Is PROP Taster Status predictive of implicit liking of bitter, astringent and chemesthetic compounds – a psychophysiological approach

Rachel Hagan, Ralph Pawling, Francis McGlone & Susannah Walker
Research Centre for Brain & Behaviour, School of Psychology, Liverpool John Moores University, Liverpool, UK.

BACKGROUND
Food choice and food intake are guided by both sensory and metabolic processes. Genetic taster status (GTS) is an inherited relative sensitivity to taste stimulation, assessed via density of the fungiform papillae (Figure 1) on the tongue and/or perceptual sensitivity to the bitter compound 6-n-Propylthiouracil (PROP) (1, 2). There are three GTS classifications within the population: non-tasters, medium-tasters, and super-tasters (1) (Figure 2). However, the effects of GTS on flavour preferences go beyond bitter tasters. For example, significant relationships between GTS and responses to trigeminal (chemical) (3) and astringent (tactile) (4, 5) stimuli have been reported, with super-tasters describing more negative reactions to oral stimuli and foods with sensory qualities such as pungency and astringency (6-9). But results are mixed and more work is needed to fully understand the relationship between GTS and food choice. To date, most research on hedonic responses to foods has relied on subjective ratings (10-13). However, such self-report measures can be influenced by demand characteristics and social desirability. In contrast, implicit psychophysiological techniques allow investigation of hedonic reactions that are not open to conscious introspection. The aim of the proposed study is to investigate whether GTS is predictive of implicit liking of bitter, astringent and chemesthetic compounds.

HYPOTHESES

• Super-tasters will display increased negative affect-related facial muscle activity in comparison to non-tasters.

• Super-tasters will display prolonged heart rate deceleration in comparison to non-tasters

• Super-tasters will report lower affective ratings to all stimuli than non-tasters

PHASE 1 – TASTER STATUS SCREENING

• 120 females aged 18-40 will be recruited for Phase 1 (Figure 3) – Taster Status screening

• Non –Tasters and Supertasters (Figure 2) will be invited for Phase 2 -

120 Participants recruited for Phase 1
Participants screened to determine Taster Status
22 Non-Tasters
22 Super-Tasters
Medium-Tasters

Invited to Phase 2
Not invited but thanked for their time

PHASE 2 – PSYCHOPHYSIOLOGICAL STUDY

Flow diagram showing order of procedure for both the Tasting and the Tasting/Rating blocks

EMG & ECG

Figure 4

Empty

Do not swallow

Swirl

Press the space bar to continue

Think

1000ms

Rinse

Press the space bar to continue

LMS Liking

LMS Intensity

EMG & ECG data will be analysed as change from baseline, where baseline is measured during the 1000ms prior to the swirling phase (Figure 4).

EMG data: responses to the three solutions at the two muscle sites (Zygomaticus, Corrugator) will be analysed separately. Each analysis will be a 2 (Taster-Status) x 2 (Phase) x 2 (Block) x 2 (Concentration) Repeated Measures Analysis of Variance.

EGG data: responses to the three solutions will be analysed separately. Each analysis will be a 2 (Taster-Status) x 2 (Block) x 2 (Concentration) Repeated Measures Analysis of Variance.

LMS ratings: ratings of the three solutions on the two rating scales (Intensity, Liking) are analysed separately. Each analysis will be a 2 (Taster-Status) x 2 (Phase) x 2 (Concentration) Repeated Measures Analysis of Variance.

REFERENCES