

Health & Nutrition Sciences

Sweetness 101

The World Health Organization recommends that the daily intake of free sugars (defined as sugars added to foods, plus sugars that are naturally present in honey, syrups and fruit juices) be reduced to less than 10% of total energy intake.¹ To help decrease sugar consumption, authoritative bodies currently recommend reducing the amount of all sweet-tasting foods and beverages, regardless of the source of the sweet taste.^{2,3,4}

Sweetness – One of the 5 Basic Tastes



Sweet



Salty



Sour



Bitter



Umami

Sweetness is complex - while it may indicate the presence of carbohydrates, it provides little information on the caloric value of a food.

Sweetness is detected from the sugars naturally present in many foods such as:



Milk

Fruit

Sweetness can also be added to foods. Here are some examples:



Table sugar

Low-calorie sweeteners (LCS)



Health policy recommendations on sweetness stem from concerns that human attraction to sweetness may be a potential risk for developing less healthy eating patterns.

Unproven hypotheses behind recommendations:

- Products containing sugar and LCS train palates to crave sweetness resulting in obesity.
- Consumer palates will adapt to lower sweetness if offered and therefore reduce energy and sugar intakes.

Knowledge gap:

- Not enough scientific evidence to determine whether sweetness preference can be changed, nor if sweetness preference/intake influences diet quality.

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Word on the Sweet: Common Questions

Is sweetness preference associated with intake of sweet-tasting foods/beverages?

No

Research shows that **liking of sweet taste and typical sweetness intake among children largely indicates no significant association,⁵ while studies in adults are mixed.⁶**

Does consumption of sweet-tasting things drive greater preference for sweetness in subsequent meals and eating occasions?

No

Research shows that **consuming sweet-tasting things does not make people desire more sweetness – at least not in the short term.⁷**

In fact, studies seem to indicate that if one eats salty food, one might desire sweetness later on, and vice versa.⁸

Does consuming sweet-tasting things affect subsequent diet quality and energy intake?

No

There is no evidence that sweetness per se drives overconsumption of energy from food/drinks or changes in diet quality in the short term.^{9,10} Long term is unknown. In fact, it appears texture and mouthfeel may have a much greater influence on energy and food intake compared to sweetness.¹¹

Can you change preference for sweetness?

Limited evidence

The few studies on this subject provide some indication that **the palate may be able to adapt to increased or decreased levels of sweetness.¹²⁻¹⁵** More research on this topic is needed.



There are many additional questions in the area of sweetness that need further research.

For example:

- Does sweetness in the absence of calories cause energy compensation, and are there differences between foods vs. beverages?
- What are the long term effects of consuming sweetness on health outcomes?
- Are there genetic differences in sweetness preferences and intakes?

It is important to continue moving the science forward to prevent regulations/policies from being developed in the absence of science.

References:

1. World Health Organization. Guideline: sugars intake for adults and children. Geneva, Switzerland: World Health Organization; 2015.
2. WHO Regional Office for the Eastern Mediterranean. Policy statement and recommended actions for lowering sugar intake and reducing prevalence of type 2 diabetes and obesity in the Eastern Mediterranean Region. 2016. Available at: <http://www.emro.who.int/nutrition/strategy/policy-statement-and-recommended-actions-for-lowering-sugar-intake-and-reducing-prevalence-of-type-2-diabetes-and-obesity-in-the-eastern-mediterranean-region.html>
3. Pan American Health Organization. Pan American Health Organization nutrient profile model. 2016. Available at: https://iris.paho.org/bitstream/handle/10665.2/18621/9789275118733_eng.pdf?sequence=9&isAllowed=y.
4. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans. 2020-2025. 9th Edition. 2020.: Available at: [DietaryGuidelines.gov](https://www.dietaryguidelines.gov).
5. Divert C, Chabanet C, Schoumacker R, Martin C, Lange C, Issanchou S, Nicklaus S. Relation between sweet food consumption and liking for sweet taste in French children. *Food Qual Prefer*. 2017;56:18-27.
6. Tan SY, Tucker RM. Sweet taste as a predictor of dietary intake: a systematic review. *Nutrients*. 2019;11(1):94.
7. Appleton KM, Tuorila H, Bertenshaw EJ, de Graaf C, Mela DJ. Sweet taste exposure and the subsequent acceptance and preference for sweet taste in the diet: systematic review of the published literature. *Am J Clin Nutr*. 2018;107(3):405-19.
8. Sørensen LB, Møller P, Flint A, Martens M, Raben A. Effect of sensory perception of foods on appetite and food intake: a review of studies on humans. *Int J Obes Relat Metab Disord*. 2003;27(10):1152-1166.
9. Griffioen-Roose S, Hogenkamp PS, Mars M, Finlayson G, de Graaf C. Taste of a 24-h diet and its effect on subsequent food preferences and satiety. *Appetite*. 2012;59(1):1-8.
10. Griffioen-Roose S, Mars M, Finlayson G, Blundell JE, de Graaf C. Satiety due to equally palatable sweet and savory meals does not differ in normal weight young adults. *J Nutr*. 2009;139(11):2093-2098.
11. Forde CG, Mars M, de Graaf K. Ultra-processing or oral processing? A role for energy density and eating rate in moderating energy intake from processed foods. *Curr Dev Nutr*. 2020;4(3):nzaa019.
12. Wise PM, Nattress L, Flammer LJ, Beauchamp GK. Reduced dietary intake of simple sugars alters perceived sweet taste intensity but not perceived pleasantness. *Am J Clin Nutr*. 2016;103(1):50-60.
13. Biguzzi C, Lange C, Schlich P. Effect of sensory exposure on liking for fat- or sugar reduced biscuits. *Appetite*. 2015;95:317-323.
14. Khimsuksri S, Tangkabutra S, Tapananont T, Sangaroon S, Rattanathongkom A, Paphangkorakit J. Effect of stepwise sugar reduction on the satisfaction of sucrose-sweetened drink. *J Med Assoc Thai*. 2020;103(1):32-35.
15. Ebbeling CB, Feldman HA, Steltz SK, Quinn NL, Robinson LM, Ludwig DS. Effects of sugar-sweetened, artificially sweetened, and unsweetened beverages on cardiometabolic risk factors, body composition, and sweet taste preference: a randomized controlled trial. *J Am Heart Assoc*. 2020;9(15):e015668.