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**Title:**

**Taste perception profiles: unveiling their impact on dietary habits in a large population cohort**

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The relationship between taste perception and dietary quality is traditionally examined on each taste separately (i.e., specific taste phenotypes) or combining them into a global taste score, leaving gaps in understanding how tastes perception influences dietary patterns. Using data-driven clustering, we identified 'taste perception profiles' encompassing all tastes to explore their relationship with observed dietary patterns.

The study involved a large Italian cohort (Italian Taste database) of 2571 adults aged 18-65 years (54% women; BMI=23.8±3.9 kg/m<sup>2</sup>). Respondents completed a consumption frequency questionnaire for several foods and beverages. Taste function was evaluated by measuring responsiveness to water solutions representing various oro-sensory qualities (sweet, salty, sour, bitter, umami, astringency, and spiciness).

K-means cluster analysis identified subgroups of individuals with similar taste perception patterns (taste perception profiles): 1)Hyposensitive (low responsiveness to all sensations), 2)Sensitive to spiciness (low responsiveness to all sensations but spiciness), 3)Sensitive to astringency (low responsiveness to all sensations but astringency), 4)Sensitive to warning sensations (high responsiveness to bitterness, sourness, and spiciness), 5)Sensitive to palatable sensations (high responsiveness to sweetness, saltiness and savoriness), 6)Hypersensitive (high responsiveness for all sensations). Notably, significant differences in dietary pattern (pattern characterized to be more/less adherent to a Mediterranean style) were observed across the taste profiles. In summary, our findings indicate that taste perception profiles are linked with distinct dietary patterns, underscoring the potential value of integrating taste perception into personalized nutritional guidance.

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