PHENOTYPING SUCROSE TASTE DETECTION & PREFERENCES IN INVIDUALS WITH NORMAL & EXCESS WEIGHT

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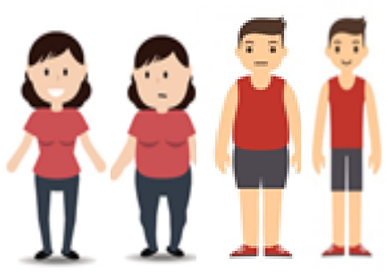
Introduction & Study Aim

One of main contributors to obesity is food intake, and among the influences of food intake is the ability to detect a taste, which then affects our consummatory receptors before driving our physiological responses of eating. This mechanism may drive our intake towards palatable foods such as sugar. Local data on taste sensitivity and preference plus its association to weight are scarce. Therefore, this **study aims** to determine if there are any differences in sweet taste detection thresholds and preferences among Malaysians who have normal and excess weight.

Methodology

Cross-sectional, comparative study with participants recruited from the Klang Valley



- ❑ Chinese and Indian ethnicity individuals with normal weight, overweight and obesity
- ❑ Aged between 18- 50 years old
- ❑ Stable body weight for the past 3 months
- ❑ Excluded if they have a chronic disease, undergone bariatric surgery, smokes, or is currently ill and taking medications that could affect taste.

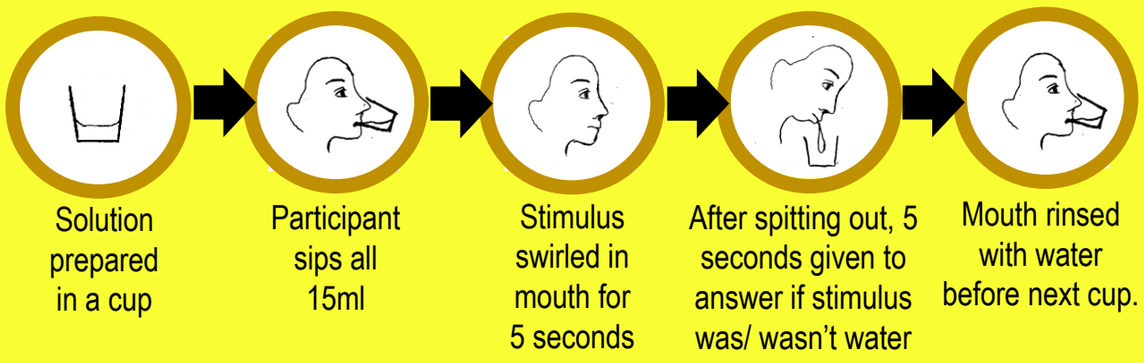
Test 1: Consummatory taste reward assessment

- 30 cups arranged in 3 blocks. Each cup contained either 15ml water or a sucrose solution stimulus
- Sucrose solutions consisted of 5 ascending concentrations arranged randomly per block. Stimuli cups alternated with water for mouth rinse
- While swirling solution in mouth, participants rated the "Just About Right" (JAR) generalized labelled magnitude scale (gLMS)

Sugar Intake Determination- Using a validated semi-quantitative food frequency questionnaire[1] (FFQ)

Test 2: Sensory domain assessment of sucrose detection

- 112 cups arranged in 8 blocks of 14 cups, each containing either 15ml of water or a sucrose solution stimulus.
- Sucrose solutions consisted of 7 ascending concentrations and was arranged in a random-generated sequence. Each block would contain each of these concentrations along with water.

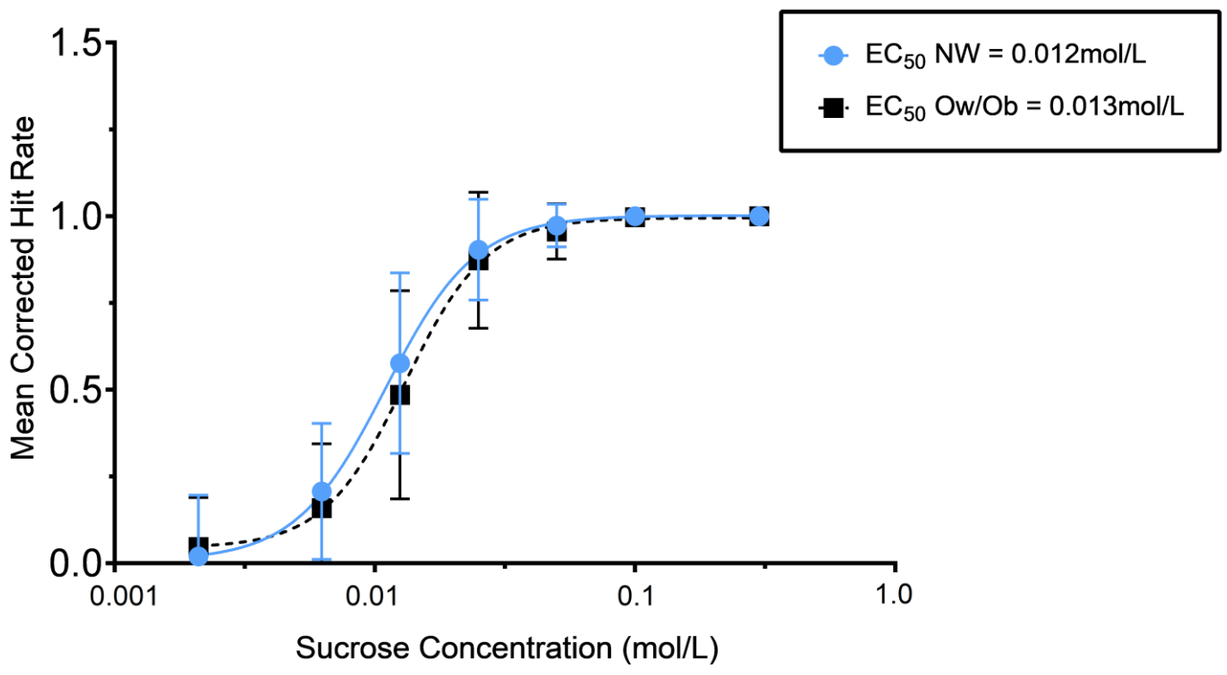


- Results used to generate a dose-response curve where the EC_{50} (detection threshold) of a participant is determined

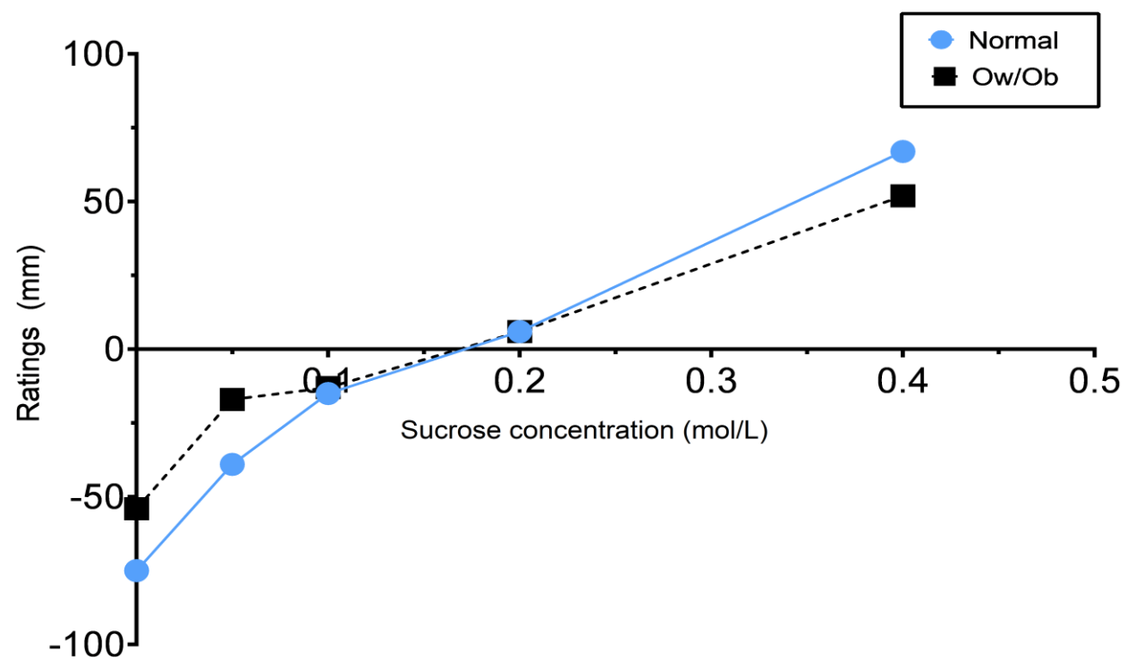
Results

Parameters n= 90	Normal weight, NW (n=45)	Overweight/ Obese, Ow/Ob (n=45)
Sex, n (%) Women Men	26 (57.8) 19 (42.2)	26 (57.8) 19(42.2)
Age, median (IQ), years	22 (2)	22 (3)
Weight, median (IQ), kg	56.1 (10.7)	73.6 (20.3)
BMI, median (IQ) kg/m^2	21.0 (2.2)	26.1 (6.1)
Sugar intake, median (IQ), g	44 (39)	42 (49)

↑ **Table 1-** A comparison of characteristics between those of normal weight (NW) and overweight/ obese (Ow/Ob). While participant numbers are even in both weight categories, 51% and 47% are of Chinese ethnicity in the NW and Ow/Ob category respectively.



↑ **Figure 2-** The mean corrected hit rates for the 7 sucrose concentrations expressed as mean ± SEM. The index of detectability (EC_{50}) indicates the concentration where participants responded correctly 50% of the time. The EC_{50} between NW and Ow/Ob was not significantly different. However, weight has a weak, positive correlation to EC_{50} (r_s= 0.226, n= 90, p <0.05).



↑ **Figure 1-** Ratings for the sweetness of 5 sucrose concentrations using the JAR scale. The median ideal sweet concentration (where the plotted line intersects the x-axis at 0 represents 'Ideal sweetness') was the same for NW and Ow/Ob at 0.17mol/L (58g/L). The most positive and negative measurements on the y-axis respectively indicates 'Far too sweet: I would never drink it' and 'Far too little sweetness: I would never drink it.'

Discussion

- Comparatively, the detectability index of our participants are slightly higher than that reported in a Chinese study[2] who had recruited similarly aged young adult individuals. This difference may be due to the methodology used.
- The ideal sweetness rated by our participants are predominantly found in tea, botanical and non-carbonated flavoured beverages. The sucrose concentration range where JAR was closest to 0 is also found in ~42.1% of the beverages available in the Asia-Oceania market.[3]
- We had a younger population with a lower BMI range for the Ow/Ob group. Changes in taste detectability and preferences may still alter along the life cycle and weight spectrum.

Conclusion

There was no difference in taste detection thresholds between those who are normal weight and with overweight or obesity. Their preferred sweetness in a solution was also the same. Future investigations that include higher BMIs could be warranted.

References

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Scan for abstract

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