**Supplemental material**

**Title: Sleep duration and eating behaviours are associated with body composition in 5-year-old children: Findings from the ROLO longitudinal birth cohort study.**

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| **Supplementary Table 1: Associations between sleep duration and body composition in 5-year-old children** | | | | |
|  | **Sleep duration (hours)** | | | |
| **Full cohort** | | | |
| **B** | **95% CI** | | **P-value** |
|  |  | **Lower** | **Upper** |  |
| **BMI (kg/m2)** | -0.244 | -0.420 | -0.027 | 0.026 |
| **BMI z-score** | -0.134 | -0.261 | -0.007 | 0.038 |
| **MUAC (cm)** | -0.212 | -0.410 | -0.015 | 0.035 |
| **Abdo circumference (cm)** | -0.566 | -1.195 | 0.063 | 0.078 |
| **Triceps SF (mm)** | 0.218 | -0.607 | 0.172 | 0.273 |
| **Subscapular SF (mm)** | -0.204 | -0.494 | 0.086 | 0.167 |
| **Thigh SF (mm)** | -0.734 | -1.561 | 0.093 | 0.082 |
| **Sum of skinfolds (mm)** | -1.183 | -3.053 | 0.686 | 0.213 |
| *BMI: body mass index; SF: skinfold thickness; Sum of Skinfolds: Biceps, Triceps, Subscapular, Thigh; MUAC: mid upper arm circumference; models adjusted for maternal BMI, breastfed ever, child age, control v non control, maternal education; Statistically significant (p value < 0.05)* | | | | |

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| **Supplementary Table 2: Association between eating behaviours and body composition in 5-year-old children (full cohort)** | | | | | | | | | | | | | | | |
| ***Food approach*** | | | | | | | | | | | | | | | |
|  | **Desire to drink** | | | **Enjoys food** | | | **Food responsiveness** | | | **Emotional overeating** | | | **Mean food approach** | | |
|  | **B** | **95% CI** | **P-Value** | **B** | **95% CI** | **P-value** | **B** | **95% CI** | **P-value** | **B** | **95% CI** | **P-Value** | **B** | **95% CI** | **P-Value** |
| **BMI (kg/m2)** | -0.02 | -0.07,0.04 | 0.50 | 0.098 | 0.05,0.15 | <0.001 | 0.06 | 0.02,0.10 | 0.003 | 0.029 | -0.05,0.11 | 0.46 | 0.11 | 0.03,0.19 | 0.03 |
| **BMI z- score** | -0.01 | -0.05,0.02 | 0.50 | 0.060 | 0.03,0.09 | <0.001 | 0.03 | 0.007,0.06 | 0.01 | 0.005 | -0.05,0.05 | 0.85 | 0.06 | 0.01,0.11 | 0.02 |
| **Sum of skinfolds (mm)** | -0.24 | -0.79,0.31 | 0.39 | -0.086 | -0.59,0.42 | 0.74 | 0.20 | -0.18,0.57 | 0.30 | 0.228 | -0.51,0.93 | 0.54 | 0.09 | -0.66,0.84 | 0.81 |
| **MUAC (cm)** | -0.008 | -0.07,0.05 | 0.79 | 0.075 | 0.02,0.13 | 0.005 | 0.05 | 0.009,0.09 | 0.02 | 0.072 | -0.005,0.15 | 0.07 | 0.11 | 0.03,0.18 | 0.008 |
| **Abdominal circ (cm)** | 0.001 | -0.18,0.18 | 0.995 | 0.138 | -0.03,0.30 | 0.10 | 0.15 | 0.03,0.27 | 0.020 | 0.179 | -0.07,0.42 | 0.15 | 0.27 | 0.02,0.52 | 0.03 |
| ***Food avoidant*** | | | | | | | | | | | | |  | |  |
|  | **Food fussiness** | | | **Emotional undereating** | | | **Satiety response** | | | **Slowness to eat** | | | **Mean food avoidant** | | |
|  | **B** | **95% CI** | **P-Value** | **B** | **95% CI** | **P-value** | **B** | **95% CI** | **P-value** | **B** | **95% CI** | **P-Value** | **B** | **95% CI** | **P-Value** |
| **BMI (kg/m2)** | -0.02 | -0.04,0.01 | 0.23 | -0.03 | -0.08,0.01 | 0.17 | -0.06 | -0.11,-0.01 | 0.01 | -0.06 | -0.11,-0.01 | 0.02 | -0.07 | -0.13,-0.01 | 0.02 |
| **BMI z- score** | -0.009 | -0.03,0.008 | 0.32 | -0.02 | -0.05,0.008 | 0.16 | -0.03 | -0.07,-0.003 | 0.03 | -0.04 | -0.06,-0.009 | 0.01 | -0.04 | -0.08,-0.006 | 0.02 |
| **Sum of skinfolds (mm)** | 0.01 | -0.25,0.27 | 0.93 | -0.15 | -0.59,03 | 0.52 | 0.08 | -0.39,0.55 | 0.73 | -0.07 | -0.57,0.43 | 0.78 | -0.03 | -0.58,0.51 | 0.91 |
| **MUAC (cm)** | -0.01 | -0.04,0.01 | 0.27 | -0.02 | -0.07,0.03 | 0.39 | -0.04 | -0.09,0.009 | 0.11 | -0.07 | -0.12,-0.02 | 0.007 | -0.06 | -0.12,-0.003 | 0.04 |
| **Abdominal circ (cm)** | -0.05 | -0.13,0.04 | 0.28 | -0.05 | -0.19,0.10 | 0.54 | -0.18 | -0.34,-0.03 | 0.02 | -0.15 | -0.31,0.02 | 0.08 | -0.18 | -0.36,0.005 | 0.06 |
| *BMI: body mass index; SF: skinfold thickness; Sum of Skinfolds: Biceps, Triceps, Subscapular, Thigh; MUAC: mid upper arm circumference; circ: circumference; Mean food approach refers to the sum of the means of the four food approach eating behaviours (Food Responsive, Emotional Overeating, Enjoys Food, Desire to Drink). Mean food avoidant refers to the sum of the means of the four food avoidant eating behaviours (Satiety Response, Emotional Undereating, Slowness Eating, Food Fussiness); All models controlled for maternal BMI, breastfed ever, control v non control, maternal education, child age; Statistically significant (p<0.05)* | | | | | | | | | | | | | | | |

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| **Supplementary Table 3: Associations between sleep duration and eating behaviours in 5 year old children** | | | | |
|  | **Sleep duration (hours)** | | | |
| **Full cohort** | | | |
|  | **B** | **95% CI** | | **P-value** |
|  |  | **Lower** | **Upper** |  |
| **Food responsiveness** | -0.070 | -0.691 | 0.522 | 0.825 |
| **Emotional overeating** | -0.249 | -0.562 | 0.064 | 0.118 |
| **Enjoys food** | 0.175 | -0.283 | 0.633 | 0.453 |
| **Desire to drink** | 0.078 | -0.340 | 0.497 | 0.713 |
| **Mean food approach** | -0.017 | -0.325 | 0.295 | 0.916 |
| **Satiety response** | -0.257 | -0.752 | 0.238 | 0.307 |
| **Slowness to eat** | 0.087 | -0.379 | 0.553 | 0.713 |
| **Emotional undereating** | -0.342 | -0.862 | 0.178 | 0.197 |
| **Food fussiness** | -0.852 | -1.741 | 0.038 | 0.060 |
| **Mean food avoidant** | -0.345 | -0.767 | 0.078 | 0.109 |
| *Mean food approach refers to the sum of the means of the four food approach eating behaviours (Food Responsive, Emotional Overeating, Enjoys Food, Desire to Drink). Mean food avoidant refers to the sum of the means of the four food avoidant eating behaviours (Satiety Response, Emotional Undereating, Slowness Eating, Food Fussiness); All models adjusted for maternal BMI , breastfed ever, child age, control v non control, SES; Statistically significant (p- value < 0.05)* | | | | |

**Supplementary Figure 1: Mediation analysis-Sleep, mean food approach eating behaviour and BMI**

**Mean food approach**

0.13 (p=<0.001)(0.05,0.21)

0.002 (p=0.99)(-0.32,0.32)

**Sleep**  **BMI**

Direct effect -0.16 (p=0.13)(-0.04,0.05)

Indirect effect 0 (p=0.02)(-0.05,0.06)

*Mean food approach refers to the sum of the means of the four food approach eating behaviours (Food Responsive, Emotional Overeating, Enjoys Food, Desire to Drink).*

**Supplementary Figure 2: Mediation analysis-Sleep, mean food avoidant eating behaviour and BMI**

**Mean food avoidant**

-0.43 (p=0.05)(-0.86,0.06)

-0.07 (p=0.003)(-0.14,-0.03)

**Sleep**  **BMI**

Direct effect -0.20 (p=0.06)(-0.04,0.01)

Indirect effect 0.04 (p=0.03)(-0.004,0.10)

*Mean food avoidant refers to the sum of the means of the four food avoidant eating behaviours (Satiety Response, Emotional Undereating, Slowness Eating, Food Fussiness)*