



# Ultra-processed Food Consumption and Oral Microbiome Characteristics in Young Adults

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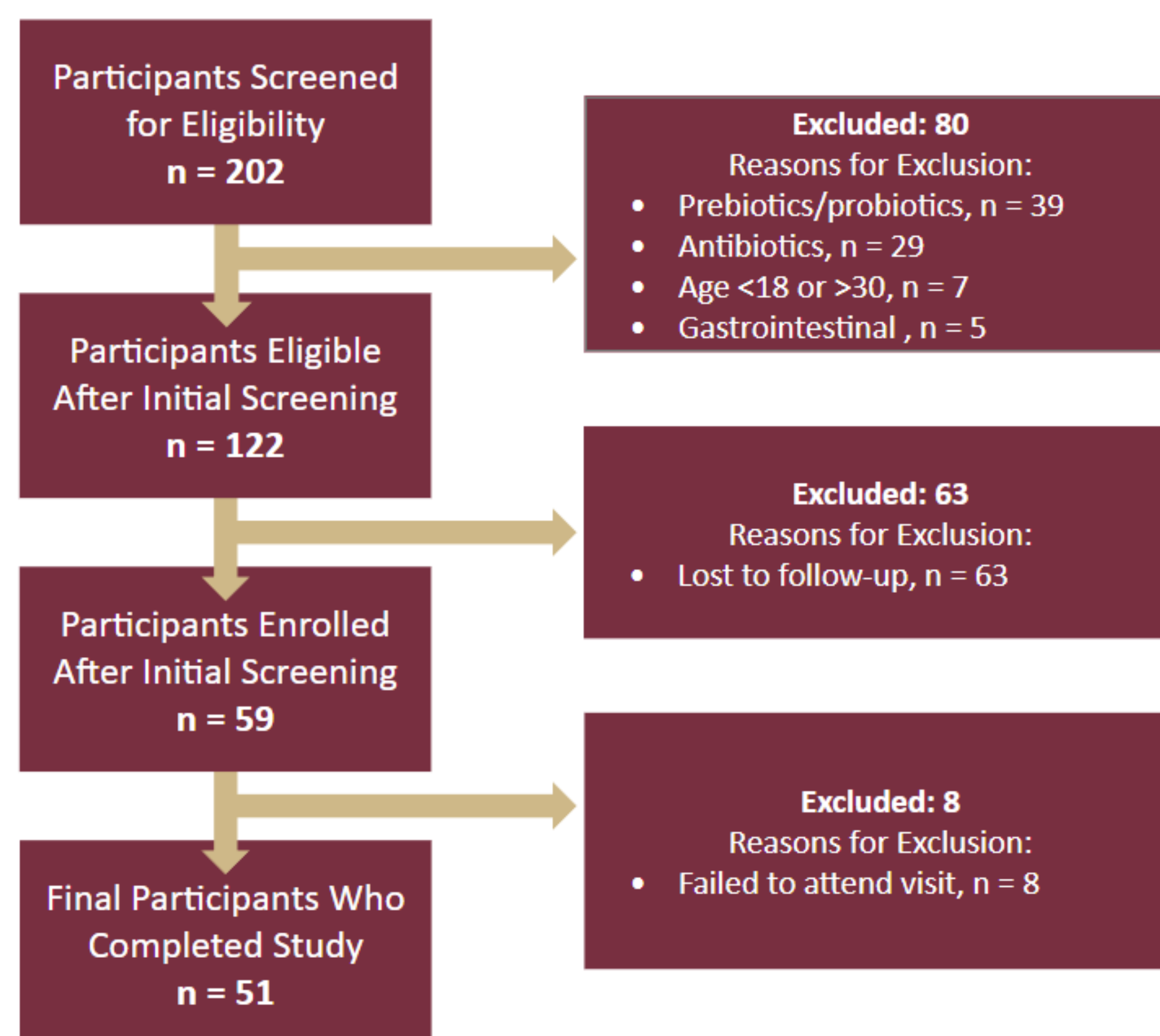
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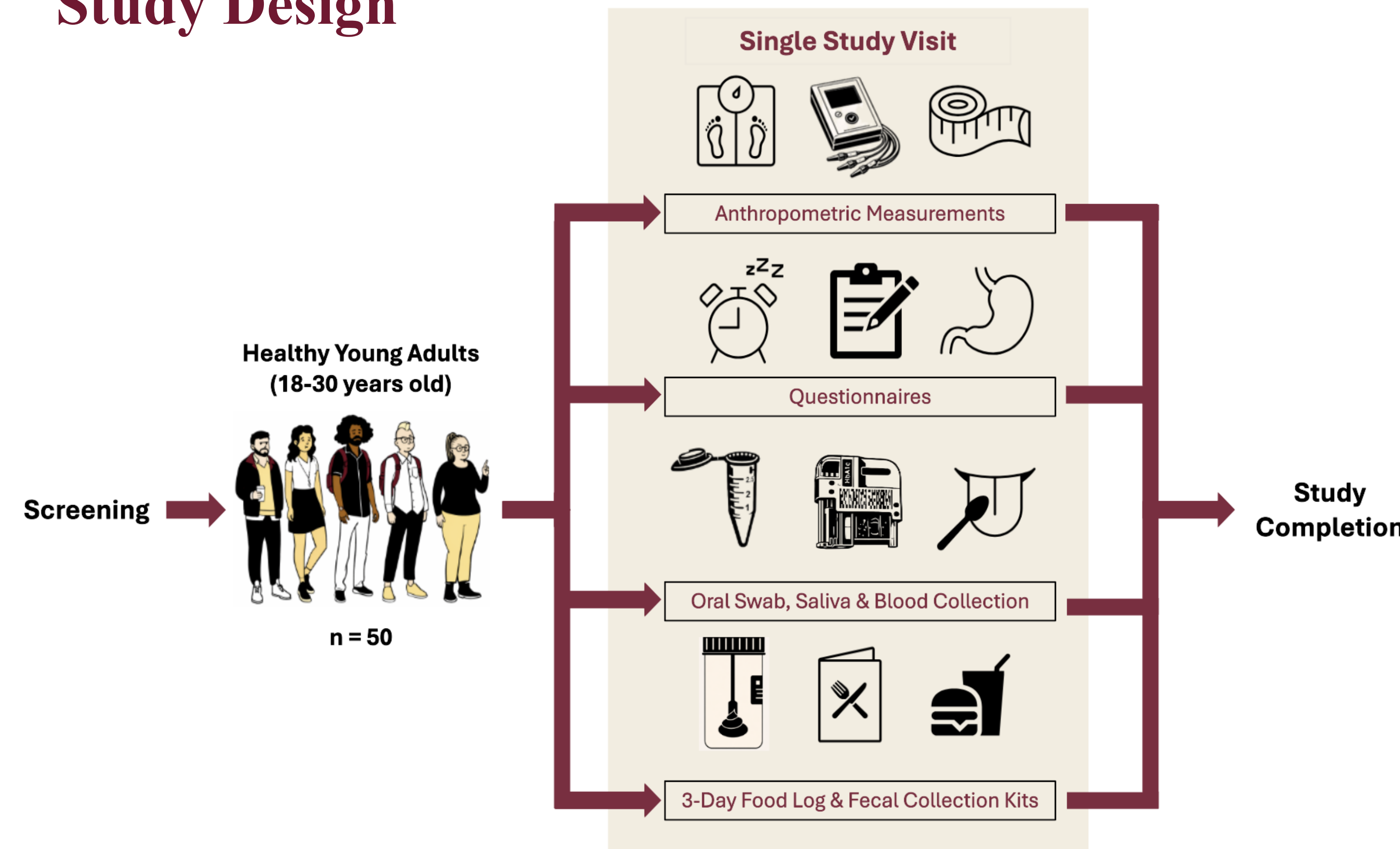
## Background & Research Objective

- Ultra-processed foods (UPFs) rose from 52.5% to 57.0% of U.S. adults' daily energy intake from 2001 to 2018.
- UPFs are industrially manufactured, ready-to-eat/heat formulations with minimal whole foods and contain refined sugars, oils, fats, emulsifiers, preservatives, flavorings, and other additives.
- The oral microbiome is influenced by diet and impacts immune signaling and inflammation.
- High-sugar and refined carbohydrate diets decrease oral microbial diversity and promote pathogenic species e.g. *Streptococcus mutans*.
- The relationship between UPF intake and oral microbiome composition is severely understudied.
- This study aims to assess whether percent of daily energy intake from UPFs is associated with alterations in the composition of the oral microbiome.**

## Participant Recruitment



## Study Design



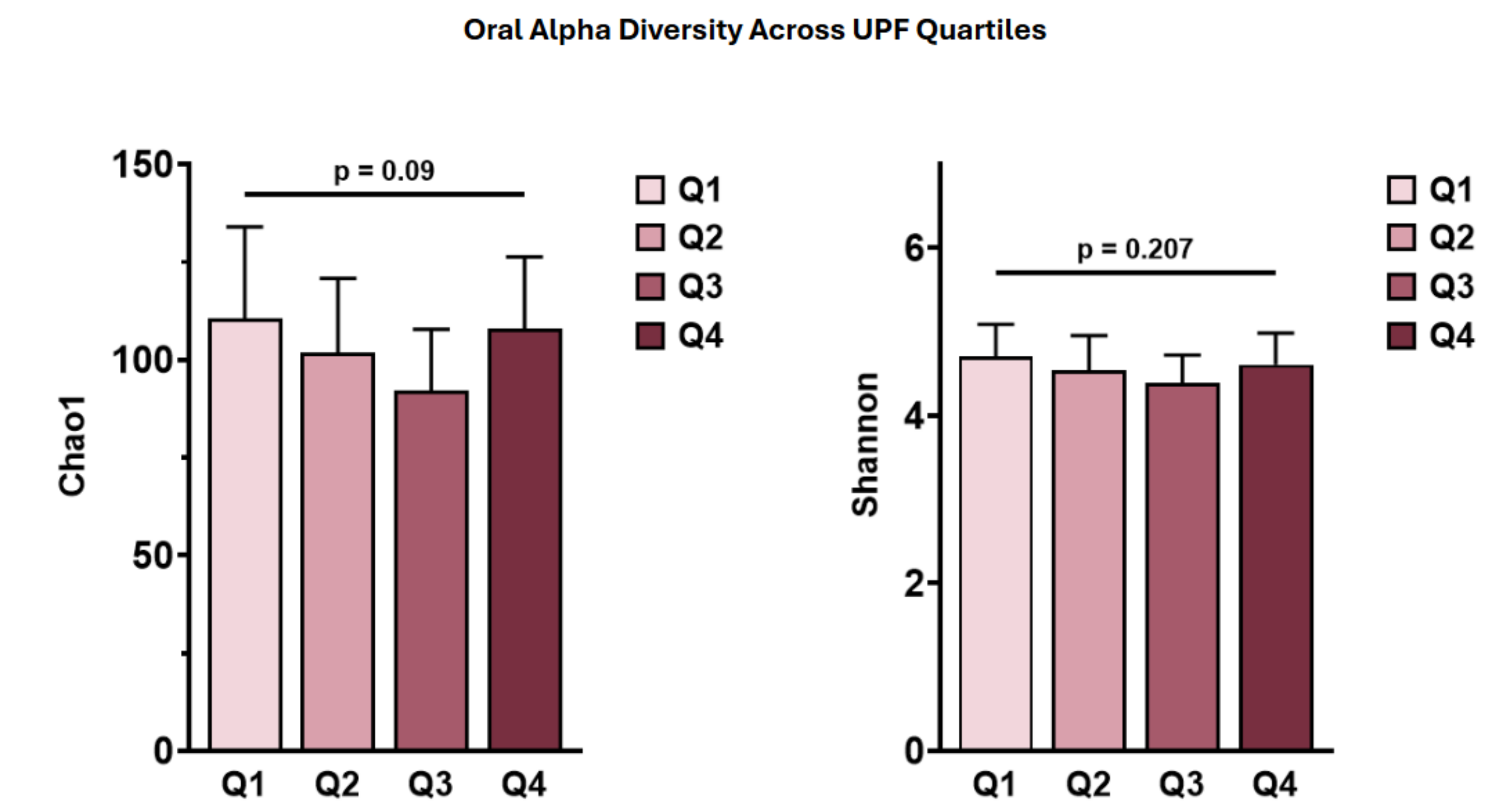
## Participant Characteristics

Table 1: Demographic and Clinical Characteristics of Participants by UPF Quartile (n = 51)<sup>1,2</sup>

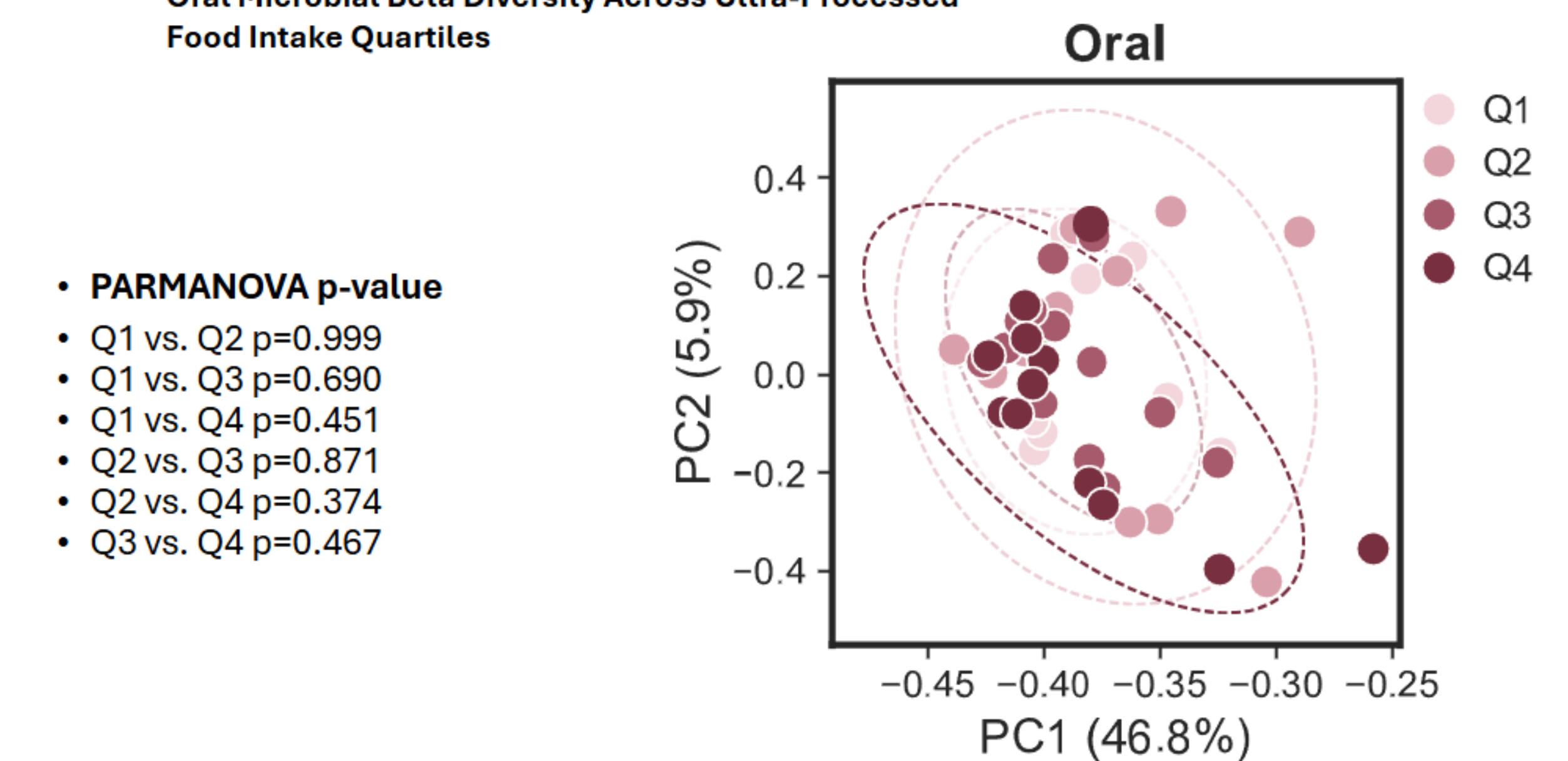
Variable	Q1 (n = 14)	Q2 (n = 12)	Q3 (n = 13)	Q4 (n = 12)	P value <sup>a</sup>	Effect Size (η <sup>2</sup> or V) <sup>b</sup>
Age (years)	23.3 ± 3.9	20.0 ± 2.6	20.4 ± 2.2	20.8 ± 3.9	0.10	0.15
Sex, n (%)					0.464	0.23
Male	5 (35.7)	2 (16.7)	6 (46.2)	5 (41.7)		
Female	9 (64.3)	10 (83.3)	7 (53.8)	7 (58.3)		
Race, n (%)					0.403	0.36
White	6 (42.9)	5 (41.7)	9 (69.2)	4 (33.4)		
Black	1 (7.1)	0 (0)	1 (7.7)	4 (33.3)		
Asian	4 (28.6)	2 (16.7)	1 (7.7)	2 (16.7)		
Hispanic	3 (21.4)	5 (41.6)	2 (15.4)	2 (16.6)		
Education, n (%)					0.06	0.35
High School or Less	0 (0)	1 (8.3)	0 (0)	0 (0)		
Some College	5 (35.7)	8 (66.7)	12 (92.3)	10 (83.3)		
Undergraduate Degree	3 (21.4)	2 (16.7)	0 (0)	0 (0)		
Graduate Degree	6 (42.9)	1 (8.3)	1 (7.7)	2 (16.7)		
Body Mass Index (kg/m <sup>2</sup> )	24.8 ± 7.9	23.8 ± 4.6	26.9 ± 9.4	27.3 ± 4.2	0.565	0.04

<sup>1</sup>Data are presented as mean ± SD for continuous variables and n (%) for categorical variables.  
<sup>2</sup>UPF intake quartiles were defined based on the percentage of total energy derived from ultra-processed foods using the NOVA classification system.  
<sup>3</sup>Data only available for n = 11 in Q1, n = 10 in Q2, n = 11 in Q3, and n = 8 in Q4  
<sup>a</sup>Continuous variables were compared using one way ANOVA or Welch's analyses of variance as appropriate, and categorical variables using chi square tests.  
<sup>b</sup>Effect sizes are reported as eta squared (η<sup>2</sup>) and Cramér's V for chi square tests.

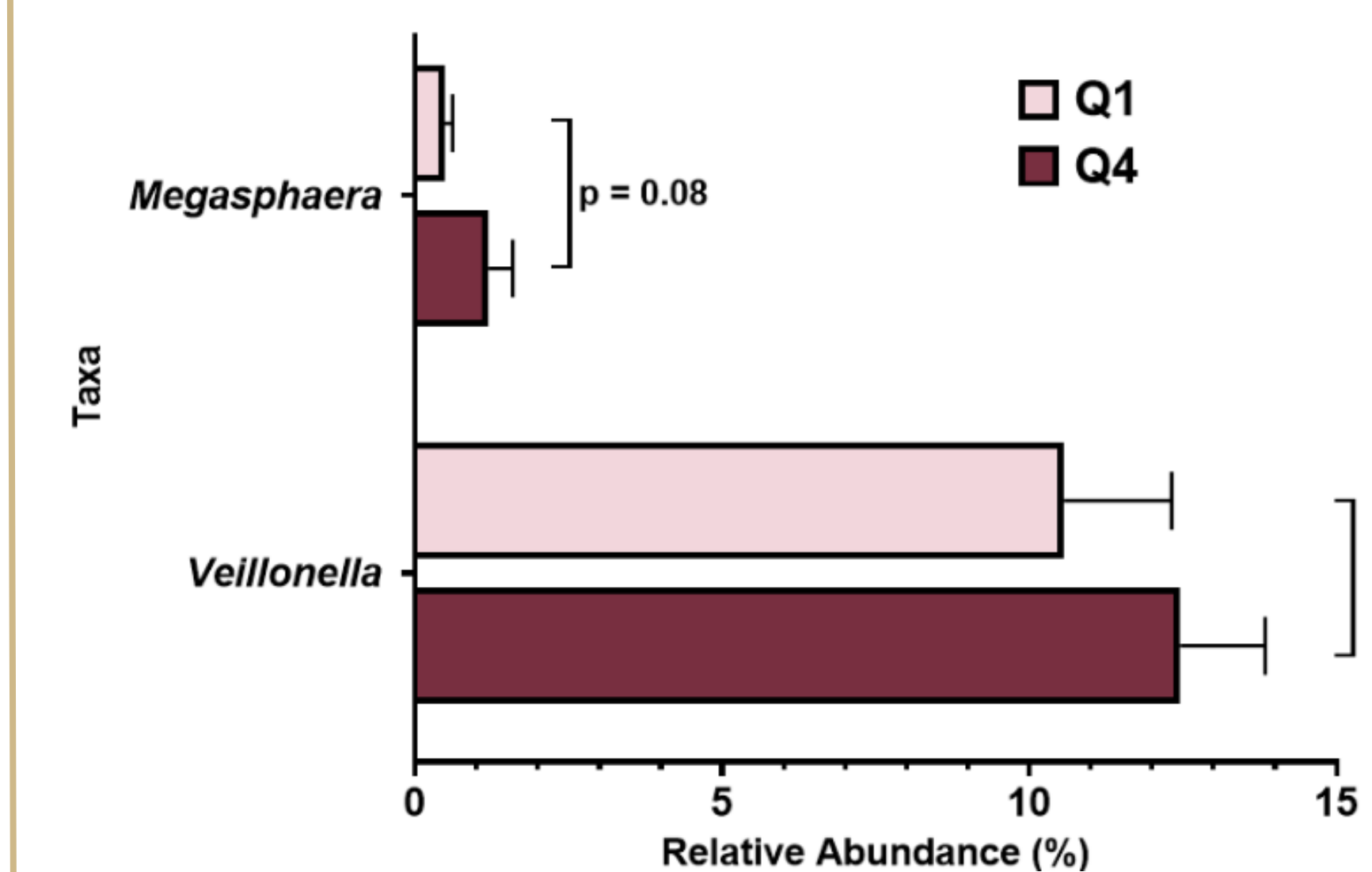
## Results



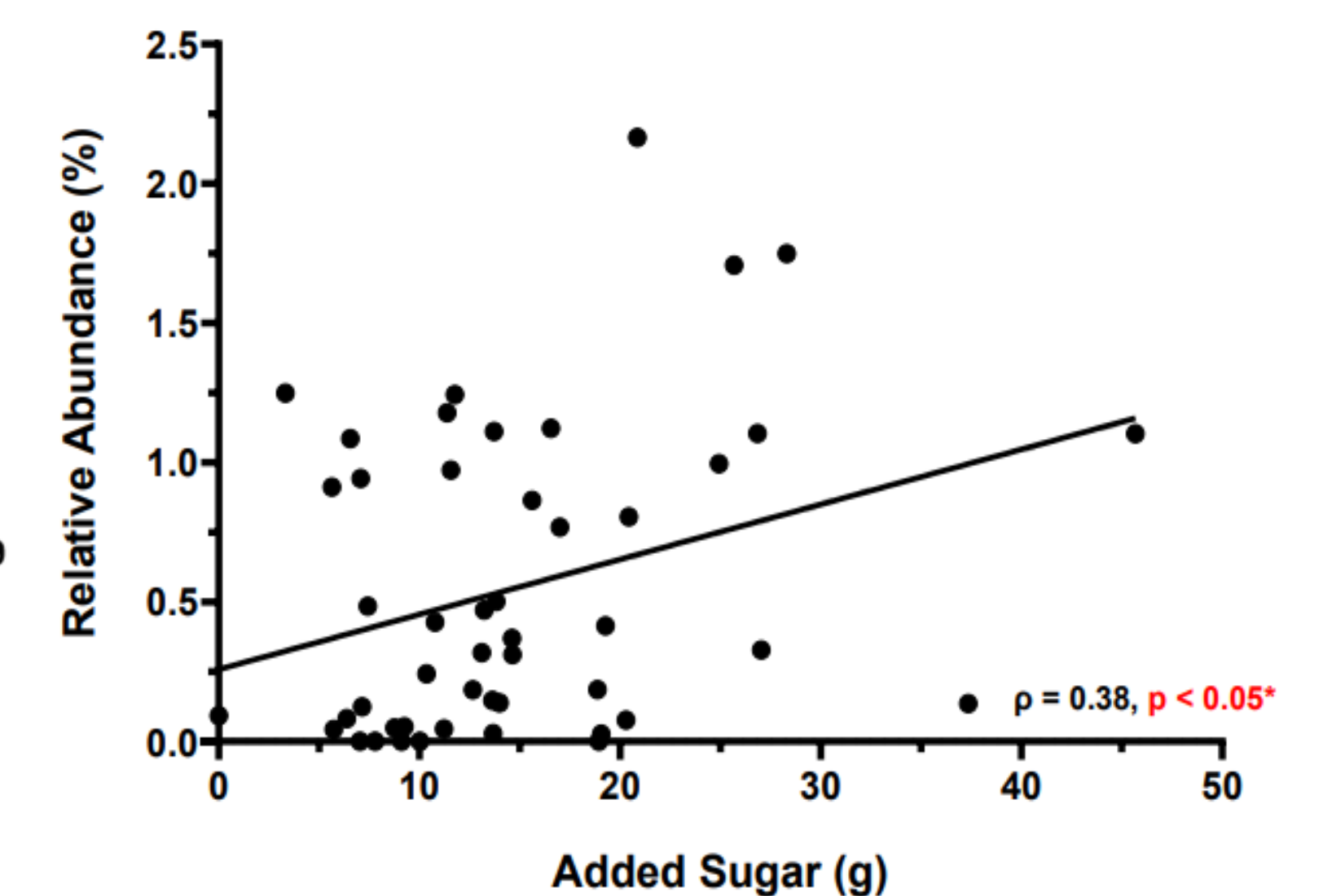
Oral Microbial Beta Diversity Across Ultra-Processed Food Intake Quartiles



Relative Abundance of Key Oral Taxa by UPF Quartile



Association Between Added Sugar Intake and Relative Abundance of Oral Megasphaera



## Conclusions

- Oral microbial diversity did not significantly differ across UPF intake quartiles.
- Alpha diversity analyses showed no differences in Shannon diversity, but **Chao1 richness showed a trend toward differences across quartiles.**
- Beta diversity analysis demonstrated no clear clustering of oral microbial communities by UPF intake, with PERMANOVA pairwise comparisons between quartiles showing no significant differences.
- Taxa-level analysis revealed trends toward higher relative abundance of *Veillonella* and *Megasphaera* in the highest UPF intake quartile compared with the lowest quartile.**
- Daily added sugar intake showed a significant positive association with the relative abundance of oral *Megasphaera*.**
- Greater UPF consumption may be associated with modest shifts in specific oral taxa without substantially altering overall oral microbiome diversity or community structure.



References



Lab Website