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Running head: Preference for bitter foods

Title: Exploring the hedonic and incentive properties in preferences for bitter foods via self-reports, facial expressions and instrumental behaviours

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Conflict of interest
The authors have no conflict of interest to declare.
Abstract

Preferences for and consumption of bitter foods such as vegetables and fruit are important in addressing the epidemic of obesity as healthy dietary patterns contribute to its prevention. However, few studies have been undertaken to understand the preference for bitter-tasting foods. A generally accepted but not proven explanation is that these acquired preferences involve changes in affective and motivational processes in order to overcome the innate rejection of bitter tastes. To examine this issue we compared the hedonic and incentive responses to bitter substances among bitter likers and dislikers. In addition, the effects of hunger, stress and weight concern on bitter preferences were also explored. Fifty-nine healthy adults (age = 24.8 ± 6.3; body mass index = 22.0 ± 2.8) were divided into bitter likers and bitter dislikers according to their food preferences. Both groups sampled the unreinforced flavours of coffee, beer, chocolate and grapefruit under four motivational states induced by static pictures (neutral, food, stressor and obesity) at the time of testing. The results showed that the bitter solutions elicited less aversive responses (higher hedonic ratings and less intense disgust reactions) and fewer avoidance behaviours (slower response time and lower amount of water for rinsing) in bitter likers after viewing neutral images. On the other hand, likers exhibited a further reduction in disgust to coffee after viewing stressor pictures, and also drank more water after tasting chocolate following the obesity pictures, compared with the dislikers. The expression of disgust increased in bitter likers, as well as the amount of water used to rinse the mouth, after tasting chocolate following pictures showing obesity compared with pictures showing food. These results show, for the first time, not only the implication of affective and incentive components in reversal of the predisposition to reject bitterness but also the motivational modulation of the expression of rejection of bitter tastes in humans.