



LV CONVEGNO DI STUDI

## **METAMORFOSI VERDE** **AGRICOLTURA, CIBO, ECOLOGIA**

*Complesso monumentale di San Pietro*  
*Dipartimento di Scienze agrarie, alimentari e ambientali*  
**PERUGIA 13-15 settembre 2018**

### **Do consumers respond to nudges? The case of bitter vegetables**

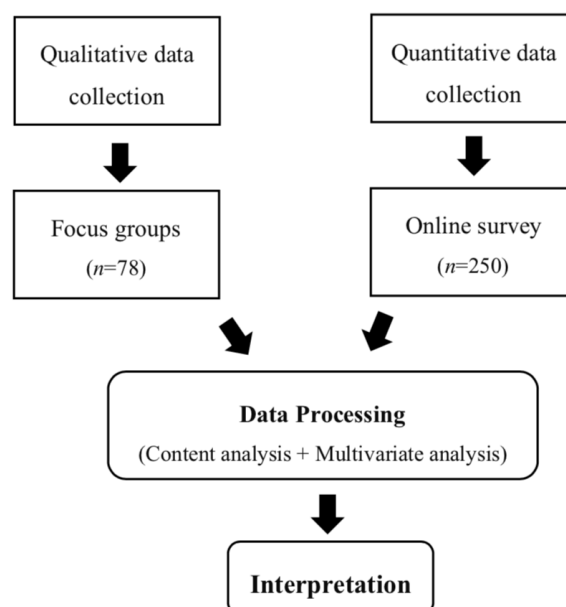
Carla Cavallo \*, Riccardo Vecchio, Department of Agricultural Sciences, Università degli Studi di Napoli Federico II; Via Università, 100 Portici (NA), Italy

\*corresponding author; email: carla.cavallo@unina.it

#### **Abstract**

The current study analyzes young consumers' preferences towards bitter tasting food and the effectiveness of nudges in changing dietary behavior. Therefore, a convergent mixed methods design collected qualitative and quantitative data in parallel (Figure 1). The product that has been used as a case study is broccoli, being the most famous vegetable from the Cruciferae family and being their most salient characteristic in the mind of consumers their

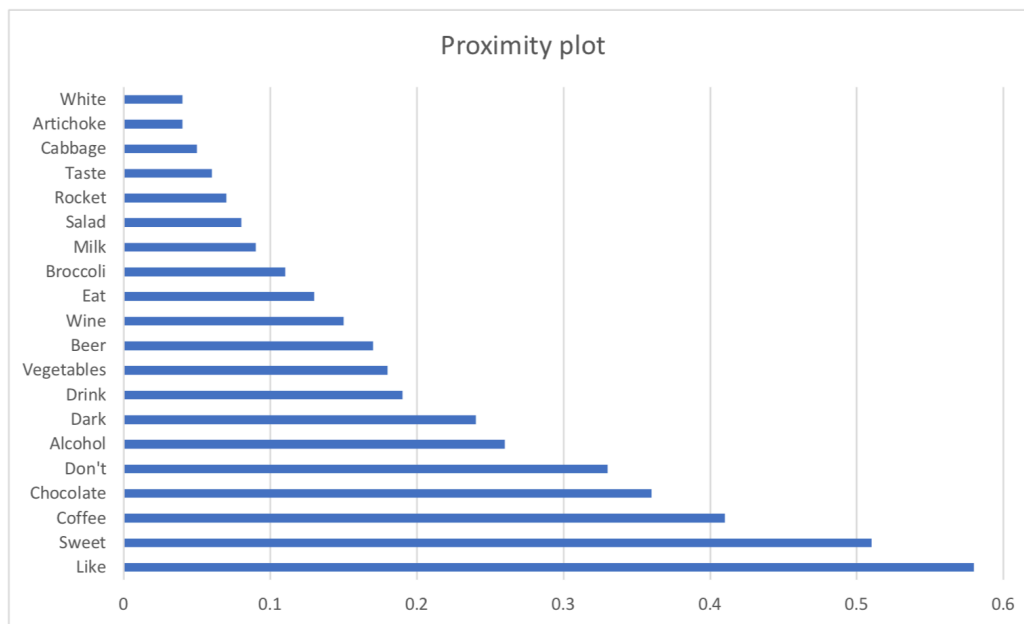
**Figure 1 – Convergent parallel mixed methods design**



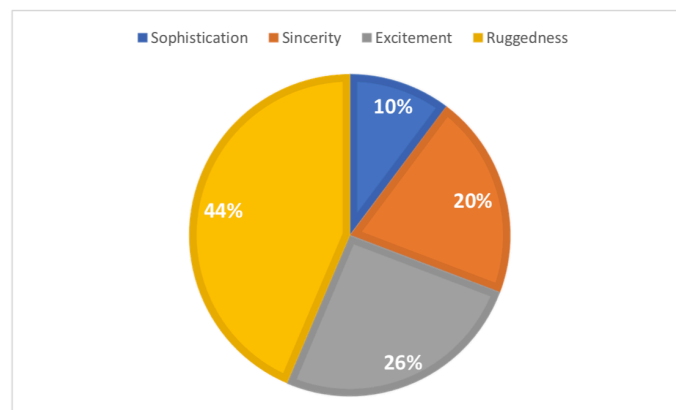
bitter taste (Cornelis, Tordoff, El-Sohehy, & van Dam, 2017). Focus groups have been

conducted to collect consumers' preferences for bitter tasting products in general. Focus groups' sample is composed by 78 consumers (43 male), aged between 18 and 32. The discussions were aimed at understanding the opinions of participants about bitter foods, their current food habits, and the core barriers and drivers to bitter food consumption. In addition, with the aim of collecting practical marketing directions, according to the brand personality theory, participants were asked what was the personality best matched with broccoli (Aaker, 1997). In parallel, an online survey has been administered to 250 consumers of the same age category, to collect specific information and test the effectiveness of providing simplified health information (nudges) to foster behavioral changes. The survey also focused on broccoli consumption.

**Figure 2 – Proximity plot for the word “bitter” as recurring during the focus groups**



**Figure 3 – Distribution of the recalled personality for broccoli during the focus groups**



Focus groups' data analysis yielded a proximity plot (Figure 2) that confirmed previous research indicating that chocolate, coffee and alcoholic beverages represent foods for which the acceptance of bitter taste has been reached (Donadini, Fumi, & Lambri, 2012; Geel, Kinnear, & De Kock, 2005; Harwood, Ziegler, & Hayes, 2012; Li, Hayes, & Ziegler, 2014; Masi, Dinnella, Pirastu, Prescott, & Monteleone, 2016; Varela, Beltrán, & Fiszman, 2014).

Furthermore, the analysis of the section devoted to the identity of broccoli, suggests that the majority of preferences were directed toward a “ruggedness” image, as shown in Figure 3.

Survey results suggest that approximately 71% of the sample expressed a favorable opinion for broccoli, using the positive emoji. More interestingly, 38% of respondents stated to be willing to enhance their bitter vegetables consumption in the next future after receiving a health nudge.

**Keywords**: consumers' preference, bitter taste, vegetables, nudging

## References

- Aaker, J. L. (1997). Dimensions of brand personality. *Journal of Marketing Research*, 347-356.
- Andreeva, V. A., Martin, C., Issanchou, S., Hercberg, S., Kesse-Guyot, E., & Méjean, C. (2013). Sociodemographic profiles regarding bitter food consumption. cross-sectional evidence from a general french population. *Appetite*, 67, 53-60.
- Bakke, A., & Vickers, Z. (2007). Consumer liking of refined and whole wheat breads. *Journal of food science*, 72(7).
- Caporaso, N., Savarese, M., Paduano, A., Guidone, G., De Marco, E., & Sacchi, R. (2015). Nutritional quality assessment of extra virgin olive oil from the Italian retail market: Do natural antioxidants satisfy EFSA health claims? *Journal of Food Composition and Analysis*, 40, 154-162.
- Cartea, M. E., & Velasco, P. (2008). Glucosinolates in Brassica foods: bioavailability in food and significance for human health. *Phytochemistry Reviews*, 7(2), 213-229.
- Cho, H. Y., Chung, S. J., Kim, H. S., & Kim, K. O. (2005). Effect of Sensory Characteristics and Non-sensory Factors on Consumer Liking of Various Canned Tea Products. *Journal of food science*, 70(8).
- Clark, J. E. (1998). Taste and flavour: their importance in food choice and acceptance. *Proceedings of the Nutrition Society*, 57(04), 639-643.
- Cornelis, M. C., Tordoff, M. G., El-Sohehy, A., & van Dam, R. M. (2017). Recalled taste intensity, liking and habitual intake of commonly consumed foods. *Appetite*, 109, 182-189.
- Drewnowski, A., & Gomez-Carneros, C. (2000). Bitter taste, phytonutrients, and the consumer: a review. *The American journal of clinical nutrition*, 72(6), 1424-1435.
- Drewnowski, A., & Monsivais, P. (2012). Taste and food choices. *Present Knowledge in Nutrition*, 1027-1042.
- Fernqvist, F., & Ekelund, L. (2014). Credence and the effect on consumer liking of food – A review. *Food Quality and Preference*, 32(Part C), 340-353. doi:<https://doi.org/10.1016/j.foodqual.2013.10.005>
- Lunceford, B. E., & Kubanek, J. (2015). Reception of Aversive Taste. *Integrative and Comparative Biology*, 55(3), 507-517. doi:10.1093/icb/icv058
- Shahi, T., Assadpour, E., & Jafari, S. M. (2016). Main chemical compounds and pharmacological activities of stigmas and tepals of 'red gold'; saffron. *Trends in Food Science & Technology*, 58, 69-78.
- Sharafi, M., Hayes, J. E., & Duffy, V. B. (2013). Masking Vegetable Bitterness to Improve Palatability Depends on Vegetable Type and Taste Phenotype. *Chemosensory Perception*, 6(1), 8-19. doi:10.1007/s12078-012-9137-5

- Vitaglione, P., Savarese, M., Paduano, A., Scafi, L., Fogliano, V., & Sacchi, R. (2013). Healthy virgin olive oil: a matter of bitterness. *Critical Reviews in Food Science and Nutrition*, 55(13), 1808-1818. doi:10.1080/10408398.2012.708685