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BACKGROUND

- Dietary intake has been shown to influence the composition and diversity of the gut microbiota in adults
- Its impact in childhood and adolescence remains uncertain
- Moreover, the impact of other lifestyle behaviors such as physical activity, sedentary behaviors, sleep and fitness on the gut microbiota has rarely been investigated

OBJECTIVE

To explore the correlations between intestinal microbiota composition and measures of diversity among 15-17 year-old adolescents with a family history of obesity and:

- i) lifestyle habits at 15-17 years;
- ii) lifestyle habits in earlier childhood.

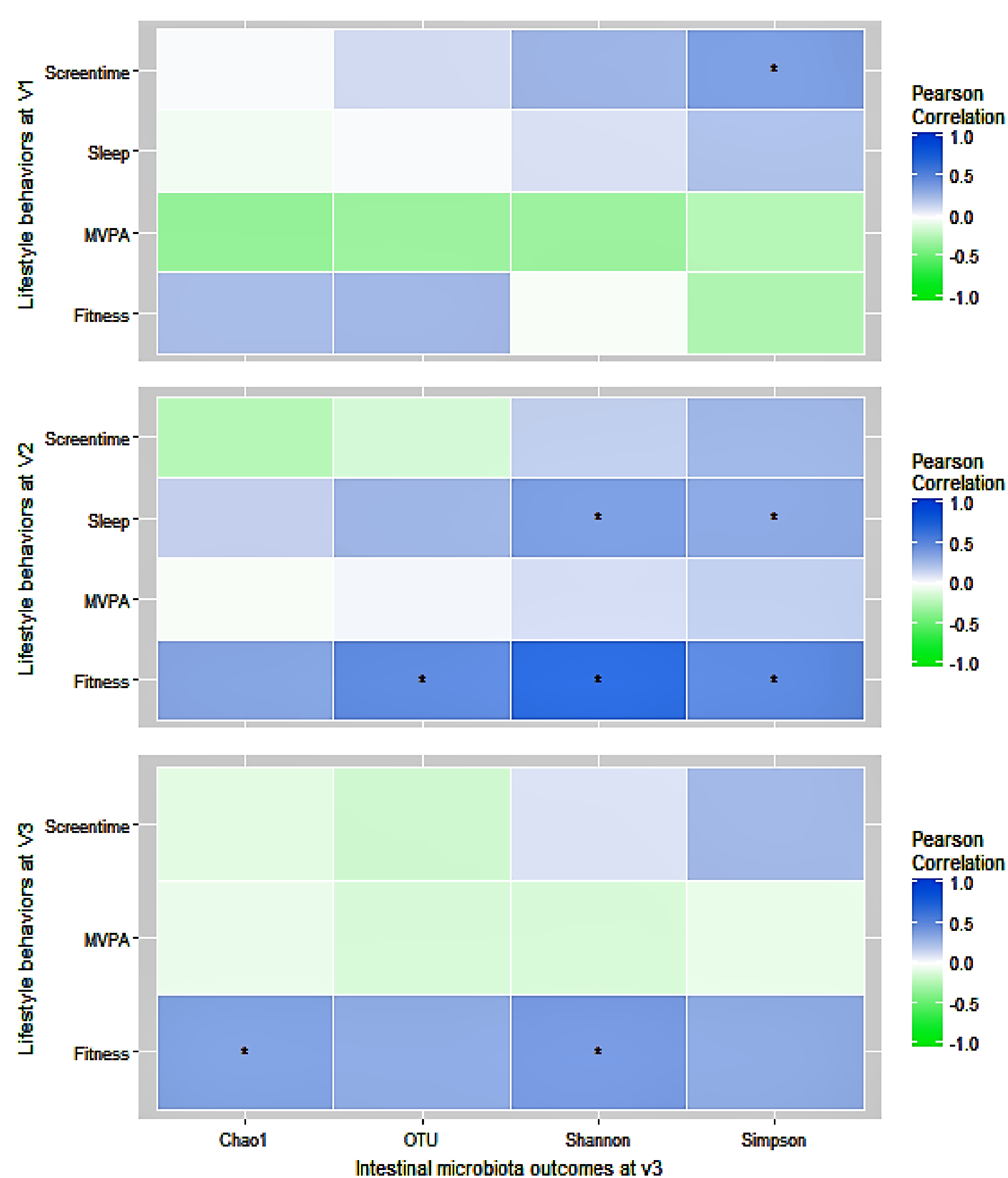
METHODS

- Data stem from the QUALITY cohort, a prospective cohort study of 630 children with a parental history of obesity
- Lifestyle habits were assessed at 8-10 yrs, 10-12 yrs and 15-17 yrs, including:
 - physical activity by 7-day accelerometry
 - self-reported screen time
 - dietary intake (at 8-10 and 15-17 yrs only) by 3 non-consecutive 24h dietary recalls,
 - self-reported sleep duration
- Fitness was measured by VO₂peak
- Stool samples obtained from 22 participants at 15-17 yrs underwent 16S-rRNA based microbial profiling for indices of diversity
- Measures of diversity include Shannon, Simpson, Chao1 and Observed OTU indices
- Pearson's correlations assessed associations between diversity indices and lifestyle habits.

RESULTS

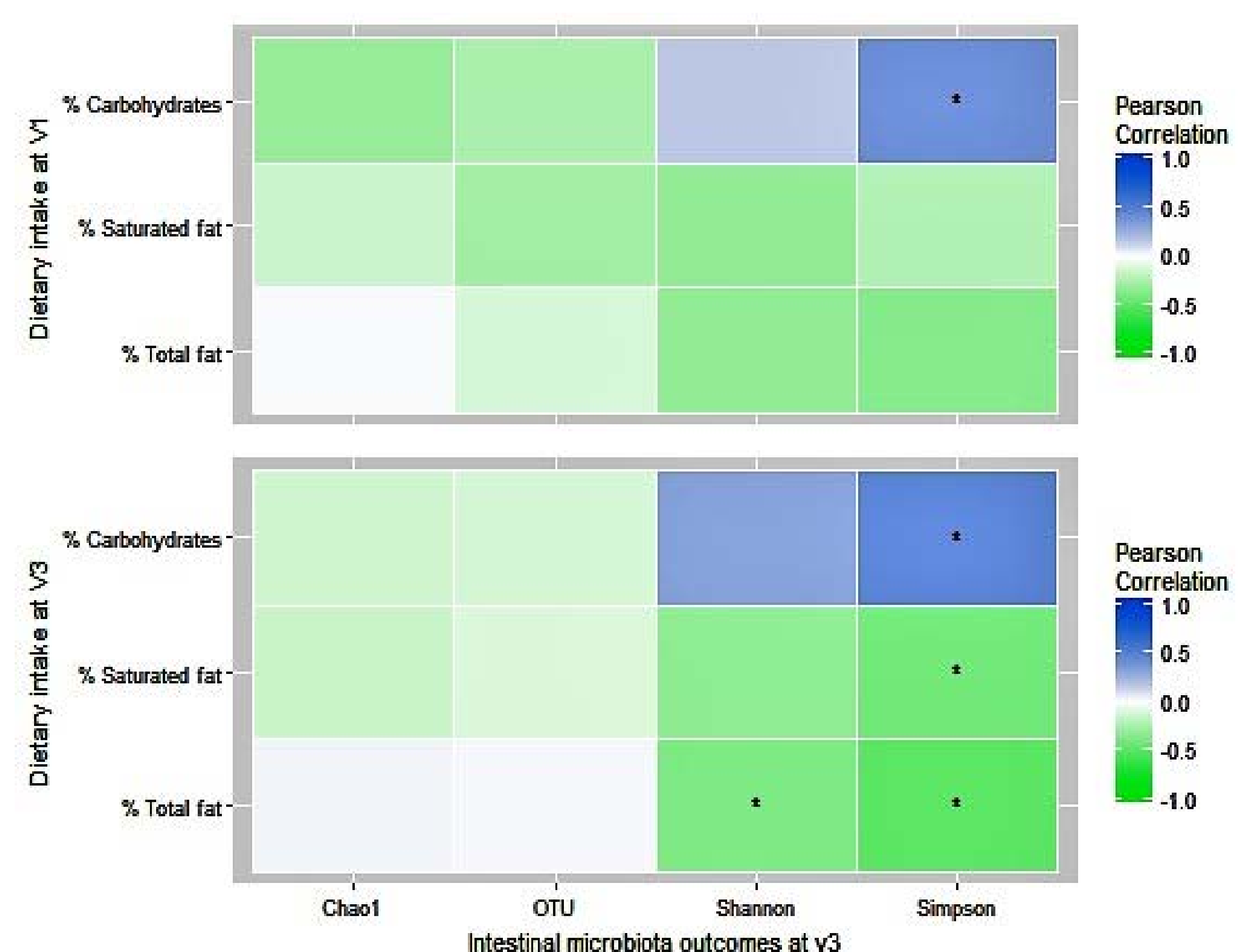
Participants having submitted stool samples were on average 16.5 years old (SD 0.9), with 8 boys; 14 were of normal weight, 6 overweight and 2 obese. Baseline lifestyle habits at 8-10 yrs of age were as follows: MVPA 52.6 min/day (SD 30.4); screen time 2.3 hrs/day (SD 1.5); sleep duration 10.7 hrs/day (SD 0.6). Percentage of daily energy intake from carbohydrates was 53.9% (SD 4.5) and from saturated fat 11.4% (SD 2.1), on average. Mean fitness level was 59.1 mls/min.kg lean body mass.

Figure 1: Correlation heat map of alpha-diversity indices at 15-17 yrs and lifestyle habits at baseline (8-10 yrs), first follow-up (10-12 yrs) and at second follow-up (15-17 yrs)



Footnote: * indicates $p < 0.10$; V1: visit 1 (baseline evaluation); V2: visit 2 (first follow-up); V3: visit 3 (second follow-up); Fitness: VO₂ peak (ml.kg LBM⁻¹.min⁻¹); MVPA: daily mean of moderate to vigorous physical activity (min/day); Screen time: addition of TV viewing (hours/day) and computer use (hours/day); Sleep: sleep duration (hours/day).

Figure 2: Correlation heat map of alpha-diversity indices at 15-17 yrs and dietary intake at baseline (8-10 yrs) and at second follow-up (15-17 yrs)



Footnote: * indicates $p < 0.10$; V1: visit 1 (baseline evaluation); V3: visit 3 (second follow-up); % carbohydrates: percentage of energy intake from carbohydrates, % saturated fat: percentage of energy intake from saturated fats, % total fat: percentage of energy intake from fat.

CONCLUSIONS

These preliminary findings from a small sample of children followed over 8 years suggest that microbiome diversity in late adolescence may be modulated by lifestyle habits, even in earlier childhood