

Is Liking for Sampled Energy-Dense Foods Mediated by Taste Phenotypes?

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Abstract : Two taste phenotypes that are of interest in the study of habitual diet-related risk factors and disease are 6-n-propylthiouracil (PROP) responsiveness and thermal tasting. Individuals differ considerably in how intensely they experience the bitterness of PROP, which is partially explained by three major single nucleotide polymorphisms associated with the TAS2R38 gene. Importantly, this variable responsiveness is a useful proxy for general taste responsiveness, and links to diet-related disease risk, including body mass index, in some studies. Thermal tasting - a newly discovered taste phenotype independent of PROP responsiveness - refers to the capacity of many individuals to perceive phantom tastes in response to lingual thermal stimulation, and is linked with TRPM5 channels. Thermal tasters (TTs) also experience oral sensations more intensely than thermal non-tasters (TnTs), and this was shown to associate with differences in self-reported food preferences in a previous survey from our lab. Here we report on two related studies, where we sought to determine whether PROP responsiveness and thermal tasting would associate with perceptual differences in the oral sensations elicited by sampled energy-dense foods, and whether in turn this would influence liking. We hypothesized that hyper-tasters (thermal tasters and individuals who experience PROP intensely) would (a) rate sweet and high-fat foods more intensely than hypo-tasters, and (b) would differ from hypo-tasters in liking scores. (Liking has been proposed recently as a more accurate measure of actual food consumption). In Study 1, a range of energy-dense foods and beverages, including table cream and chocolate, was assessed by 25 TTs and 19 TnTs. Ratings of oral sensation intensity and overall liking were obtained using gVAS and gDOL scales, respectively. TTs and TnTs did not differ significantly in intensity ratings for most stimuli (ANOVA). In a 2nd study, 44 female participants sampled 22 foods and beverages, assessing them for intensity of oral sensations (gVAS) and overall liking (9-point hedonic scale). TTs (n=23) rated their overall liking of creaminess and milk products lower than did TnTs (n=21), and liked milk chocolate less. PROP responsiveness was negatively correlated with liking of food and beverages belonging to the sweet or sensory food grouping. No other differences in intensity or liking scores between hyper- and hypo-tasters were found. Taken overall, our results are somewhat unexpected, lending only modest support to the hypothesis that these taste phenotypes associate with energy-dense food liking and consumption through differences in the oral sensations they elicit. Reasons for this lack of concordance with expectations and some prior literature are discussed, and suggestions for future research are advanced.

Keywords : taste phenotypes, sensory evaluation, PROP, thermal tasting, diet-related health risk

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