

Hold that spoonful of sugar: Higher sweetness does not correlate with increased desire to consume.

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Introduction:

- Sugar sweetened beverages have been linked to obesity (Ruanpeng D. et al, 2017) and are increasingly prevalent in Western diet.
- Humans are evolutionarily programmed draw pleasure from tasting sweetness (Drewnowski A. et al, 2012).
- Aspects of hedonic valuation are complex; “liking” and “wanting” are separate concepts (Berridge K. C. et al, 2009).
- **Study aim:** to determine if higher sugar content correlated with higher subjective ratings of fruit flavored beverages across hedonic domains.

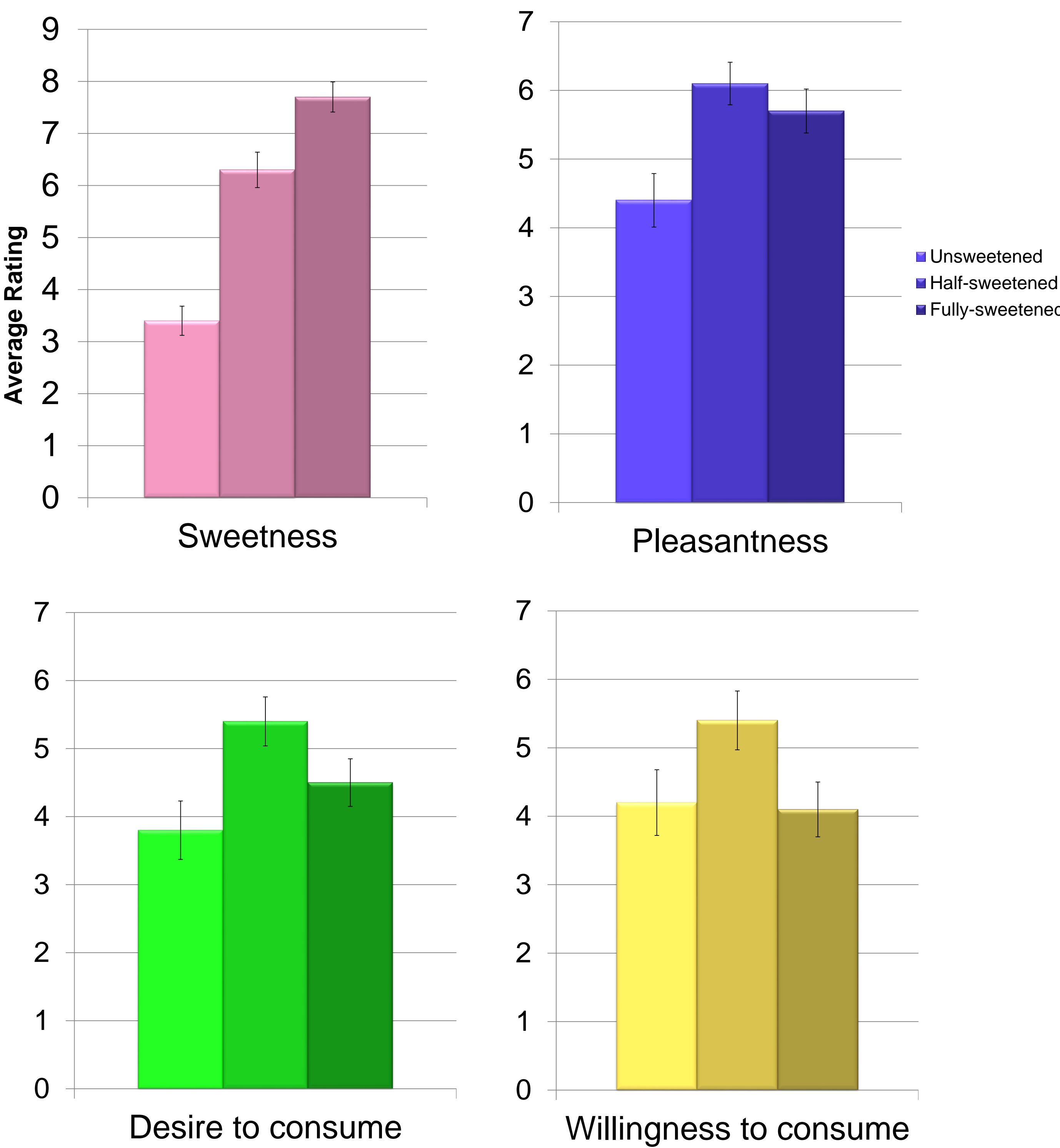
Methods:

- **Participants:** 28 participants were recruited through email and word of mouth to rate palatability of fruit flavored beverages.
- **Beverages:** Participants were presented with four flavors of fruit flavored beverage: Peach + Raspberry Zinger, Peach + Blueberry, Blueberry + Cherry Berry, and Raspberry Zinger + Mixed Berry Zinger. Prepared each flavor with three sweetness levels: unsweetened (0g/8oz), half-sweetened (13g/8oz), and fully sweetened (26g/8oz).
- **Data collection:** Participants were administered a ¼ cup serving of each beverage. They tasted four beverages at a time, grouped according to sweetness levels. The order that beverages were presented was randomly assigned. Participants rated each beverage on a 1-10 scale on sweetness, pleasantness, willingness to consume, and desire to consume. Participants’ height and weight were recorded. Participants were paid \$5 for their time.
- **Analysis:** We completed a 2-tailed t-test to examine the difference in hedonic ratings between sweetness levels, averaging across ratings of each flavor. To correct for multiple comparison, we used a Bonferroni-corrected significance threshold ($p < 0.00625$).

Table 1. Sample characteristics		
Variable	Mean (SD)	Range
BMI	23.05 (3.46)	17.7-35.4
Age	22.96 (2.97)	18-30
Sex- no. (%)		
Male	5 (17.9)	
Female	23 (82.1)	

Results:

- There was a significant difference in the sweetness ratings from unsweetened to half-sweetened and from half-sweetened to fully-sweetened.
- The ratings for pleasantness, willingness to consume and desire to consume were significantly different between unsweetened and half-sweetened.
- No significant difference in the ratings for pleasantness, willingness to consume or desire to consume from half-sweetened to fully-sweetened.



Figures 1-4. Bar graphs displaying average ratings of hedonic domains across different levels of added sweetener.

Table 2. Ratings of hedonic domains across levels of added sweetener			
Domain	Mean (SD)	t-statistic	p-value
Sweetness*			
Unsweetened v. half-sweetened	US=3.4 (1.50) HS=6.3 (1.78)	-6.49	<0.001
Half-Sweetened v. full-sweetened	HS=6.3 (1.78) FS=7.7 (1.54)	-2.96	0.0046
Pleasantness*			
Unsweetened v. half-sweetened	US=4.4 (1.99) HS=6.1 (1.74)	-3.43	0.0012
Half-Sweetened v. full-sweetened	HS=6.1 (1.74) FS=5.7 (1.86)	0.89	0.38
Desire to consume			
Unsweetened v. half-sweetened	US=3.8 (2.20) HS=5.4 (2.07)	-2.69	0.0096
Half-Sweetened v. full-sweetened	HS=5.4 (2.07) FS=4.5 (1.94)	1.55	0.13
Willingness to consume			
Unsweetened v. half-sweetened	US=4.2 (2.50) HS=5.4 (2.35)	-1.82	0.074
Half-Sweetened v. full-sweetened	HS=5.4 (2.35) FS=4.1 (2.13)	1.60	0.12

*Domains starred are also significantly different when comparing US to FL, but results are not presented.

Conclusions:

- When comparing half-sweetened beverage to fully sweetened beverage, ratings across hedonic domains decreased with added sugar.
- Limitations of study include small sample size, low variability of BMI
- Results suggest that **participants did not prefer the fully sweetened beverages**; instead, would rather consume a beverage with half as much sugar as a typical soda.
- These results can be taken as a suggestion to beverage companies to lower the amount of sugar present in their drinks.