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Short Communication

Sweet music influences sensory and hedonic perception of food products with varying sugar levels

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ABSTRACT

Reducing sugar intake is an important nutritional goal in most developed countries. Despite the health consequences of excessive sugar consumption (e.g., non-communicable diseases), individuals are often reluctant to shift dietary habits due to the high hedonic appeal of sugar-rich products. Manipulating the intrinsic sensory attributes of foods (such as color or aroma) has been put forward as a promising framework for enhancing taste perception and increasing acceptance of low-sugar products. So far, it is less known whether extrinsic sensory cues may have similar effects.

In this within-subjects experiment ($N = 106$, 64 % women), we tested how auditory stimuli (i.e., music) may impact the perception and acceptance of products varying in sweetness levels. Participants tasted samples of two product categories (vegetables and cookies), with higher (carrots and cookies) and lower sweetness levels (cucumbers and 0 % sugar cookies), while listening to previously tested soundtracks that were strongly (vs weakly) associated with sweetness.

Results showed that the high "sweetness" soundtrack increased the sweetness ratings of all products compared to the low "sweetness" soundtrack. Participants also reported higher preference and more favorable intentions of future consumption when the high "sweetness" soundtrack was played. Overall, these findings suggest that extrinsic sensory cues, namely music, may aid in reducing sugar intake by increasing the acceptance of products with lower sugar content.

1. Introduction

Sweets are among the most desired and palatable foods. Products like cookies, ice creams, or chocolates are commonly referred to as comfort foods due to their ability to trigger pleasant psychological states (Wansink & Sangerman, 2000). Human preference for sweet seems to result from a "perfect storm" of biological and psychological determinants. On the one hand, there are innate predispositions for seeking sweet- and avoiding bitter-tasting foods since early in ontogeny. On the other hand, in most Western countries, there is constant exposure to abundant, often highly processed, sweet foods, commonly associated with feelings of pleasure and reward (Mennella & Bobowski, 2015). Unsurprisingly, overconsumption of sugar is pervasive in most developed countries and is expected to continue rising, according to projections of OECD and FAO (2020). The worrisome implications of this nutritional imbalance include increased risks for obesity and non-communicable diseases, such as diabetes or cardiovascular and respiratory diseases (World Health Organization, 2015).

While several countries are implementing measures to reduce sugar intake, this may be a challenging endeavor due to the negative consequences of sugar reduction for eating enjoyment. For manufacturers, developing new sugar-reduced versions of food products often comes at the cost of sacrificing sensory appeal (e.g., taste, texture) and consumer acceptance (de Souza et al., 2021; Prada et al., 2022). While replacing sugars with artificial sweeteners is a common mitigation strategy, multisensory integration techniques may also improve sweetness perception by modulating other sensory attributes (Hutchings et al., 2019). Common strategies involve changes to foods' intrinsic properties, such as adding aromas or manipulating products' colors. For example, adding vanilla aroma to milk desserts was shown to be an effective strategy for mitigating the effects of sugar reduction (Alcaire et al., 2017). Likewise, adding red coloring to aqueous solutions led to higher

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