00 | (0.00- 0.96) |
| Sweets | 0.03 | 0.01 | 0.43 | (0.16- 0.92) | 0.06 | **2.14** | **(1.37- 3.16)** | 0.01 | 0.32 | (0.04- 1.15) |
| Chips | 0.01 | 0.00 | 0.00 | (0.00- 1.16) | 0.02 | **2.87** | **(1.16- 5.86)** | 0.00 | 0.00 | (0.00- 2.60) |
| Pizza/hotdog/ hamburger | 0.02 | 0.00 | 0.00 | (0.00- 0.46) | 0.05 | **2.91** | **(1.73- 4.53)** | 0.00 | 0.00 | (0.00- 1.03) |
| Cake | 0.07 | 0.03 | 0.50 | (0.29- 0.80) | 0.13 | **1.89** | **(1.42- 2.45)** | 0.04 | 0.60 | (0.28- 1.12) |

Abbreviations: OAFC. overall average frequency of consumption- AFC. average frequency of consumption- RAFC ratio of consumption to average frequency of consumption- CI. confidence interval.

† 95% confidence intervals not including unity were considered statistically significant and representative of the meal pattern.

‡ Food items included in each meal pattern are shown in bold.

Supplementary Table 5. Relative frequency of food items for mid-morning snack patterns derived by latent class analysis of 7–14-year-old schoolchildren. (n= 753)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Mid- morning snack | | | | | | | | | |
| **Food item** |  | Ultra-processed and fruits (69%) | | | Coffee with milk, bread, cheese and processed meat (24%) | | | Traditional Brazilian lunch with soda  (9%) | | |
| OAFC | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI |
| Water | 0.20 | 0.21 | 1.07 | (0.91- 1.27) | 0.18 | 0.92 | (0.64- 1.23) | 0.10 | 0.50 | (0.15- 1.09) |
| Rice | 0.05 | 0.00 | 0.00 | (0.00- 0.16) | 0.00 | 0.00 | (0.00- 0.44) | 0.67 | **14.80** | **(11.56- 17.56)** |
| Vegetables | 0.02 | 0.01 | 0.72 | (0.25- 1.57) | 0.01 | 0.35 | (0.01- 1.95) | 0.10 | **6.16** | **(1.89- 13.46)** |
| Green leaves | 0.01 | 0.00 | 0.34 | (0.04- 1.18) | 0.02 | 1.39 | (0.29- 4.03) | 0.08 | **6.55** | **(1.85- 15.80)** |
| Vegetable soup | 0.01 | 0.00 | 0.24 | (0.01- 1.39) | 0.01 | 0.70 | (0.02- 3.92) | 0.08 | **9.92** | **(2.78- 23.80)** |
| Beans | 0.04 | 0.00 | 0.04 | (0.00- 0.25) | 0.00 | 0.00 | (0.00- 0.46) | 0.63 | **14.38** | **(10.96- 17.35)** |
| Manioc flour | 0.01 | 0.00 | 0.00 | (0.00- 1.06) | 0.00 | 0.00 | (0.00- 3.03) | 0.10 | **14.85** | **(5.00- 32.42)** |
| Corn/maize | 0.01 | 0.00 | 0.34 | (0.04- 1.18) | 0.01 | 0.46 | (0.01- 2.61) | 0.12 | **9.83** | **(3.70- 20.08)** |
| Pasta | 0.02 | 0.02 | 0.87 | (0.38- 1.74) | 0.00 | 0.00 | (0.00- 1.16) | 0.10 | **5.70** | **(1.92- 12.44)** |
| Instant pasta | 0.01 | 0.01 | 1.00 | (0.42- 2.11) | 0.00 | 0.00 | (0.00- 1.54) | 0.06 | 4.52 | (0.92- 12.31) |
| French fries | 0.01 | 0.02 | 1.29 | (0.60- 2.46) | 0.00 | 0.00 | (0.00- 1.52) | 0.02 | 1.48 | (0.04- 7.58) |
| Beef/poultry | 0.05 | 0.00 | 0.00 | (0.00- 0.15) | 0.02 | 0.47 | (0.13- 1.21) | 0.61 | **13.15** | **(9.91- 15.99)** |
| Sausages | 0.02 | 0.01 | 0.36 | (0.06- 1.05) | 0.04 | **2.77** | **(1.19- 5.41)** | 0.02 | 1.23 | (0.03- 6.54) |
| Eggs | 0.03 | 0.02 | 0.68 | (0.32- 1.28) | 0.03 | 1.32 | (0.49- 2.84) | 0.08 | 3.12 | (0.88- 7.52) |
| Fish/seafood | 0.01 | 0.01 | 0.86 | (0.18- 2.53) | 0.00 | 0.00 | (0.00- 3.03) | 0.04 | 5.91 | (0.71- 20.45) |
| Fruits | 0.22 | 0.28 | **1.25** | **(1.09- 1.43)** | 0.12 | 0.55 | (0.35- 0.80) | 0.00 | 0.00 | 0.00- 0.31) |
| Breads | 0.24 | 0.00 | 0.02 | (0.00- 0.06) | 1.00 | **4.14** | **(4.05- 4.14)** | 0.00 | 0.00 | (0.00- 0.29) |
| Cheese bread | 0.04 | 0.05 | 1.29 | (0.86- 1.82) | 0.02 | 0.40 | (0.08- 1.14) | 0.02 | 0.47 | (0.01- 2.48) |
| Cream cookies | 0.17 | 0.21 | **1.22** | **(1.01- 1.43)** | 0.11 | 0.65 | (0.39- 0.95) | 0.02 | 0.12 | (0.00- 0.62) |
| Breakfast cereal | 0.04 | 0.06 | 1.33 | (0.89- 1.86) | 0.02 | 0.40 | (0.08- 1.14) | 0.00 | 0.00 | (0.00- 1.64) |
| Cheese | 0.03 | 0.01 | 0.19 | (0.04- 0.57) | 0.11 | **3.70** | **(2.30- 5.53)** | 0.00 | 0.00 | (0.00- 2.30) |
| Coffee with milk | 0.04 | 0.02 | 0.50 | (0.24- 0.92) | 0.11 | **2.78** | **(1.71- 4.21)** | 0.00 | 0.00 | (0.00- 1.82) |
| Milk | 0.03 | 0.03 | 0.86 | (0.46- 1.45) | 0.05 | 1.72 | (0.79- 3.21) | 0.00 | 0.00 | (0.00- 2.38) |
| Yogurt | 0.08 | 0.10 | 1.19 | (0.89- 1.53) | 0.06 | 0.74 | (0.38- 1.32) | 0.00 | 0.00 | (0.00- 0.85) |
| Chocolate milk | 0.07 | 0.06 | 0.83 | (0.57- 1.17) | 0.12 | **1.74** | **(1.13- 2.59)** | 0.00 | 0.00 | (0.00- 1.00) |
| Fruit juice | 0.14 | 0.15 | 1.04 | (0.83- 1.28) | 0.16 | 1.15 | (0.79- 1.58) | 0.00 | 0.00 | (0.00- 0.50) |
| Soda | 0.04 | 0.04 | 1.23 | (0.78- 1.82) | 0.01 | 0.15 | (0.00- 0.84) | 0.06 | **1.62** | **(3.35- 4.47)** |
| Sweets | 0.05 | 0.07 | 1.37 | (0.96- 1.84) | 0.01 | 0.11 | (0.00- 0.61) | 0.02 | 0.41 | (0.01- 2.04) |
| Chips | 0.04 | 0.06 | 1.41 | (0.95- 2.02) | 0.00 | 0.00 | (0.00- 0.51) | 0.02 | 0.51 | (0.01- 2.56) |
| Pizza/hotdog/ hamburger | 0.04 | 0.06 | **1.48** | **(1.03- 2.08)** | 0.00 | 0.00 | (0.00- 0.50) | 0.00 | 0.00 | (0.00- 1.73) |
| Cake | 0.07 | 0.10 | **1.41** | **(1.08- 1.83)** | 0.01 | 0.08 | (0.00- 0.42) | 0.00 | 0.00 | (0.00- 0.97 |

Abbreviation: OAFC. overall average frequency of consumption- AFC. average frequency of consumption- RAFC ratio of consumption to average frequency of consumption- CI. confidence interval.

† 95% confidence intervals not including unity were considered statistically significant and representative of the meal pattern.

‡ Food items included in each meal pattern are shown in bold.

Supplementary Table 6. Relative frequency of food items for lunch patterns derived by latent class analysis of 7–14-year-old schoolchildren. (n=1293)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Lunch | | | | | | | | | | | | | |
| Food item |  | Brazilian traditional  (40.9%) | | | Brazilian traditional. processed meat, egg and fish (28.8%) | | | ” Ultra-processed, milk and bread” (19.0%) | | | Pasta and cheese  (11.3%) | | | |
| OAFC | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI |
| Water | 0.16 | 0.18 | 1.14 | (0.94- 1.36) | 0.17 | 1.07 | (0.82- 1.33) | 0.11 | 0.72 | (0.49- 1.01) | 0.12 | 0.78 | (0.47- 1.19) |
| Rice | 0.64 | 0.92 | **1.43** | **(1.39- 1.47)** | 0.88 | **1.37** | **(1.32- 1.42)** | 0.05 | 0.08 | (0.04- 0.13) | 0.02 | 0.03 | (0.01- 0.09) |
| Vegetables | 0.18 | 0.23 | **1.33** | **(1.13- 1.55)** | 0.24 | **1.34** | **(1.10- 1.61)** | 0.02 | 0.09 | (0.03- 0.23) | 0.08 | 0.47 | (0.24- 0.79) |
| Green leaves | 0.16 | 0.23 | **1.40** | **(1.19- 1.64)** | 0.20 | 1.21 | (0.97- 1.48) | 0.02 | 0.15 | (0.06- 0.32) | 0.08 | 0.46 | (0.23- 0.80) |
| Vegetable soup | 0.02 | 0.00 | 0.00 | (0.00- 0.29) | 0.00 | 0.13 | (0.00- 0.63) | 0.12 | **5.10** | **(3.51- 7.11)** | 0.00 | 0.00 | (0.00- 1.05) |
| Beans | 0.49 | 0.65 | **1.33** | **(1.24- 1.41)** | 0.76 | **1.55** | **(1.45- 1.63)** | 0.02 | 0.04 | (0.01- 0.10) | 0.06 | 0.11 | (0.05- 0.21) |
| Manioc flour | 0.13 | 0.17 | **1.27** | **(1.04- 1.53)** | 0.19 | **1.44** | **(1.14- 1.76)** | 0.03 | 0.21 | (0.08- 0.44) | 0.03 | 0.21 | (0.06- 0.52) |
| Corn/maize | 0.08 | 0.08 | 1.02 | (0.74- 1.37) | 0.09 | 1.17 | (0.82- 1.59) | 0.08 | 1.07 | (0.66- 1.62) | 0.03 | 0.36 | (0.10- 0.91) |
| Pasta | 0.15 | 0.05 | 0.34 | (0.22- 0.49) | 0.04 | 0.28 | (0.16- 0.45) | 0.00 | 0.03 | (0.00- 0.15) | 1.00 | **6.90** | **(6.72- 6.90)** |
| Instant pasta | 0.04 | 0.00 | 0.00 | (0.00- 0.18) | 0.01 | 0.34 | (0.10- 0.80) | 0.18 | **4.74** | **(3.52- 6.14)** | 0.00 | 0.00 | (0.00- 0.65) |
| French fries | 0.06 | 0.05 | 0.78 | (0.50- 1.14) | 0.08 | 1.38 | (0.95- 1.90) | 0.07 | 1.12 | (0.65- 1.78) | 0.03 | 0.59 | (0.19- 1.34) |
| Beef/poultry | 0.52 | 1.00 | **1.93** | **(1.91- 1.93)** | 0.02 | 0.03 | (0.01- 0.07) | 0.34 | 0.66 | (0.54- 0.77) | 0.36 | 0.69 | (0.54- 0.85) |
| Sausages | 0.08 | 0.02 | 0.29 | (0.15- 0.50) | 0.14 | **1.79** | **(1.40- 2.31)** | 0.12 | **1.56** | **(1.08- 2.17)** | 0.04 | 0.51 | (0.19- 1.12) |
| Eggs | 0.07 | 0.03 | 0.35 | (0.14- 0.58) | 0.16 | **2.23** | **(1.77- 2.92)** | 0.06 | 0.85 | (0.49- 1.36) | 0.03 | 0.38 | (0.11- 0.95) |
| Fish/seafood | 0.06 | 0.00 | 0.00 | (0.00- 0.12) | 0.16 | **2.67** | **(2.08- 3.33)** | 0.05 | 0.88 | (0.47- 1.47) | 0.04 | 0.67 | (0.25- 1.45) |
| Fruits | 0.02 | 0.03 | 1.20 | (0.69- 2.04) | 0.03 | 1.25 | (0.60- 2.22) | 0.02 | 0.74 | (0.20- 1.90) | 0.00 | 0.00 | (0.00- 1.16) |
| Breads | 0.01 | 0.00 | 0.00 | (0.00- 0.58) | 0.00 | 0.25 | (0.01- 1.25) | 0.06 | **5.00** | **(2.58- 7.50)** | 0.00 | 0.00 | (0.00- 2.08) |
| Cheese bread | 0.00 | 0.00 | 0.00 | (0.00- 1.84) | 0.00 | 0.00 | (0.00- 2.58) | 0.02 | **5.26** | **(1.74- 12.37)** | 0.00 | 0.00 | (0.00- 6.58) |
| Cream cookies | 0.00 | 0.00 | 0.00 | (0.00- 1.52) | 0.00 | 0.00 | (0.00- 2.13) | 0.02 | **5.22** | **(1.96- 11.30)** | 0.00 | 0.00 | (0.00- 5.43) |
| Breakfast cereal | 0.00 | 0.00 | 0.00 | (0.00- 1.84) | 0.01 | 1.42 | (0.17- 5.00) | 0.01 | 3.16 | (0.66- 9.21) | 0.00 | 0.00 | (0.00- 6.58) |
| Cheese | 0.01 | 0.00 | 0.40 | (0.05- 1.51) | 0.00 | 0.00 | (0.00- 1.05) | 0.02 | 1.72 | (0.47- 4.41) | 0.04 | **4.41** | **(1.61- 9.35)** |
| Coffee with milk | 0.00 | 0.00 | 0.00 | (0.00- 3.04) | 0.00 | 1.30 | (0.03- 6.52) | 0.01 | 3.52 | (0.43- 12.61) | 0.00 | 0.00 | (0.00- 10.87) |
| Milk | 0.00 | 0.00 | 0.00 | (0.00- 2.33) | 0.00 | 0.00 | (0.00- 3.27) | 0.02 | **5.43** | **(1.47- 13.67)** | 0.00 | 0.00 | (0.00- 8.33) |
| Yogurt | 0.00 | 0.00 | 0.00 | (0.00- 1.84) | 0.01 | 1.32 | (0.16- 5.00) | 0.01 | 3.16 | (0.66- 9.21) | 0.00 | 0.00 | (0.00- 6.58) |
| Chocolate milk | 0.00 | 0.00 | 0.00 | (0.00- 4.52) | 0.00 | 0.00 | (0.00- 6.32) | 0.01 | 5.23 | (0.63- 18.71) | 0.00 | 0.00 | (0.00- 16.13) |
| Fruit juice | 0.18 | 0.19 | 1.05 | (0.87- 1.25) | 0.17 | 0.97 | (0.77- 1.20) | 0.13 | 0.76 | (0.54- 1.03) | 0.22 | 1.25 | (0.88- 1.68) |
| Soda | 0.10 | 0.09 | 0.91 | (0.70- 1.21) | 0.08 | 0.81 | (0.56- 1.11) | 0.12 | 1.23 | (0.81- 1.71) | 0.14 | 1.38 | (0.86- 2.02) |
| Sweets | 0.02 | 0.02 | 1.19 | (0.56- 2.13) | 0.01 | 0.31 | (0.04- 1.19) | 0.03 | 1.75 | (0.72- 3.56) | 0.01 | 0.88 | (0.10- 3.04) |
| Chips | 0.00 | 0.00 | 0.00 | (0.00- 4.60) | 0.00 | 0.00 | (0.00- 6.53) | 0.01 | 5.33 | (0.65- 19.33) | 0.00 | 0.00 | (0.00- 16.67) |
| Pizza/hotdog/ hamburger | 0.03 | 0.00 | 0.00 | (0.00- 0.27) | 0.01 | 0.31 | (0.07- 0.90) | 0.12 | **4.78** | **(3.25- 6.63)** | 0.00 | 0.00 | (0.00- 0.98) |
| Cake | 0.00 | 0.00 | 0.00 | (0.00- 2.23) | 0.00 | 0.00 | (0.00- 3.16) | 0.02 | **5.16** | **(1.42- 12.90)** | 0.00 | 0.00 | (0.00- 8.06) |

Abbreviation: OAFC. overall average frequency of consumption- AFC. average frequency of consumption- RAFC ratio of consumption to average frequency of consumption- CI. confidence interval.

† 95% confidence intervals not including unity were considered statistically significant and representative of the meal pattern. ‡ Food items included in each meal pattern are shown in bold.

Supplementary Table 7.Relative frequency of food items for mid-afternoon snack patterns derived by latent class analysis of 7–14-year-old schoolchildren. (n= 1115)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Mid-afternoon snack | | | | | | | | | | | | |
| **Food item** |  | Ultra-processed  (51.6%) | | | Coffee with milk, bread, cheese and processed meat (30.5%) | | | Fruits  (14,6%) | | | Traditional Brazilian lunch  (3.2%) | | |
| **OAFC** | **AFC** | **RAFC** | **95% CI** | **AFC** | **RAFC** | **95% CI** | **AFC** | **RAFC** | **95% CI** | **AFC** | **RAFC** | **95% CI** |
| Water | 0.12 | 0.12 | 0.99 | (0.76- 1.23) | 0.11 | 0.90 | (0.64- 1.22) | 0.15 | 1.30 | (0.86- 1.85) | 0.11 | 0.92 | (0.25- 2.03) |
| Rice | 0.02 | 0.00 | 0.00 | (0.00- 0.30) | 0.00 | 0.00 | (0.00- 0.51) | 0.00 | 0.00 | (0.00- 1.02) | 0.60 | **30.20** | (**21.37- 38.17**) |
| Vegetables | 0.01 | 0.01 | 0.47 | (0.09- 1.40) | 0.01 | 1.37 | (0.45- 3.17) | 0.01 | 0.56 | (0.01- 3.15) | 0.08 | **7.57** | (**1.59- 20.56**) |
| Green leaves | 0.00 | 0.00 | 0.00 | (0.00- 1.34) | 0.00 | 0.00 | (0.00- 2.23) | 0.00 | 0.00 | (0.00- 4.46) | 0.14 | **30.13** | (**10.04- 64.06**) |
| Vegetable soup | 0.01 | 0.01 | 0.86 | (0.23- 2.21) | 0.00 | 0.00 | (0.00- 1.25) | 0.01 | 0.75 | (0.19- 4.21) | 0.11 | **13.50** | (**3.75- 31.75**) |
| Beans | 0.02 | 0.00 | 0.00 | (0.00-0.38) | 0.00 | 0.00 | (0.00- 0.69) | 0.00 | 0.00 | (0.00- 1.38) | 0.49 | **30.38** | (**19.94- 41.00**) |
| Manioc flour | 0.00 | 0.00 | 0.00 | (0.00- 1.34) | 0.00 | 0.65 | (0.02- 3.62) | 0.00 | 0.00 | (0.00- 4.46) | 0.11 | **24.11** | (**6.70- 55.80**) |
| Corn/maize | 0.01 | 0.01 | 0.74 | (0.24- 1.72) | 0.00 | 0.00 | (0.00- 0.86) | 0.01 | 0.52 | (0.01- 2.89) | 0.19 | **16.22** | (**6.78- 30.04**) |
| Pasta | 0.01 | 0.02 | 1.64 | (0.71- 2.71) | 0.00 | 0.00 | (0.00- 0.71) | 0.00 | 0.00 | (0.00-1.43) | 0.08 | **5.79** | (**1.21- 15.64**) |
| Instant pasta | 0.01 | 0.02 | 1.59 | (0.71- 2.96) | 0.00 | 0.30 | (0.01- 1.63) | 0.00 | 0.00 | (0.00- 2.04) | 0.03 | 2.76 | (0.07- 14.29) |
| French fries | 0.02 | 0.03 | 1.54 | (0.90- 2.49) | 0.00 | 0.00 | (0.00- 0.53) | 0.00 | 0.00 | (0.00- 1.17) | 0.11 | **5.74** | (**1.60- 13.30**) |
| Beef/poultry | 0.03 | 0.00 | 0.14 | (0.02- 0.50) | 0.01 | 0.47 | (0.13- 1.19) | 0.01 | 0.24 | (0.01- 1.35) | 0.57 | **22.68** | (**15.80- 29.16**) |
| Sausages | 0.02 | 0.00 | 0.16 | (0.02- 0.58) | 0.06 | **2.73** | (**1.67- 4.14**) | 0.00 | 0.00 | (0.00- 0.93) | 0.05 | 2.33 | (0.31- 8.37) |
| Eggs | 0.02 | 0.01 | 0.53 | (0.20- 1.20) | 0.03 | 1.54 | (0.74- 2.82) | 0.01 | 0.65 | (0.08- 2.29) | 0.08 | 4.31 | (0.90- 11.65) |
| Fish/seafood | 0.00 | 0.00 | 0.00 | (0.00- 1.67) | 0.01 | 1.61 | (0.19- 5.83) | 0.01 | 1.67 | (0.04- 9.36) | 0.03 | 7.50 | (0.19- 38.89) |
| Fruits | 0.19 | 0.01 | 0.04 | (0.01- 0.09) | 0.12 | 0.61 | (0.44- 0.82) | 1.00 | **5.35** | (**5.22- 5.35**) | 0.08 | 0.43 | (0.09-1.17) |
| Breads | 0.31 | 0.01 | 0.02 | (0.00- 0.05) | 1.00 | **3.25** | (**3.18- 3.25**) | 0.00 | 0.00 | (0.00- 0.07) | 0.03 | 0.09 | (0.00- 0.45) |
| Cheese bread | 0.06 | 0.09 | **1.43** | (**1.08- 1.86**) | 0.04 | 0.70 | (0.39- 1.14) | 0.02 | 0.29 | (0.06- 0.84) | 0.00 | 0.00 | (0.00- 1.51) |
| Cream cookies | 0.19 | 0.29 | **1.50** | (**1.31- 1.68**) | 0.11 | 0.56 | (0.39- 0.74) | 0.09 | 0.45 | (0.25- 0.74) | 0.00 | 0.00 | (0.00- 0.49) |
| Breakfast cereal | 0.04 | 0.06 | 1.27 | (0.87- 1.76) | 0.03 | 0.58 | (0.27- 1.11) | 0.05 | 1.09 | (0.47- 2.11) | 0.00 | 0.00 | (0.00- 2.12) |
| Cheese | 0.03 | 0.01 | 0.21 | (0.05- 0.54) | 0.10 | **2.94** | (**2.05- 4.03**) | 0.00 | 0.00 | (0.00- 0.67) | 0.00 | 0.00 | (0.00- 2.87) |
| Coffee with milk | 0.10 | 0.08 | 0.80 | (0.59- 1.05) | 0.19 | **1.94** | (**1.50- 2.40**) | 0.01 | 0.06 | (0.00- 0.34) | 0.00 | 0.00 | (0.00- 0.95) |
| Milk | 0.05 | 0.06 | 1.10 | (0.77- 1.52) | 0.07 | 1.41 | (0.92- 2.05) | 0.01 | 0.12 | (0.00- 0.65) | 0.00 | 0.00 | (0.00- 1.83) |
| Yogurt | 0.08 | 0.10 | 1.27 | (0.97- 1.64) | 0.06 | 0.74 | (0.45- 1.14) | 0.06 | 0.81 | (0.40- 1.47) | 0.00 | 0.00 | (0.00- 1.26) |
| Chocolate milk | 0.10 | 0.11 | 1.05 | (0.83- 1.33) | 0.14 | 1.32 | (0.98- 1.71) | 0.04 | 0.35 | (0.13- 0.74) | 0.00 | 0.00 | (0.00- 0.91) |
| Fruit juice | 0.14 | 0.15 | 1.06 | (0.86- 1.29) | 0.15 | 1.06 | (0.79- 1.36) | 0.12 | 0.86 | (0.55- 1.29) | 0.00 | 0.00 | (0.00- 0.68) |
| Soda | 0.05 | 0.09 | **1.64** | (**1.23- 2.08**) | 0.02 | 0.44 | (0.19- 0.86) | 0.00 | 0.00 | (0.00- 0.38) | 0.05 | 1.02 | (0.12- 3.40) |
| Sweets | 0.13 | 0.20 | **1.51** | (**1.27- 1.77**) | 0.04 | 0.32 | (0.17- 0.52) | 0.12 | 0.94 | (0.59- 1.38) | 0.03 | 0.21 | (0.00- 1.08) |
| Chips | 0.04 | 0.07 | **1.71** | (**1.22- 2.31**) | 0.00 | 0.00 | (0.00- 0.26) | 0.03 | 0.81 | (0.26- 1.82) | 0.00 | 0.00 | (0.00- 2.47) |
| Pizza/hotdog/ hamburger | 0.04 | 0.09 | **1.93** | (**1.45- 2.50**) | 0.00 | 0.00 | (0.00- 0.23) | 0.00 | 0.00 | (0.00- 0.45) | 0.00 | 0.00 | (0.00- 2.05) |
| Cake | 0.10 | 0.14 | **1.43** | (**1.13- 1.74**) | 0.05 | 0.54 | (0.33- 0.84) | 0.06 | 0.61 | (0.31- 1.12) | 0.00 | 0.00 | (0.00- 0.97) |

Abbreviation: OAFC. overall average frequency of consumption- AFC. average frequency of consumption- RAFC ratio of consumption to average frequency of consumption- CI. confidence interval.

† 95% confidence intervals not including unity were considered statistically significant and representative of the meal pattern.

‡ Food items included in each meal pattern are shown in bold.

Supplementary Table 8. Relative frequency of food items for dinner patterns derived by latent class analysis of 7–14-year-old schoolchildren. (n=1218)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Dinner | | | | | | | | | |
| **Food item** |  | Mixed  (46.5%) | | | Traditional Brazilian, fish and water (41.3%) | | | Ultra-processed and sweets  (12.2%) | | |
| OAFC | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI |
| Water | 0.16 | 0.13 | 0.84 | (0.67- 1.03) | 0.21 | **1.33** | **(1.11- 1.57)** | 0.08 | 0.51 | (0.26- 0.85) |
| Rice | 0.36 | 0.00 | 0.00 | (0.00- 0.02) | 0.88 | **2.44** | **(2.35- 2.51**) | 0.00 | 0.00 | (0.00- 0.07) |
| Vegetables | 0.10 | 0.05 | 0.52 | (0.35- 0.75) | 0.17 | **1.82** | **(1.48- 2.20**) | 0.01 | 0.07 | (0.00- 0.39) |
| Green leaves | 0.09 | 0.03 | 0.35 | (0.20- 0.55) | 0.18 | **2.03** | **(1.66- 2.44**) | 0.00 | 0.00 | (0.00- 0.28) |
| Vegetable soup | 0.07 | 0.15 | **1.99** | (**1.60- 2.42**) | 0.01 | 0.14 | (0.04- 0.32) | 0.01 | 0.18 | (0.02- 0.65) |
| Beans | 0.26 | 0.01 | 0.05 | (0.02- 0.11) | 0.61 | **2.37** | **(2.19- 2.53**) | 0.00 | 0.00 | (0.00- 0.09) |
| Manioc flour | 0.07 | 0.01 | 0.15 | (0.05- 0.32) | 0.16 | **2.24** | **(1.79- 2.72**) | 0.01 | 0.09 | (0.00- 0.51) |
| Corn/maize | 0.05 | 0.03 | 0.63 | (0.37- 0.96) | 0.09 | **1.67** | **(1.25- 2.22**) | 0.01 | 0.12 | (0.00- 0.68) |
| Pasta | 0.10 | 0.19 | **1.87** | (**1.56- 2.21**) | 0.03 | 0.33 | (0.19- 0.52) | 0.00 | 0.00 | (0.00- 0.24) |
| Instant pasta | 0.06 | 0.13 | **1.96** | (**1.56- 2.42**) | 0.01 | 0.15 | (0.05- 0.35) | 0.01 | 0.20 | (0.02- 0.73) |
| French fries | 0.06 | 0.05 | 0.84 | (0.56- 1.20) | 0.06 | 1.12 | (0.77- 1.55) | 0.07 | 1.29 | (0.65- 2.25) |
| Beef/poultry | 0.32 | 0.18 | 0.55 | (0.46- 0.66) | 0.57 | **1.77** | **(1.63- 1.92**) | 0.03 | 0.08 | (0.02- 0.21) |
| Sausages | 0.07 | 0.09 | **1.36** | (**1.03- 1.76**) | 0.06 | 0.84 | (0.56- 1.19) | 0.01 | 0.19 | (0.02- 0.69) |
| Eggs | 0.07 | 0.07 | 0.98 | (0.70- 1.31) | 0.10 | 1.29 | (0.96- 1.69) | 0.01 | 0.09 | (0.00- 0.50) |
| Fish/seafood | 0.04 | 0.03 | 0.80 | (0.48- 1.24) | 0.06 | **1.43** | **(1.00- 2.05**) | 0.01 | 0.16 | (0.00- 0.88) |
| Fruits | 0.03 | 0.06 | **1.67** | (**1.14- 2.33**) | 0.02 | 0.48 | (0.21- 0.94) | 0.01 | 0.20 | (0.01- 1.12) |
| Breads | 0.09 | 0.19 | **2.06** | (**1.73- 2.44**) | 0.01 | 0.08 | (0.02- 0.21) | 0.00 | 0.00 | (0.00- 0.26) |
| Cheese bread | 0.02 | 0.03 | **1.88** | (**1.10- 2.94**) | 0.00 | 0.24 | (0.03- 0.88) | 0.01 | 0.42 | (0.01- 2.30) |
| Cream cookies | 0.01 | 0.03 | **2.11** | (**1.29- 3.33**) | 0.00 | 0.00 | (0.00- 0.50) | 0.00 | 0.00 | (0.00- 1.67) |
| Breakfast cereal | 0.01 | 0.01 | 1.76 | (0.70- 3.57) | 0.00 | 0.56 | (0.07- 2.04) | 0.00 | 0.00 | (0.00- 3.49) |
| Cheese | 0.03 | 0.05 | **1.85** | (**1.25- 2.61**) | 0.01 | 0.21 | (0.03- 0.59) | 0.01 | 0.47 | (0.06- 1.66) |
| Coffee with milk | 0.02 | 0.04 | **2.02** | (**1.29- 2.97**) | 0.00 | 0.19 | (0.00- 1.14) | 0.00 | 0.00 | (0.00- 1.16) |
| Milk | 0.02 | 0.03 | **1.88** | (**1.09- 2.98**) | 0.00 | 0.24 | (0.03- 0.88) | 0.01 | 0.42 | (0.01- 2.30) |
| Yogurt | 0.01 | 0.02 | 1.98 | (0.99- 3.52) | 0.00 | 0.19 | (0.01- 1.12) | 0.00 | 0.00 | (0.00- 2.45) |
| Chocolate milk | 0.02 | 0.04 | **2.00** | (**1.31- 2.93**) | 0.00 | 0.09 | (0.00- 0.50) | 0.01 | 0.30 | (0.01- 1.67) |
| Fruit juice | 0.15 | 0.15 | 0.96 | (0.78- 1.17) | 0.15 | 0.94 | (0.75- 1.16) | 0.20 | 1.31 | (0.91- 1.79) |
| Soda | 0.12 | 0.09 | 0.78 | (0.58- 1.01) | 0.09 | 0.77 | (0.57- 1.02) | 0.30 | **2.59** | **(1.98- 3.30**) |
| Sweets | 0.03 | 0.04 | 1.25 | (0.79- 1.94) | 0.01 | 0.35 | (0.11- 0.82) | 0.06 | **2.15** | **(1.00- 3.98**) |
| Chips | 0.01 | 0.01 | 1.37 | (0.54- 2.78) | 0.00 | 0.00 | (0.00- 0.78) | 0.03 | 2.98 | (0.78- 7.44) |
| Pizza/hotdog/ hamburger | 0.13 | 0.00 | 0.00 | (0.00- 0.05) | 0.01 | 0.05 | (0.01- 0.14) | 1.00 | **8.00** | **(7.80- 8.00**) |
| Cake | 0.02 | 0.03 | **1.82** | (**1.03- 2.92**) | 0.00 | 0.00 | (0.00- 0.47) | 0.02 | 1.28 | (0.27- 3.70) |

Abbreviation: OAFC. overall average frequency of consumption- AFC. average frequency of consumption- RAFC ratio of consumption to average frequency of consumption- CI. confidence interval.

† 95% confidence intervals not including unity were considered statistically significant and representative of the meal pattern.

‡ Food items included in each meal pattern are shown in bold.

Supplementary Table 9. Relative frequency of food items for evening snack patterns derived by latent class analysis of 7–14-year-old schoolchildren. (n= 738)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Evening snack | | | | | | | | | |
| Food item |  | Ultra-processed, sweets, dairy and fruits (64.1%) | | | Water  (27.4%) | | | Traditional Brazilian lunch and ultra-processed food (8.5%) | | |
| OAFC | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI | AFC | RAFC | 95% CI |
| Water | 0.28 | 0.00 | 0.00 | (0.00- 0.03) | 1.00 | **3.53** | **(3.47- 3.53)** | 0.11 | 0.39 | (0.16- 0.76) |
| Rice | 0.03 | 0.00 | 0.00 | (0.00- 0.23) | 0.00 | 0.00 | (0.00- 0.59) | 0.40 | **11.75** | **(8.14- 15.68)** |
| Vegetables | 0.01 | 0.01 | 0.75 | (0.13- 2.25) | 0.00 | 0.00 | (0.00- 2.50) | 0.05 | **5.88** | **(1.24- 16.63)** |
| Green leaves | 0.01 | 0.00 | 0.00 | (0.00- 1.15) | 0.00 | 0.00 | (0.00- 2.69) | 0.08 | **11.79** | **(3.88- 26.19)** |
| Vegetable soup | 0.01 | 0.00 | 0.00 | (0.00- 0.57) | 0.01 | 0.73 | (0.07- 2.59) | 0.13 | **9.41** | **(4.15- 17.41)** |
| Beans | 0.03 | 0.00 | 0.00 | (0.00- 0.23) | 0.00 | 0.00 | (0.00- 0.55) | 0.38 | **11.52** | **(7.88- 15.45)** |
| Manioc flour | 0.02 | 0.00 | 0.00 | (0.00- 0.44) | 0.01 | 0.28 | (0.01- 1.53) | 0.19 | **10.80** | **(5.68- 17.61)** |
| Corn/maize | 0.01 | 0.00 | 0.00 | (0.00- 0.71) | 0.00 | 0.00 | (0.00- 1.85) | 0.13 | **11.76** | **(5.19- 21.76)** |
| Pasta | 0.01 | 0.01 | 0.74 | (0.22- 1.78) | 0.01 | 0.73 | (0.09- 2.59) | 0.05 | 3.70 | (0.73- 9.85) |
| Instant pasta | 0.02 | 0.02 | 0.90 | (0.37- 1.75) | 0.00 | 0.00 | (0.00- 0.95) | 0.10 | **5.03** | **(1.90- 10.37)** |
| French fries | 0.02 | 0.02 | 0.70 | (0.30- 1.43) | 0.00 | 0.00 | (0.00- 0.78) | 0.14 | **6.22** | **(2.91- 11.04)** |
| Beef/poultry | 0.03 | 0.01 | 0.18 | (0.03- 0.53) | 0.00 | 0.00 | (0.00- 0.59) | 0.35 | **10.33** | **(6.80- 14.17)** |
| Sausages | 0.01 | 0.00 | 0.21 | (0.01- 1.26) | 0.01 | 0.95 | (0.11- 3.68) | 0.06 | **6.32** | **(1.89- 16.32)** |
| Eggs | 0.02 | 0.02 | 0.85 | (0.35- 1.65) | 0.01 | 0.45 | (0.05- 1.75) | 0.08 | **3.95** | **(1.30- 8.78)** |
| Fish/seafood | 0.01 | 0.01 | 0.63 | (0.11- 2.11) | 0.00 | 0.00 | (0.00- 1.89) | 0.06 | **6.32** | **(1.79- 16.32)** |
| Fruits | 0.18 | 0.23 | **1.24** | **(1.04- 1.46**) | 0.13 | 0.70 | (0.47- 1.01) | 0.02 | 0.09 | (0.00- 0.47) |
| Breads | 0.08 | 0.10 | 1.23 | (0.91- 1.62) | 0.06 | 0.77 | (0.40- 1.30) | 0.00 | 0.00 | (0.00- 0.73) |
| Cheese bread | 0.03 | 0.04 | 1.18 | (0.77- 1.91) | 0.02 | 0.44 | (0.09- 1.27) | 0.03 | 0.95 | (0.11- 3.25) |
| Cream cookies | 0.09 | 0.13 | **1.35** | **(1.05- 1.72**) | 0.04 | 0.42 | (0.18- 0.82) | 0.02 | 0.16 | (0.00- 0.91) |
| Breakfast cereal | 0.04 | 0.06 | 1.43 | (0.95- 2.05) | 0.03 | 0.63 | (0.20- 1.43) | 0.00 | 0.00 | (0.00- 1.43) |
| Cheese | 0.01 | 0.01 | 1.49 | (0.45- 3.58) | 0.00 | 0.00 | (0.00- 2.99) | 0.00 | 0.00 | (0.00- 8.51) |
| Coffee with milk | 0.05 | 0.06 | 1.21 | (0.81- 1.74) | 0.04 | 0.83 | (0.36- 1.64) | 0.00 | 0.00 | (0.00- 1.28) |
| Milk | 0.07 | 0.09 | **1.36** | **(1.02- 1.82**) | 0.03 | 0.45 | (0.15- 0.91) | 0.00 | 0.00 | (0.00- 0.91) |
| Yogurt | 0.08 | 0.11 | **1.43** | **(1.03- 1.82**) | 0.03 | 0.39 | (0.18- 0.91) | 0.00 | 0.00 | (0.00- 0.78) |
| Chocolate milk | 0.08 | 0.11 | **1.45** | **(1.12- 1.90**) | 0.01 | 0.13 | (0.01- 0.46) | 0.02 | 0.21 | (0.01- 1.12) |
| Fruit juice | 0.08 | 0.11 | 1.31 | (0.95- 1.67) | 0.02 | 0.24 | (0.06- 0.58) | 0.11 | 1.31 | (0.55- 2.62) |
| Soda | 0.05 | 0.06 | 1.18 | (0.78- 1.76) | 0.02 | 0.37 | (0.10- 0.96) | 0.08 | 1.55 | (0.51- 3.43) |
| Sweets | 0.13 | 0.18 | **1.40** | **(1.12- 1.68**) | 0.05 | 0.36 | (0.16- 0.64) | 0.00 | 0.00 | (0.00- 0.46) |
| Chips | 0.04 | 0.06 | 1.31 | (0.86- 1.88) | 0.03 | 0.60 | (0.19- 1.36) | 0.00 | 0.00 | (0.00- 1.36) |
| Pizza/hotdog/ hamburger | 0.04 | 0.06 | **1.43** | **(1.02- 2.12**) | 0.01 | 0.12 | (0.00- 0.64) | 0.00 | 0.00 | (0.00- 1.36) |
| Cake | 0.03 | 0.04 | 1.33 | (0.85- 2.03) | 0.02 | 0.45 | (0.09- 1.30) | 0.00 | 0.00 | (0.00- 1.73) |

Abbreviations: OAFC. overall average frequency of consumption- AFC. average frequency of consumption- RAFC ratio of consumption to average frequency of consumption- CI. confidence interval.

† 95% confidence intervals not including unity were considered statistically significant and representative of the meal pattern.

‡ Food items included in each meal pattern are shown in bold.

SupplementaryTable 10. Probability (%) of belonging to a latent class at different meals/snacks in schoolchildren by quartile of midpoint of sleep and school shift (MSFsc group). Florianópolis. Brazil. 2018/2019 (*n* = 1333).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Meal/snack pattern** | **Quartile of midpoint of sleep (MSFsc group)** | | | | | | | | | | | | | | | |
| **Morning shift (n=572)** | | | | | | | | **Afternoon shift** | | | | | | | |
| **Q1 (Low)** | | **Q2** | | **Q3** | | **Q4 (High)** | | **Q1 (Low)** | | **Q2** | | **Q3** | | **Q4 (High)** | |
| **%** † | **95% CI** | **%** † | **95% CI** | **%** † | **95% CI** | **%** † | **95% CI** | **%** † | **95% CI** | **%** † | **95% CI** | **%** † | **95% CI** | **%** † | **95% CI** |
| **Breakfast** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Coffee with milk. bread and cheese | 52,8 | 42,6-63,0 | 40,6 | 33,8-47,3 | 42,1 | 22,3-61,9 | 36,3 | 24,0-48,7 | **58,0** | **51,5-64,3** | 52,4 | 33,1-71,7 | **44,8** | **41,0-48,7** | **36,8** | **29,0-44,5** |
| Mixed | 27,9 | 22,0-33,8 | **41,0** | **37,0-44,9** | **26,8** | **17,6-36,0** | 35,3 | 16,5-54,1 | **28,0** | **20,8-35,1** | 32,0 | 20,5-43,5 | 34,6 | 27,8-41,5 | **42,3** | **35,4-49,2** |
| Chocolate milk | 19,3 | 11,6-27,0 | 18,5 | 12,9-24,1 | 31,1 | 16,0-46,3 | 28,4 | 18,2-38,6 | 14,1 | 9,6-18,6 | 15,6 | 5,6-25,6 | 20,6 | 16,3-24,8 | 20,9 | 16,9-24,8 |
| **Mid-morning snack** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ultra-processed and fruit | 67,7 | 57,6-77,8 | 74,6 | 65,6-82,6 | 66,1 | 55,5-76,7 | 62,2 | 45,3-79,1 | 83,7 | 70,9-96,4 | 72,5 | 53,5-91,5 | 82,0 | 72,6-91,5 | 81,5 | 71,4-91,5 |
| Coffee with milk. bread. cheese and processed meat | 30,2 | 19,9-40,5 | 23,8 | 16,2-31,4 | 30,4 | 20,6-40,2 | 33,7 | 18,4-49,0 | 14,9 | 1,3-28,5 | 18,5 | 5,5-31,5 | 5,0 | -1,0-11,0 | 8,4 | 4,0-12,7 |
| Traditional Brazilian lunch with soda | 2,1 | 0,2-3,9 | 1,6 | -0,06-3,3 | 3,5 | 0,3-6,7 | 4,1 | -1,2-9,4 | **1,5** | **-1,2-4,1** | 9,0 | -1,5-19,4 | **13,0** | **5,6-20,3** | 10,2 | 3,6-16,8 |
| **Lunch** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Brazilian traditional | 41,7 | 35,0-48,5 | 45,3 | 37,7-52,8 | 50,0 | 41,1-58,8 | 32,2 | 16,6-47,7 | 50,2 | 42,4-58,0 | 43,6 | 37,6-49,7 | 41,2 | 34,9-47,6 | 43,9 | 39,2-48,7 |
| Brazilian traditional, processed meat, egg and fish | **38,2** | **32,1-44,4** | 23,8 | 17,8-29,8 | **16,8** | **6,5-27,1** | 29,2 | 14,8-43,5 | 29,4 | 19,3-39,4 | 26,0 | 17,5-34,5 | 24,4 | 19,0-30,0 | 28,7 | 22,7-34,6 |
| Ultra-processed, milk and bread | 8,6 | 3,7-13,4 | 15,2 | 7,5-23,0 | 15,1 | 12,7-17,5 | 13,8 | 6,9-20,8 | 10,8 | 2,8-18,9 | 13,7 | 5,0-22,4 | 19,4 | 14,2-24,6 | 22,1 | 16,0-28,2 |
| Pasta and cheese | **11,5** | **7,8-15,2** | 15,7 | 9,8-21,6 | 18,2 | 9,0-27,4 | **24,8** | **16,2-33,5** | 9,6 | -0,7-19,9 | **16,7** | **10,3-23,1** | 15,0 | 12,1-17,9 | **5,3** | **0,4-10,2** |
| **Mid-afternoon snack** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ultra-processed | 50,2 | 45,4-55,1 | 45,6 | 39,2-51,9 | 57,1 | 49,1-65,1 | 57,7 | 36,8-78,5 | 65,2 | 53,1-77,2 | 50,8 | 40,0-61,6 | 55,5 | 49,2-61,8 | 57,0 | 50,6-63,4 |
| Coffee with milk, bread, cheese, and processed meat | 29,3 | 24,8-33,8 | 38,4 | 30,1-46,6 | 25,6 | 14,6-36,5 | 35,0 | 15,5-54,4 | 20,0 | 11,9-28,0 | 34,7 | 27,6-41,8 | 29,1 | 24,9-33,3 | 30,5 | 25,7-35,4 |
| Fruits | 18,4 | 13,9-22,9 | 14,4 | 12,0-16,9 | 16,4 | 4,7-28,1 | 7,4 | -3,0-17,7 | 11,7 | 5,5-18,0 | 11,2 | 5,2-17,3 | 10,3 | 7,3-13,3 | 10,7 | 6,9-14,5 |
| Traditional Brazilian lunch | 2,1 | 0,3-3,9 | 1,7 | -0,9-4,3 | 0,9 | -0,6-2,5 | - | - | 3,2 | -1,7-8,1 | 3,3 | 0,4-6,1 | 5,1 | 0,2-10,0 | 1,8 | 0,9-2,7 |
| **Dinner** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mixed | 48,7 | 39,6-57,7 | **50,5** | **45,1-56,0** | 43,3 | 31,1-55,5 | **34,6** | **28,0-41,1** | 50,5 | 39,4-61,6 | 43,1 | 22,1-64,1 | 49,4 | 40,9-57,8 | 44,4 | 37,8-51,2 |
| Traditional Brazilian. water and fish | 36,4 | 29,3-43,6 | 33,0 | 28,3-37,5 | 42,4 | 28,6-56,3 | 43,3 | 23,9-62,7 | 41,1 | 29,1-53,1 | 46,5 | 33,3-59,7 | 41,0 | 31,5-50,6 | 45,3 | 38,1-52,5 |
| Ultra-processed and sweets | 14,9 | 9,0-20,8 | 16,6 | 8,4-24,7 | 14,3 | 7,5-21,1 | 22,1 | 2,9-41,3 | 8,5 | 6,9-10,0 | 10,4 | 2,2-18,6 | 9,6 | 4,1-15,1 | 10,2 | 7,5-12,9 |
| **Evening snack** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ultra-processed, sweets, dairy and fruits | 45,1 | 32,6-57,7 | 52,1 | 43,8-60,4 | 46,8 | 24,6-69,0 | 64,1 | 41,2-87,0 | **58,6** | **51,0-66,3** | **75,9** | **66,9-84,8** | 71,2 | 61,0-81,4 | 68,3 | 58,6-77,9 |
| Water | 45,8 | 34,0-57,7 | 46,7 | 39,0-54,4 | 45,3 | 26,1-64,5 | 33,0 | 10,7-55,2 | **37,7** | **28,1-47,3** | **19,0** | **10,2-27,7** | 19,3 | 15,2-23,4 | 24,6 | 15,9-33,2 |
| Traditional Brazilian lunch and ultra-processed foods | **9,1** | **4,6-13,5** | **1,2** | **-0,4-3,0** | 8,0 | 2,2-13,6 | 2,9 | 0,1-5,7 | 3,7 | -0,4-7,8 | 5,2 | -0,2-12,3 | 9,6 | 2,4-16,7 | 7,2 | 4,3-10,0 |