

Multisensory modulation of texture perception in apples

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Crispness is an important texture parameter influencing sensory evaluation of food, as it works as a predictor of overall food quality. Previous research demonstrated that crispness perception of dry foods could be modulated by the sound the perceiver produced while biting into them (1). Therefore, we investigated whether multisensory effects on crispness perception could be extended to wet food (apples). Additionally, we were interested in verifying whether sound could also modulate perceived hardness, given that hardness (unlike crispness; 2) is considered to mainly rely on mechanical cues. Participants here were asked to bite a series of apple cylinders and to rate their crispness or hardness using a rating scale. Crucially, they heard their biting sound (either realistic or manipulated) through headphones. Measures have been replicated with different apple varieties with the aim to study the sound manipulation effect at different intensity levels for crispness and hardness.

In experiment 1, participants evaluated the perceived crispness of cylinders from 3 apple varieties differing in crispness ('Reinette'-low, 'Golden'-medium, and 'Fuji'-high). High frequencies of sound (2-20 kHz) were reduced (-12 dB or -24 dB) or were left unmodified (realistic sound). The results confirmed the role of sound manipulation in crispness perception also in the case of wet food: Apples were perceived as being less crispy when both sound reductions were applied than with the realistic sound. Additionally, apple varieties were correctly perceived as differing in terms of crispness ('Reinette')

References :

- (1) Zampini, M., & Spence, C. (2004). The role of auditory cues in modulating the perceived crispness and staleness of potato chips. *Journal of Sensory Studies*, 19, 347-363.
- (2) Christensen, C. M., & Vickers, Z. M. (1981). Relationships between chewing sounds to judgments of food crispness. *Journal of Food Science*, 46, 574-578.