Webinar Will Begin Momentarily

Become an Orgain Ambassador Today!

Request an Orgain Ambassador account to access our on-line sampling portal so you can share Orgain products and discount offers with your patients or clients.

healthcare.orgain.com/ambassador

Orgain

Professional Education Series

Support. Inform. Educate. Empower.

Sugar vs. Sugar Alternatives: Impacts on Brain Health, Obesity, and Addiction

TODAY'S AGENDA:

- Introduction & Housekeeping
- Speaker Introduction
- Presentation
- Q&A
- Closing

WEBINAR HOST:

Keith Hine, MS, RD
VP of Healthcare, Sports & Professional Education
Orgain, LLC

WEBINAR PRESENTER:

Dr. Nicole Avena
Associate Professor of Neuroscience Mount Sinai School of Medicine

Sugar vs. Sugar Alternatives: Impacts on Brain Health, Obesity, and Addiction

NICOLE M. AVENA, PH.D.

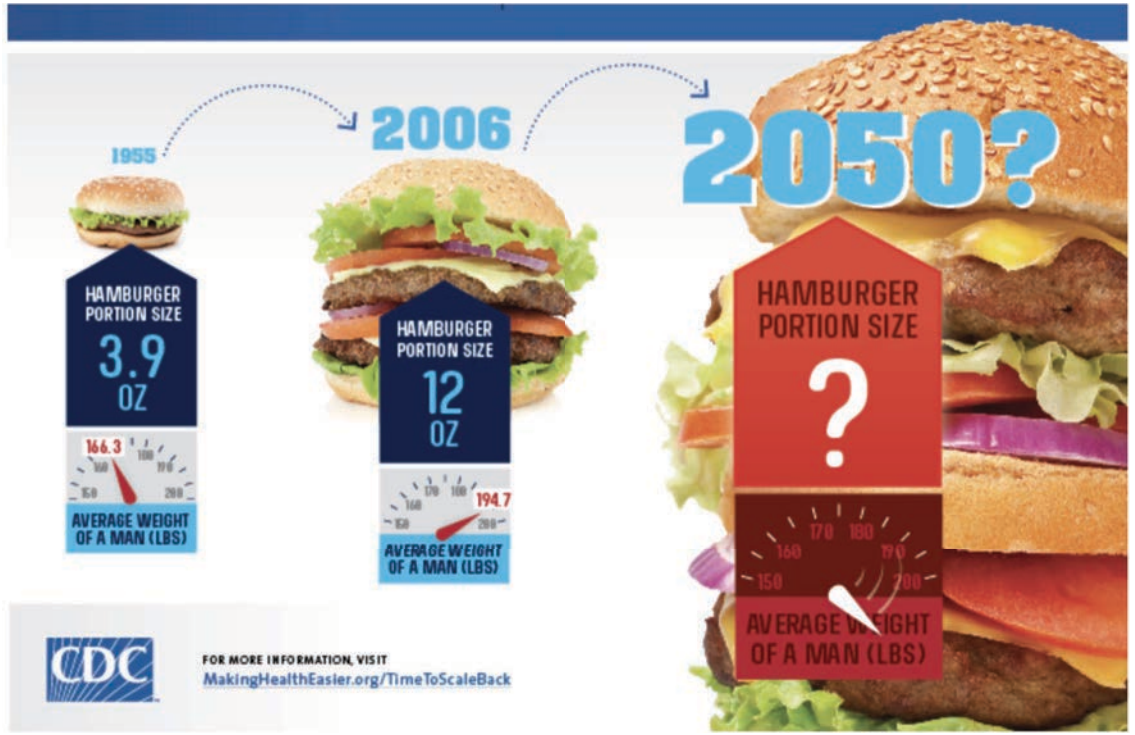
ASSOCIATE PROFESSOR OF NEUROSCIENCE
ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI

VISITING PROFESSOR OF HEALTH PSYCHOLOGY
PRINCETON UNIVERSITY

WHY ARE SO MANY PEOPLE OVERWEIGHT OR OBESE?

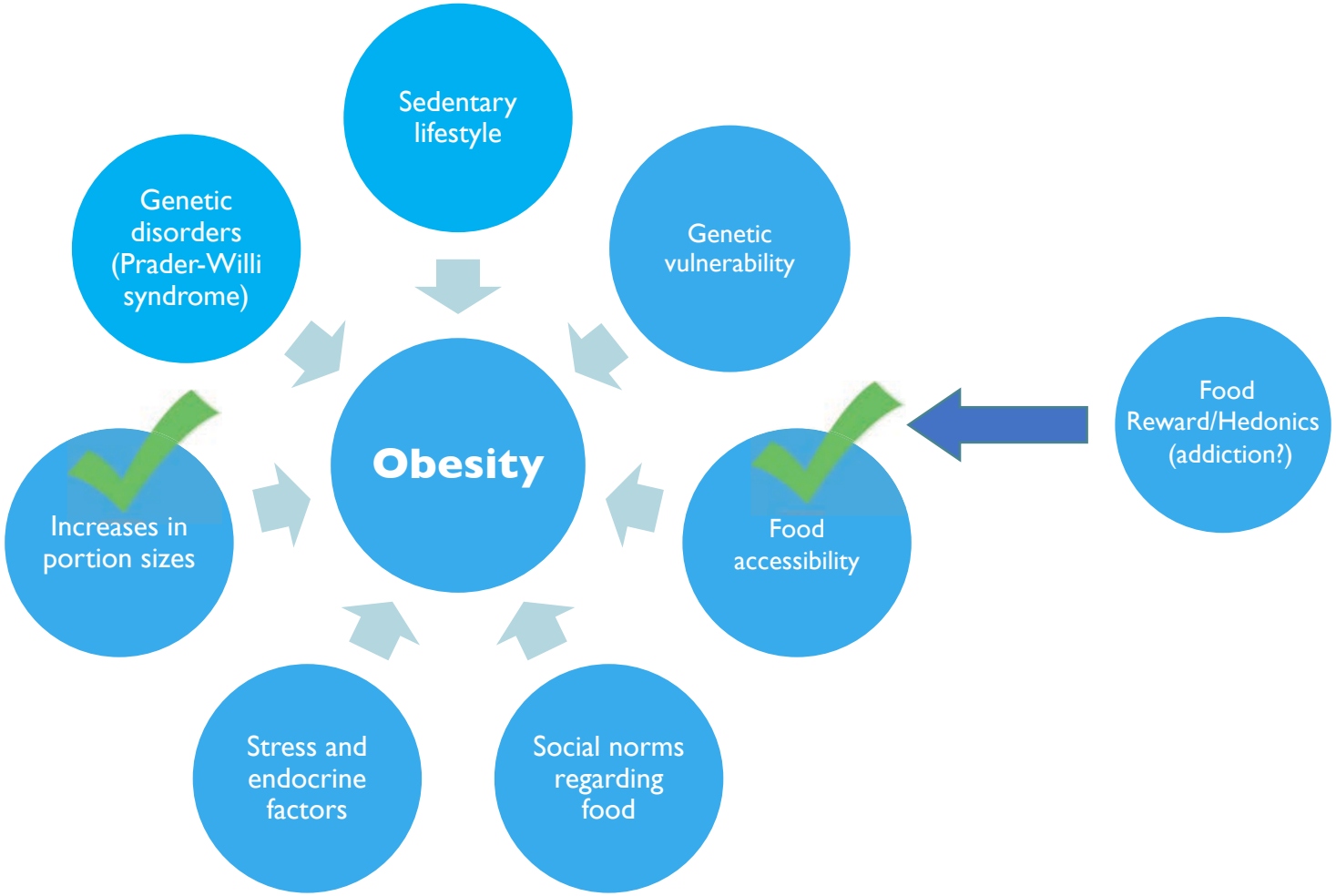
FOOD ACCESSABILITY AND ACQUISIT

PORTION SIZES



Food	20 Years Ago	Today
Bagel	140 calories (3" diameter)	350 calories (6" diameter)
Muffin	210 calories (1.5 oz)	500 calories (4 oz)
Cheeseburger	333 calories	590 calories
Pasta (Spaghetti & Meatballs)	500 calories	1025 calories
French Fries	210 calories (2.4 oz)	610 calories (6.9 oz)
Soda	85 calories (6.5 oz)	250 calories (20 oz)
Theater Popcorn	270 calories (5 cups)	630 calories (1 tub)
Turkey Sandwich	320 calories	820 calories
Pizza	500 calories (2 slices)	850 calories (2 calories)

OBESITY IS AN ENDPOINT, WITH MULTIPLE CONTRIBUTING FACTORS



WHAT IS A FOOD?

Nutrition Facts

Serving Size 100 grams (100 grams)

Amount Per Serving

Calories 36	Calories from Fat 4
	% Daily Value*
Total Fat 0g	1%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 68mg	3%
Total Carbohydrates 8g	3%
Dietary Fiber 3g	13%
Sugars 5g	
Protein 1g	

Vitamin A	284%	• Vitamin C	4%
Calcium	4%	• Iron	2%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Fiber		25g	30g

Calories per gram:

Fat 9 • Carbohydrate 4 • Protein 4

Ingredients: Whole Baby Carrots, Frozen, Unprepared

Nutrition Facts

Serving Size 1 Pouch (14g)

Amount Per Serving

Calories 60	Calories from Fat 15
	% Daily Value*
Total Fat 1.5g	**2%**
Saturated Fat 0.5g	**3%**
Trans Fat 0g	
Polyunsaturated Fat 0.5g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 75mg	**3%**
Total Carbohydrate 11g	**4%**
Dietary Fiber 0g	**0%**
Sugars 5g	
Protein less than 1g	

Vitamin A	6%	• Vitamin C	0%	• Calcium	0%	• Iron	6%
Thiamin	6%	• Riboflavin	6%	• Niacin	6%	• Vitamin B_6	6%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat. Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4

INGREDIENTS: ENRICHED FLOUR (WHEAT FLOUR, NIACIN, REDUCED IRON, VITAMIN B_1 [THIAMIN MONONITRATE], VITAMIN B_2 [RIBOFLAVIN], FOLIC ACID), SUGAR, SOYBEAN AND PALM OIL (WITH TBHQ FOR FRESHNESS), CORN SYRUP, CONTAINS TWO PERCENT OR LESS OF MODIFIED CORN STARCH, SALT, WHEAT STARCH, DEXTROSE, BAKING SODA, GELATIN, CANOLA OIL, CORNSTARCH, CORN SYRUP SOLIDS, NATURAL AND ARTIFICIAL FLAVOR, BLUEBERRY JUICE CONCENTRATE, COLOR ADDED, GLYCERIN, CONFECTIONER'S GLAZE, CARNAUBA WAX, VITAMIN A PALMITATE, BLUE 2 LAKE, NIACINAMIDE, REDUCED IRON, VITAMIN C (ASCORBIC ACID), RED 40 LAKE, VITAMIN B_6 (PYRIDOXINE HYDROCHLORIDE), VITAMIN B_2 (RIBOFLAVIN), VITAMIN B_1 (THIAMIN HYDROCHLORIDE), BLUE 1 LAKE, YELLOW 6, RED 40, YELLOW 5 LAKE, YELLOW 5, BLUE 1, SOY LECITHIN.

CONTAINS WHEAT AND SOY INGREDIENTS.

Nutrition Facts

3 servings per container

Serving size **⅓ container (100g) (makes about 1 cup)**

	Per serving		Per container	
Calories	**290**		**880**	
		%DV*		**%DV***
Total Fat	9g	**12%**	27g	**35%**
Sat. fat	3.5g	**18%**	11g	**55%**
Trans Fat	0g		0g	
Cholest.	0mg	**0%**	0mg	**0%**
Sodium	580mg	**25%**	1750mg	**76%**
Total Carb.	49g	**18%**	146g	**53%**
Fiber	2g	**7%**	6g	**21%**
Total Sugars	1g		2g	
Incl. Added Sugars	0g	**0%**	1g	**2%**
Protein	4g		12g	
Vitamin D	0mcg	0%	0mcg	0%
Calcium	185mg	15%	555mg	45%
Iron	1mg	6%	3mg	15%
Potassium	90mg	2%	271mg	6%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

BX-00133US 0.02

INGREDIENTS

Brown Rice Pasta (Brown Rice, Rice Bran, Water), Filtered Water, Tapioca Starch, Expeller Pressed: Canola and/or Safflower Oil, Coconut Oil, Salt, Pea Protein, Vegan Natural Flavors, Tricalcium Phosphate, Cane Sugar, Lactic Acid (Vegan), Xanthan Gum, Yeast Extract, Titanium Dioxide Color (naturally occuring mineral), Annatto Color, Onion.

Learn more about our ingredients. >

WHAT'S THE BIG DEAL ABOUT PROCESSING?


DEA


Hostess
Twinkies
Happy Birthday!


Get a FREE Coke with 8 caps @mycokerewards.com
Coca-Cola
classic

WHY WORRY ABOUT SUGAR AND ALTERNATIVE SWEETENERS?

Circulation

ORIGINAL RESEARCH ARTICLE

Long-Term Consumption of Sugar-Sweetened and Artificially Sweetened Beverages and Risk of Mortality in US Adults

Vasanti S. Malik, ScD
Yanping Li, PhD
An Pan, PhD
Lawrence De Koning, PhD
Eva Schernhammer, MD, DrPH
Walter C. Willett, MD, DrPH
Frank B. Hu, MD, PhD

BACKGROUND: Whether consumption of sugar-sweetened beverages (SSBs) or artificially sweetened beverages (ASBs) is associated with risk of mortality is of public health interest.

METHODS: We examined associations between consumption of SSBs and ASBs with risk of total and cause-specific mortality among 37 716 men from the Health Professional's Follow-up study (from 1986 to 2014) and 80 647 women from the Nurses' Health study (from 1980 to 2014) who were free from chronic diseases at baseline. Cox proportional hazards regression was used to estimate hazard ratios and 95% confidence intervals.

RESULTS: We documented 36 436 deaths (7896 cardiovascular disease [CVD] and 12 380 cancer deaths) during 3 415 564 person-years of follow-up. After adjusting for major diet and lifestyle factors, consumption of SSBs was associated with a higher risk of total mortality; pooled hazard ratios (95% confidence intervals) across categories (<1/mo, 1–4/mo, 2–6/week, 1-<2/d, and ≥2/d) were 1.00 (reference), 1.01 (0.98, 1.04), 1.06 (1.03, 1.09), 1.14 (1.09, 1.19), and 1.21 (1.13, 1.28; *P* trend <0.0001). The association was observed for CVD mortality (hazard ratio comparing extreme categories was 1.31 [95% confidence interval, 1.15, 1.50], *P* trend <0.0001) and cancer mortality (1.16 [1.04, 1.29], *P* trend =0.0004). ASBs were associated with total and CVD mortality in the highest intake category only; pooled hazard ratios (95% confidence interval) across categories were 1.00 (reference), 0.96 (0.93, 0.99), 0.97 (0.95, 1.00), 0.98 (0.94, 1.03), and 1.04 (1.02, 1.12; *P* trend = 0.01) for total mortality and 1.00 (reference), 0.93 (0.87, 1.00), 0.95 (0.89, 1.00), 1.02 (0.94, 1.12), and 1.13 (1.02, 1.25; *P* trend = 0.02) for CVD mortality. In cohort-specific analysis, ASBs were associated with mortality in NHS (Nurses' Health Study) but not in HPFS (Health Professionals Follow-up Study) (*P* interaction, 0.01). ASBs were not associated with cancer mortality in either cohort.

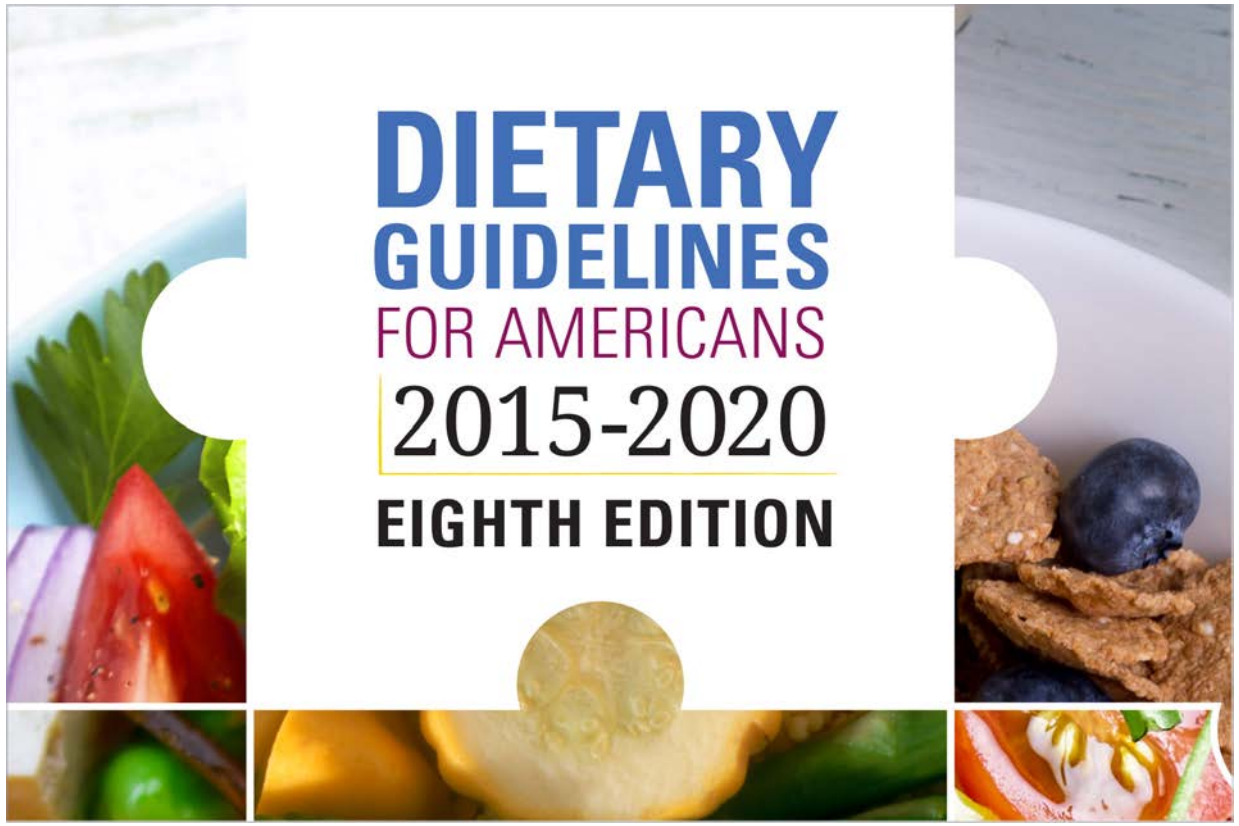
CONCLUSIONS: Consumption of SSBs was positively associated with mortality primarily through CVD mortality and showed a graded association with dose. The positive association between high intake levels of ASBs and total and CVD mortality observed among women requires further confirmation.

Key Words: all-cause death ■ artificially sweetened beverages ■ cardiovascular death ■ low calorie beverages ■ sugar-sweetened beverages

Sources of Funding, see page XXX

© 2019 American Heart Association, Inc.

https://www.ahajournals.org/journal/circ



Added Sugar Consumption in the United States

US Department of Agriculture, Agricultural Research Service. 2020

What Are Alternative Sweeteners?

- There are nine types of low or no caloris sweeteners (LNCS) permitted by the FDA for use in foods and beverages:
- Acesulfame potassium
- Advantame
- Aspartame
- Monk fruit sweeteners
- Neotame
- Saccharin
- Stevia sweeteners
- Sucralose
- Thaumatin

Sugar alcohols are in a different class. They are a group of naturally occurring compounds found in certain fruits and vegetables.

They are partially absorbed by the body and provide fewer calories than regular sugar.

The Rise (and Fall) in Artificial Sweeteners has led to an Interest In “Alternative Sweeteners”

- Aspartame may cause excessive free radical production and excess cortisol levels
- Sucralose has been linked to dysregulation of gut-brain control of glucose metabolism

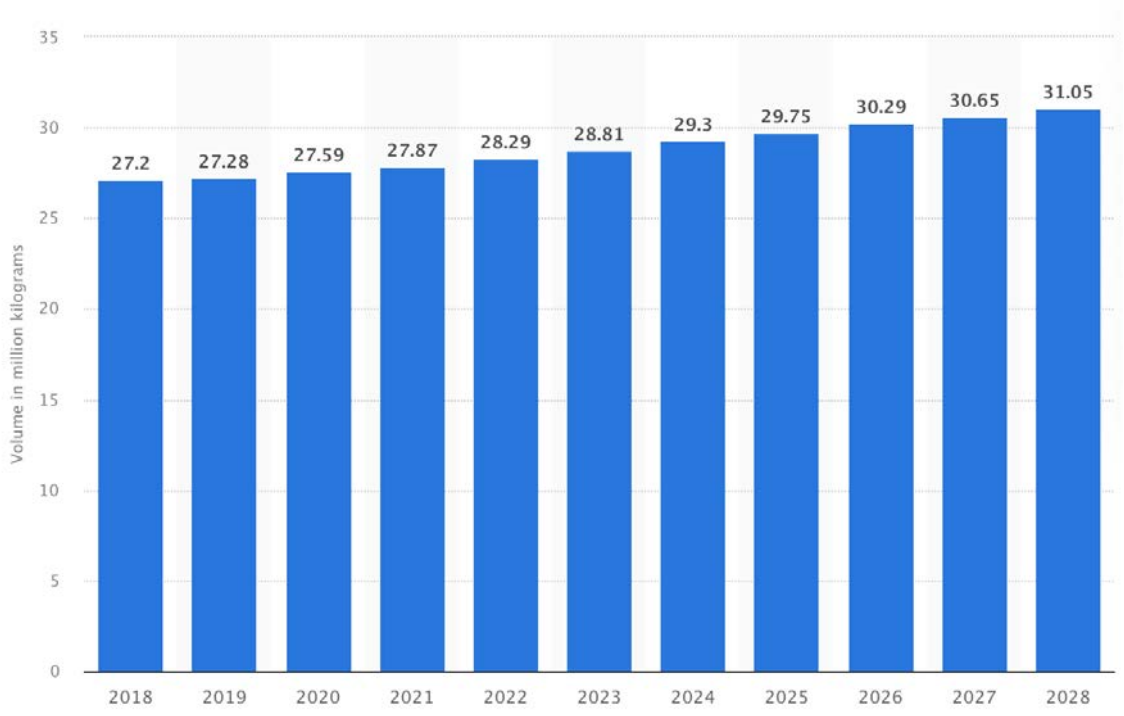
SUGAR	1 TBSP	1/4 CUP	1/2 CUP	1 CUP
ERYTHRITOL	1 TBSP + 1 TSP	1/3 CUP	2/3 CUP	1 1/3 CUP
LIQUID STEVIA	1/16 TSP 6 DROPS	1/4 TSP 24 DROPS	1/2 TSP 48 DROPS	1 TSP 96 DROPS
STEVIA POWDER	1/16 TSP	1/4 TSP	1/2 TSP	1 TSP
TRUVIA ERYTHRITOL + STEVIA	1.5 TSP	1 TBSP + 2 TSP	3.5 TBSP	1/3 CUP + 1.5 TBSP
LIQUID MONK FRUIT	10 DROPS	40 DROPS	80 DROPS	160 DROPS
SWERVE ERYTHRITOL + OLIGOSACHARIDES	1 TBSP	1/4 CUP	1/2 CUP	1 CUP
ALLULOSE	1 TBSP + 1 TSP	5 TBSP + 1 TSP	1/2 CUP + 3 TBSP	1 1/3 CUP
XYLITOL	1 TBSP	1/4 CUP	1/2 CUP	1 CUP

A recent study published in *JAMA Network* found that eating ultra-processed foods increases the risk for depression. The researchers found that the risk was particularly related to eating foods and drinking beverages containing artificial sweeteners.

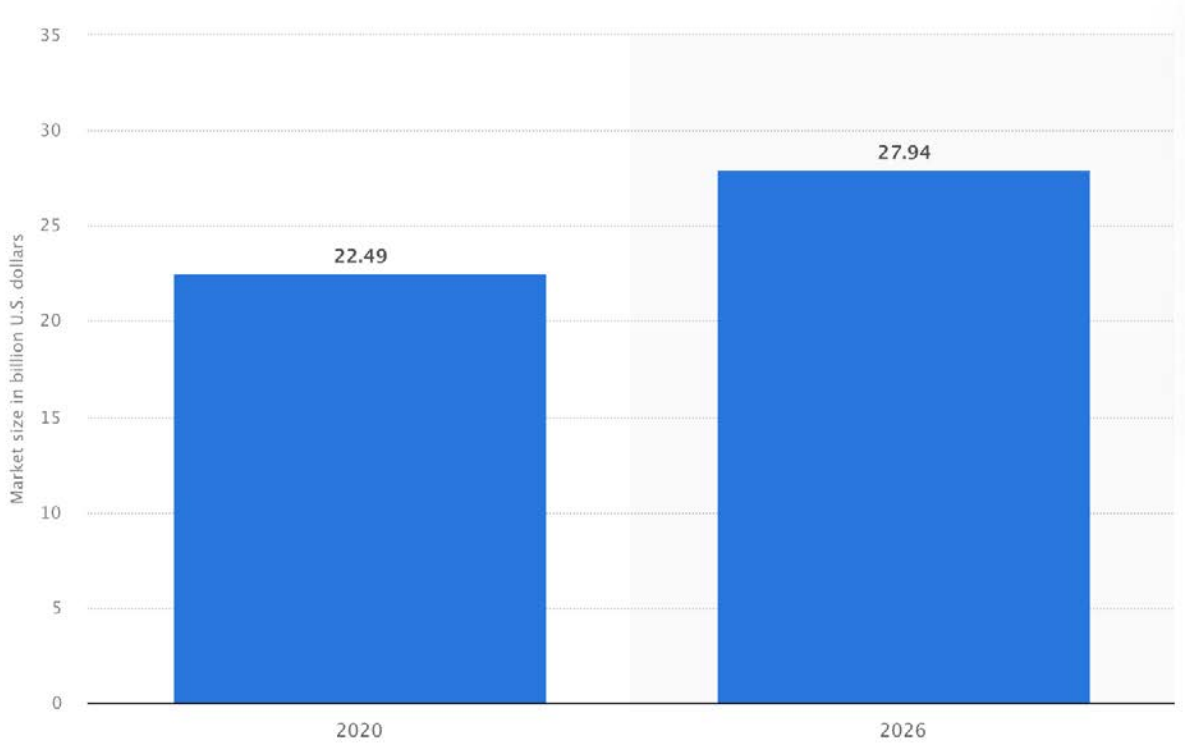
Artificial and Alternative Sweetener Forecast

- In a recent review, researchers found little to no benefit of using artificial sweeteners in place of calorie-containing sweeteners in those with obesity or pre-diabetes- yet the market continues to grow

Volume of the artificial sweetener market in the US from 2018 to 2028



Forecast of the worldwide market size for natural sweeteners from 2020 to 2026



WHY IS IT SO HARD FOR PEOPLE TO REDUCE THEIR SWEETENER INTAKE?

1. It’s dominating our food supply

THE LANCET
Diabetes & Endocrinology

low-calorie sweeteners, or both. Of all packaged foods and beverages purchased by a nationally representative sample of US households in 2013, 68% (by proportion of calories) contain caloric sweeteners and 2% contain low-calorie sweeteners. We believe that

Alternative Sweetner Demand In Processed Foods

- The demand for more “natural sweeteners” and low-calorie alternatives is primarily due to the health food trend.
- Companies, such as Coca-Cola and PepsiCo, are focusing on catering to the rising demand for low-calorie products. Currently, the US market is saturated in the case of natural and artificial sweeteners. Thus, the market is growing at a slow pace.
- There is an increased demand to “switch out” the sugar in sweetened beverages and baked goods (usually full of sugar) with non-nutritive sweeteners; instead of cutting out all the extra sweetners added all together

2. We don’t realize how much sugar/sweetener we are consuming

16 OZ STARBUCKS CARAMEL FRAPPACCINO

64 g of sugar

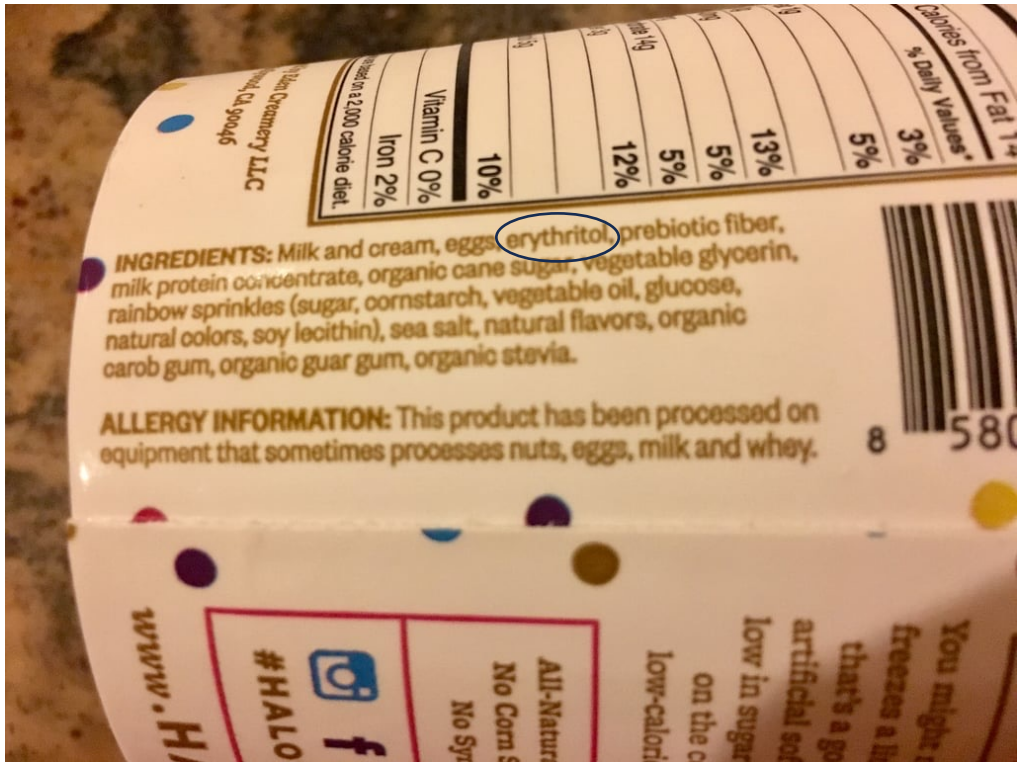
(128% of DV)

DANNON “FRUIT ON THE BOTTOM” YOGURT

24 g of sugar (48% of DV)

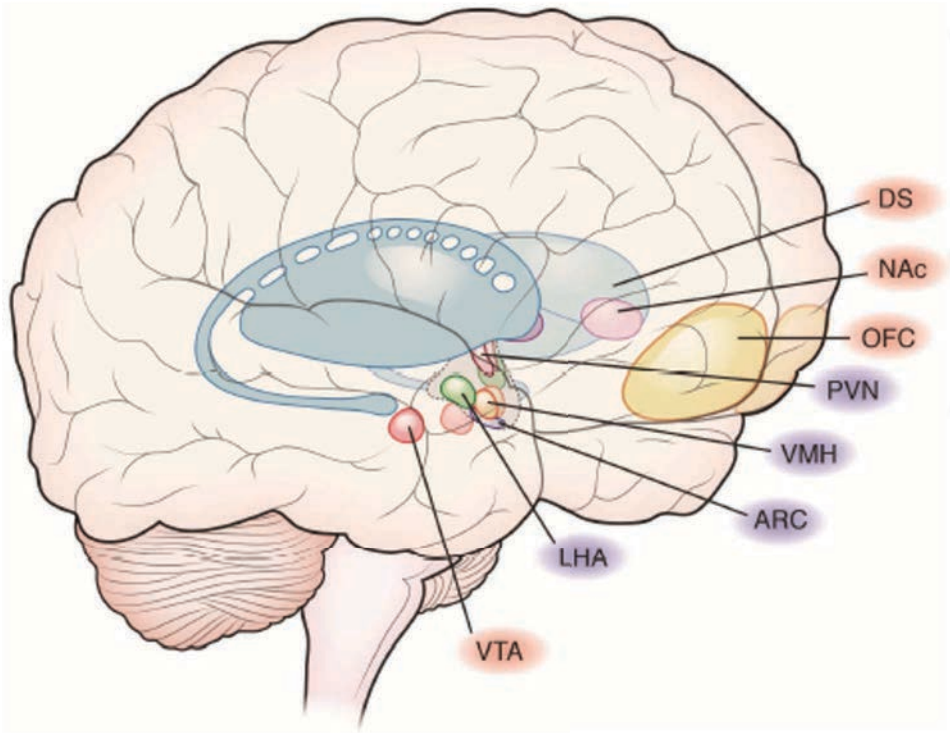
Alternative Sweeteners are Harder to Spot

Diet Coke



Halo Top ice cream

3. We are addicted to it, just ask the brain!



- Drugs that are abused act on brain systems that evolved to reinforce natural behaviors (e.g., sex, feeding).
- There are overlaps in the brain pathways activated by palatable foods and drugs of abuse.

TWO KINDS OF HUNGER

hun·ger
həNGgər/
noun: **hunger**

- a feeling of discomfort or weakness caused by lack of food, **coupled with the desire to eat**.
- *Negative reinforcement*

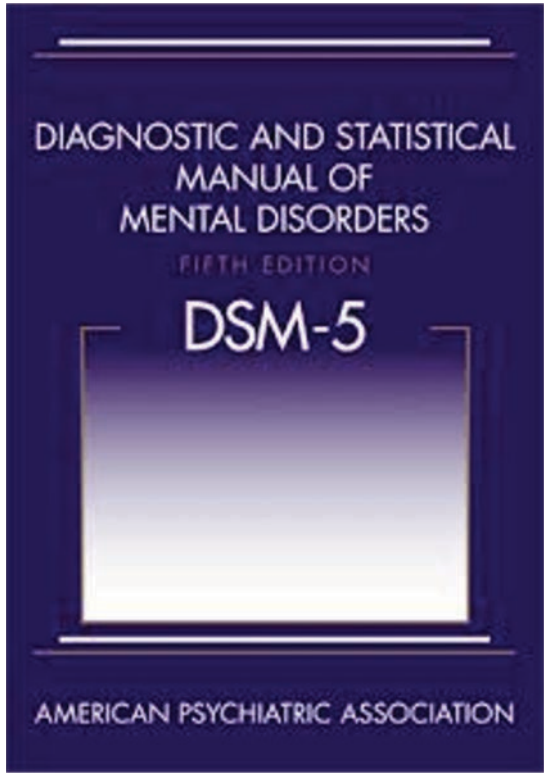
he·don·ic
hē dänik/
adjective: **hedonic**

- relating to or considered in terms of **pleasant sensations**.

- *Positive reinforcement*

EVIDENCE THAT WE ARE ADDICTED TO SUGAR, SWEETENERS AND HIGHLY PROCESSED FOODS
(selected)

HOW DO WE DEFINE ADDICTION?



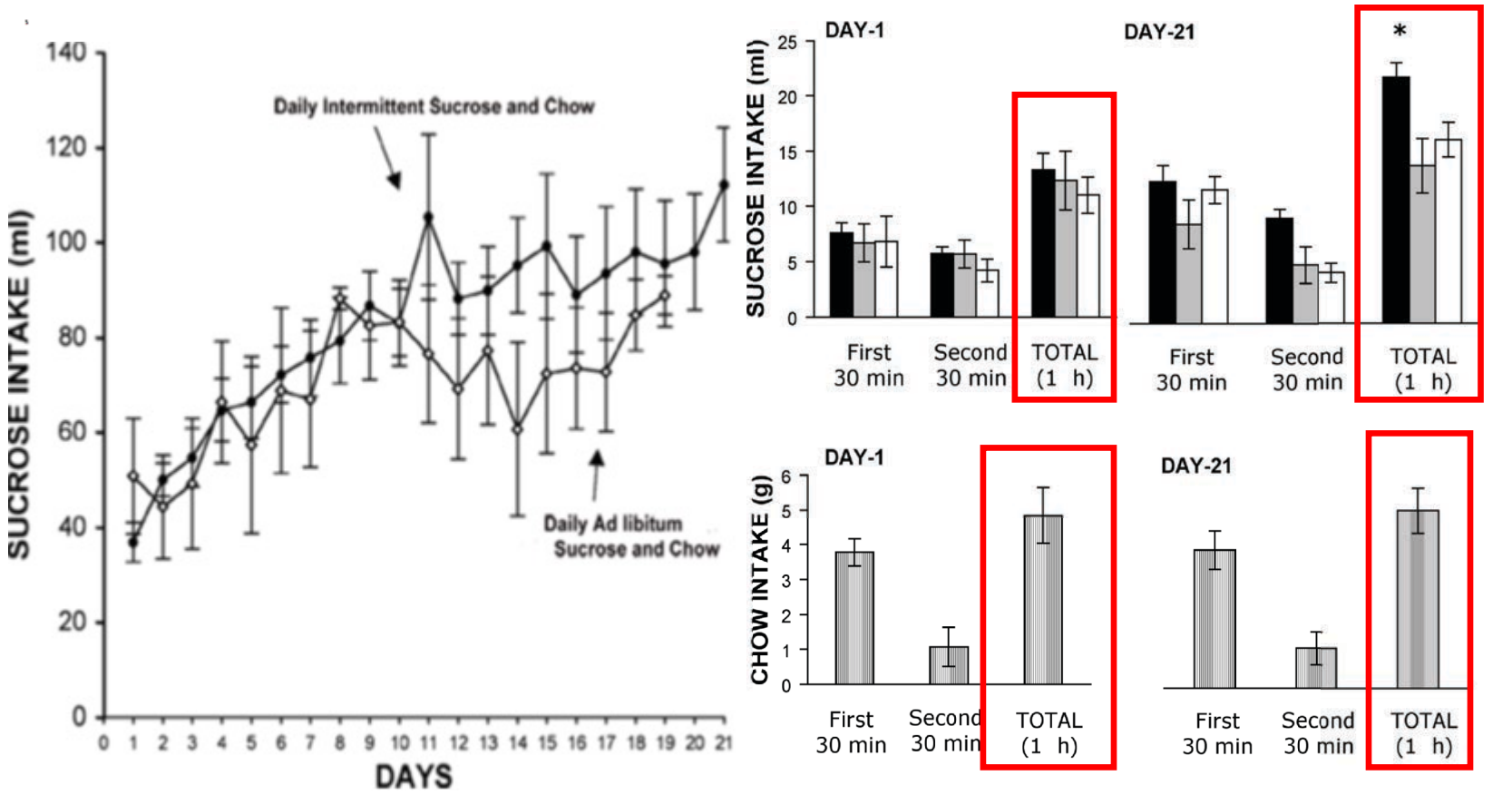
DSM-5 Criteria for Substance Use Disorder

Criterion	Severity
Use in larger amounts or for longer periods of time than intended	Severity is designated according to the number of symptoms endorsed: 0-1: No diagnosis 2-3: Mild SUD 4-5: Moderate SUD 6 or more: Severe SUD
Unsuccessful efforts to cut down or quit	
Excessive time spent using the drug	
Intense desire/urge for drug (craving)	
Failure to fulfill major obligations	
Continued use despite social/interpersonal problems	
Activities/hobbies reduced given use	
Recurrent use in physically hazardous situations	
Recurrent use despite physical or psychological problem caused by or worsened by use	
Tolerance	
Withdrawal	

SUD, substance use disorder

Adapted from Diagnostic and Statistical Manual of Mental Disorders, *fifth edition.*[23]

BINGEING/TOLERANCE



Rada, Avena, & Hoebel (2005)

Daily Intermittent Sucrose and Chow

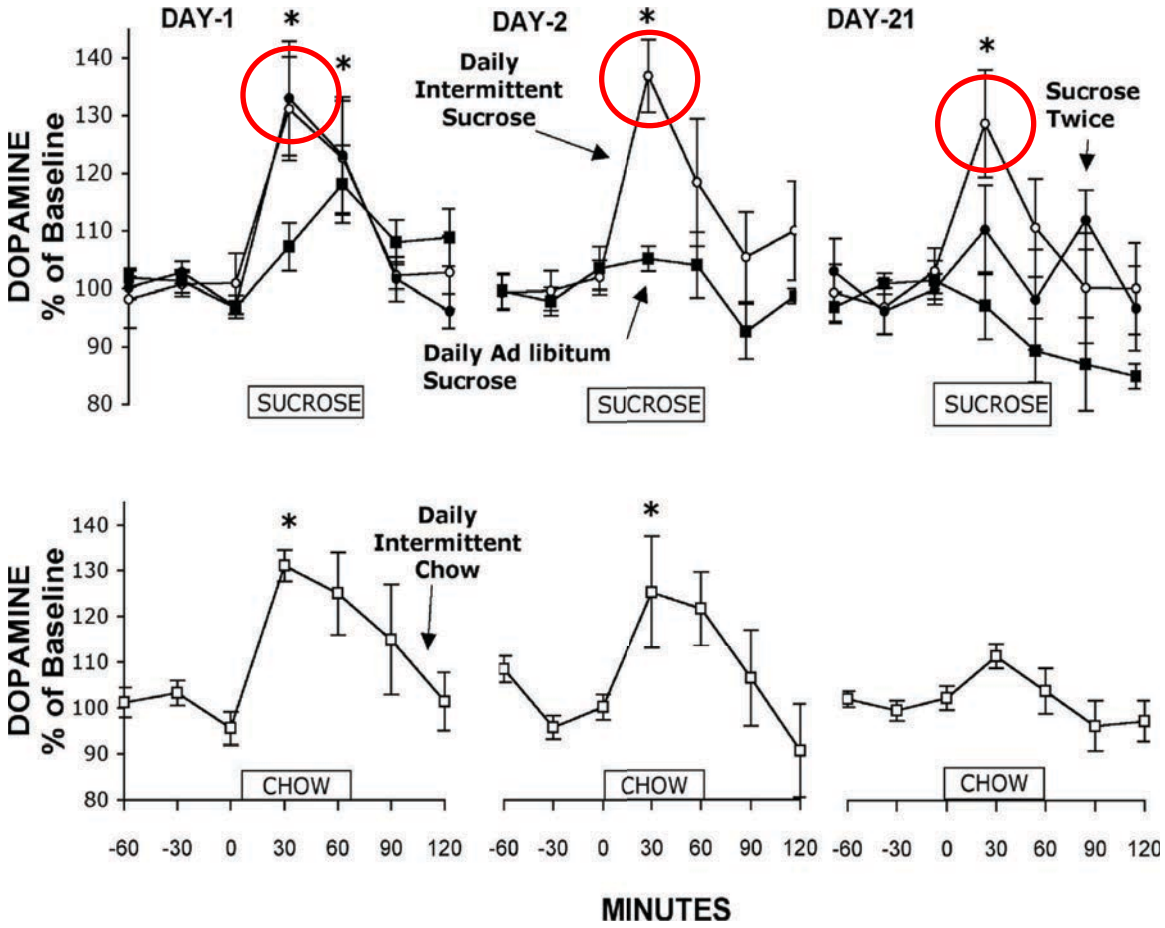
Sucrose Twice

Daily Ad libitum Sucrose and Chow

ALTERATIONS IN BRAIN DOPAMINE LEVELS

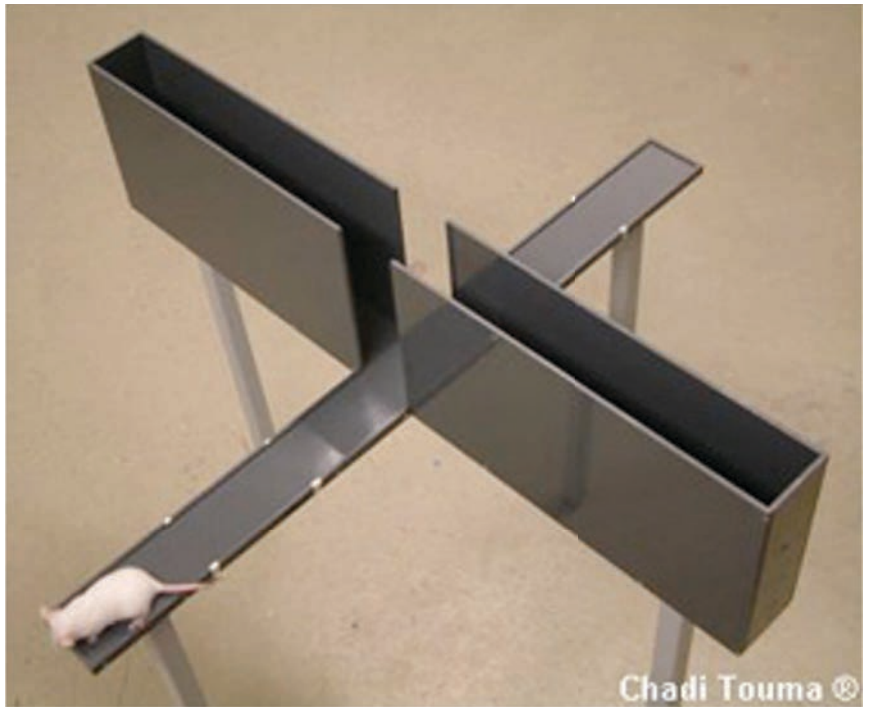
Increases in dopamine (DA) release wane with repeated exposure to chow; however, these increases continue in response to sugar.

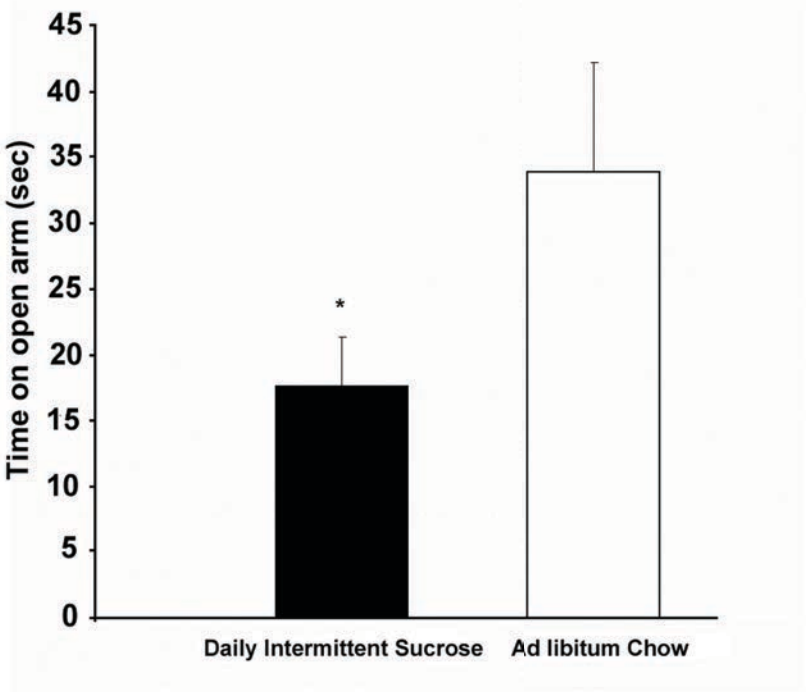
This effect is only seen in sugar-bingeing rats, not control rats.



Rada, Avena & Hoebel (2005)

WITHDRAWAL

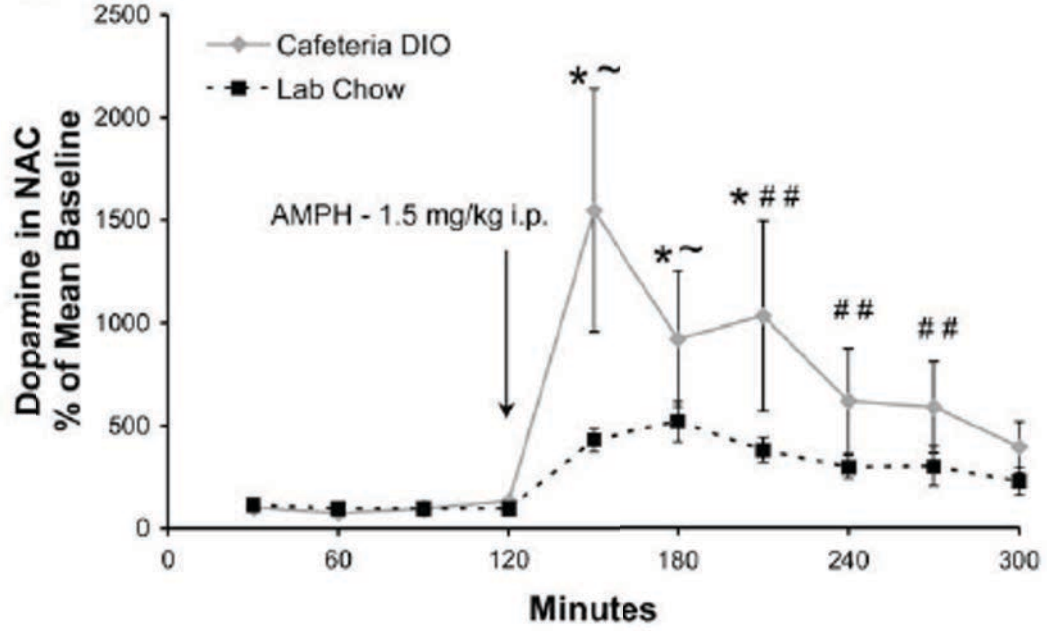




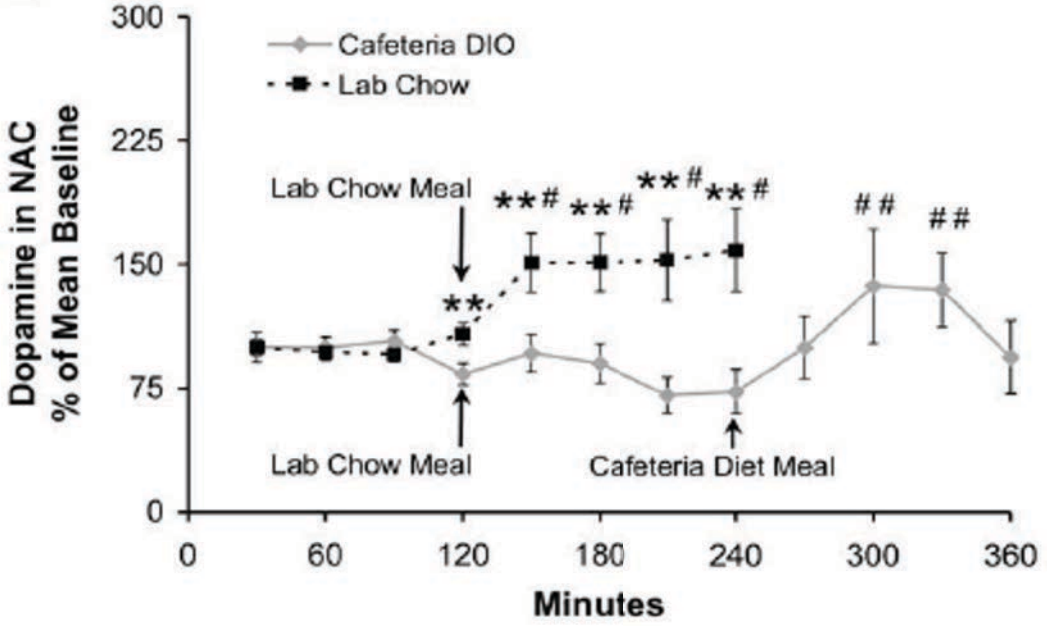
- Sugar bingeing rats show signs of anxiety when given an opioid antagonist (naloxone) or when fasted from all food for 36 h.

- Opioid systems are perturbed by overeating, as revealed by increased mu-opioid receptor binding in these animals prior to withdrawal.

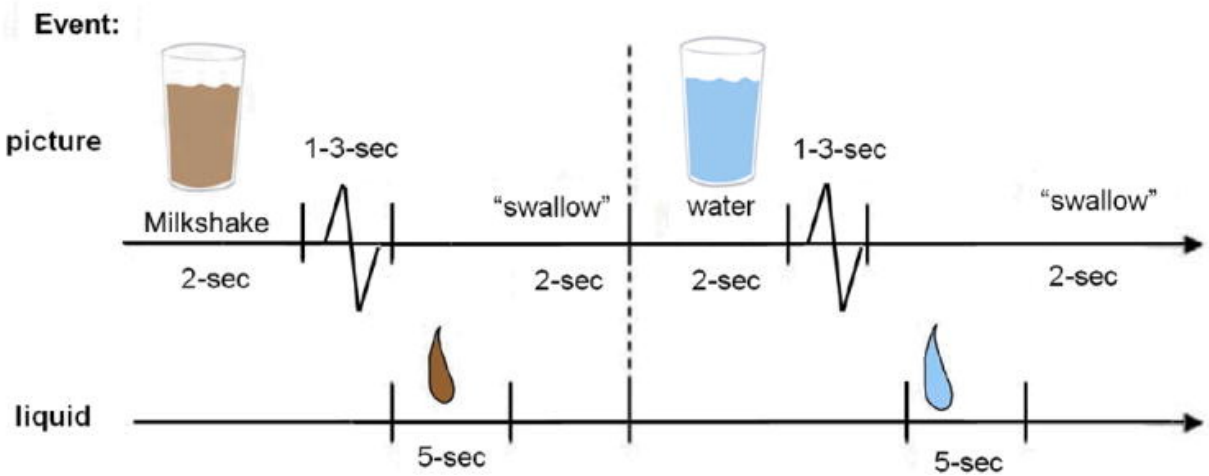
Colantuoni et al. (2001); Avena, Bocarsly, et al. (2008)

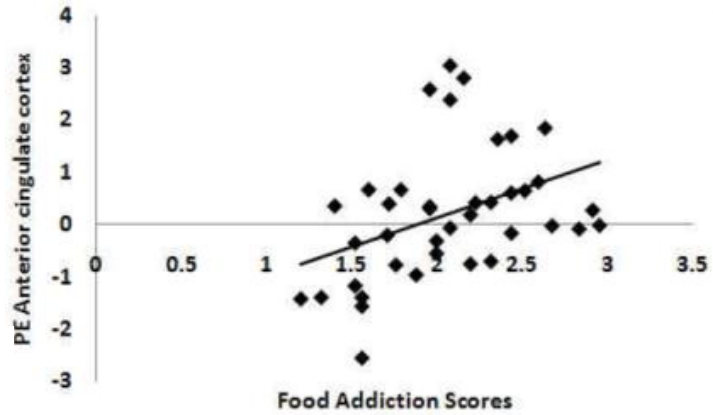


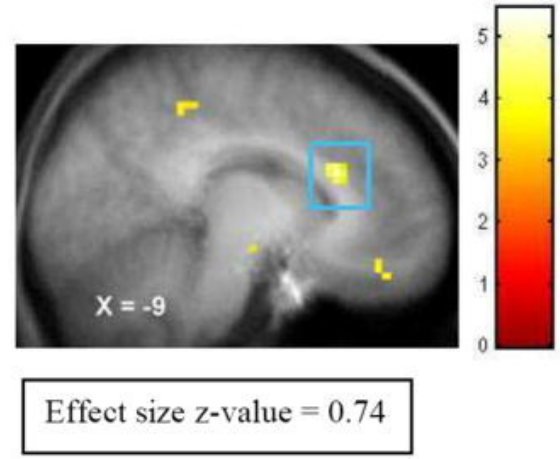
Rats with access to a cafeteria-style diet are hyper-responsive to amphetamine in terms of dopamine release.



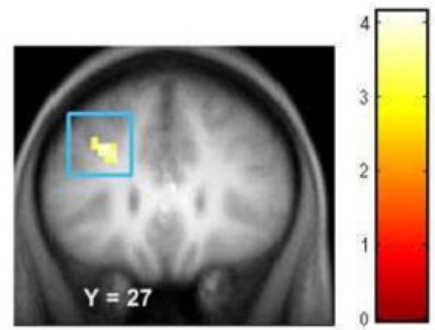
However, they do not respond to a lab chow meal. These rats need "junk food" to release accumbens dopamine.

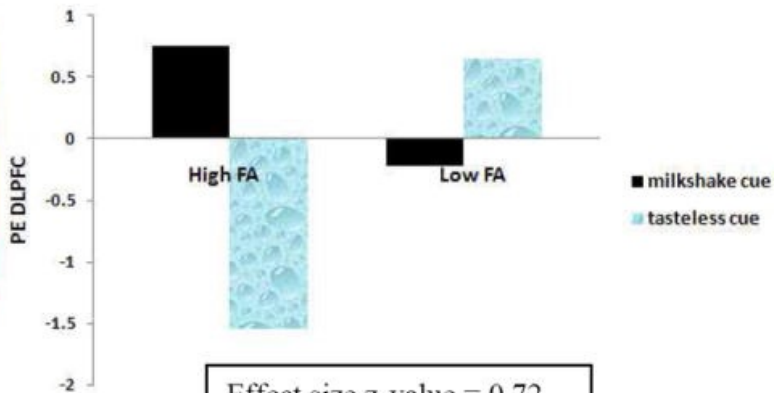






Effect size z-value = 0.74

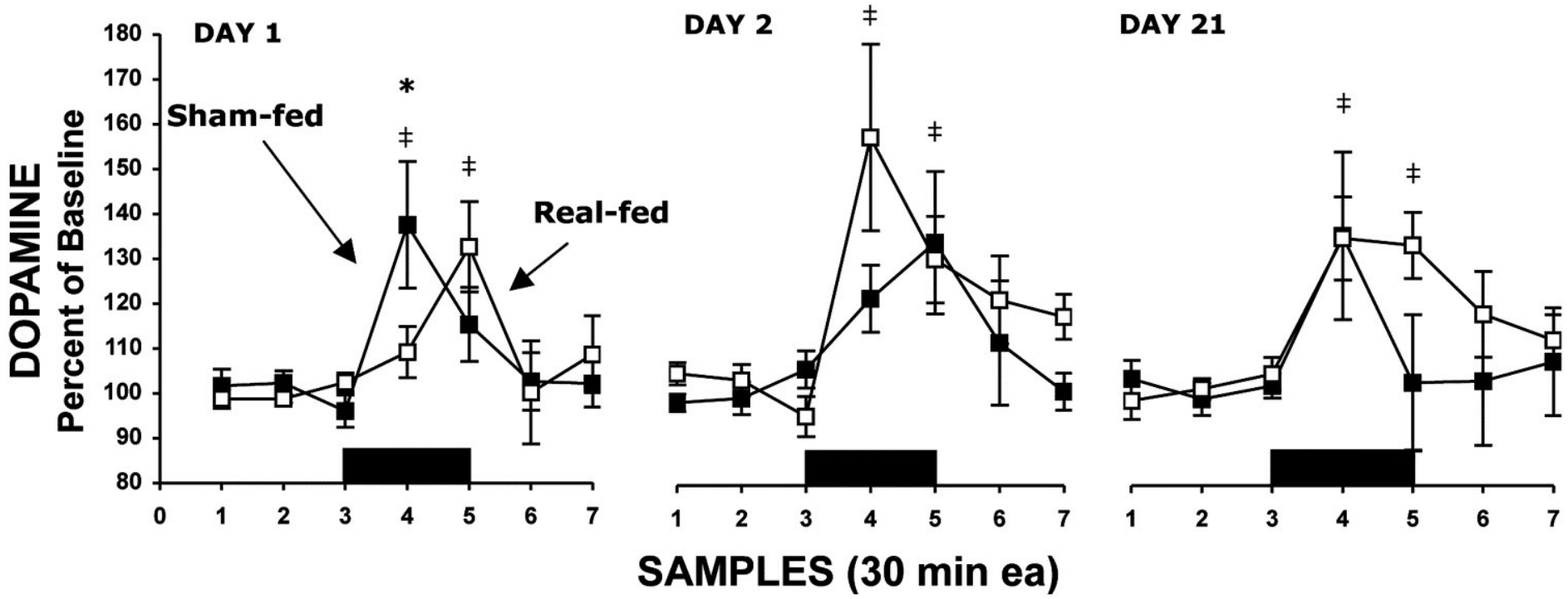




Effect size z-value = 0.72

Gearheardt et al., 2011

It is the Sweet Taste That Drives Addiction



Avena et al.

- Alternative sweeteners have been show to not reduce overall caloric intake.

The Effect of Artificial Sweeteners Use on Sweet Taste Perception and Weight Loss Efficacy: A Review

Klara Wilk,[1] Wiktoria Korytek,[1] Marta Pelczyńska,[2] Małgorzata Moszak,[2,*] and Paweł Bogdański[2]

summarize the current knowledge about the use of NNS as a potential strategy for weight loss and their impact on sweet taste perception. Most studies have demonstrated that consumption of NNS-sweetened foods does not increase sweetness preference orenergy intake. Nonetheless, further research is required to

- They can be used for cravings of sweet things but remember that they should all be weaned when quitting sugar!

Final Thoughts on Alternative Sweeteners

The Impact of Artificial Sweeteners on Body Weight Control and Glucose Homeostasis

Michelle D. Pang* Gijs H. Goossens Ellen E. Blaak

"The majority of clinical studies performed thus far report no significant effects or beneficial effects of artificial sweeteners on body weight and glycemic control…"

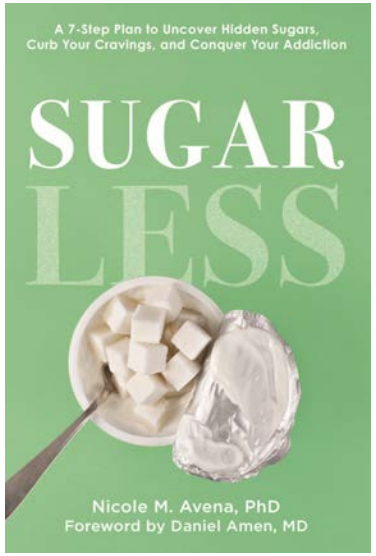
Eating low-calorie sweetened products – especially when hungry or exhausted – may lead to a higher likelihood of seeking high calorie alternatives later, due to a newly discovered signal in the brain, suggests new research published today in *The Journal of Physiology.*

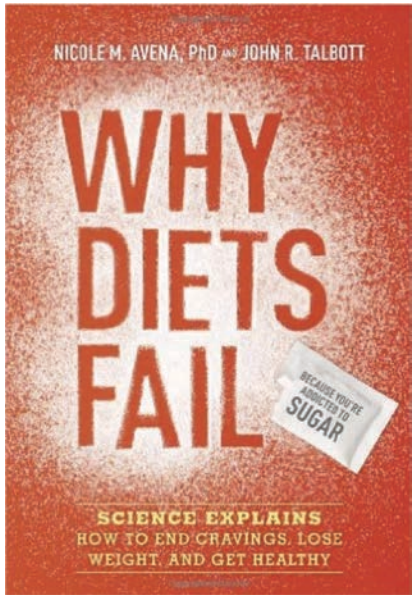
adults or children. Results of the review also suggest that there may be potential undesirable effects from long-term use of NSS, such as an increased risk of type 2 diabetes, cardiovascular diseases, and mortality in adults.

"Replacing free sugars with NSS does not help with weight control in the long term. People need

Per WHO.

New! Out Now!

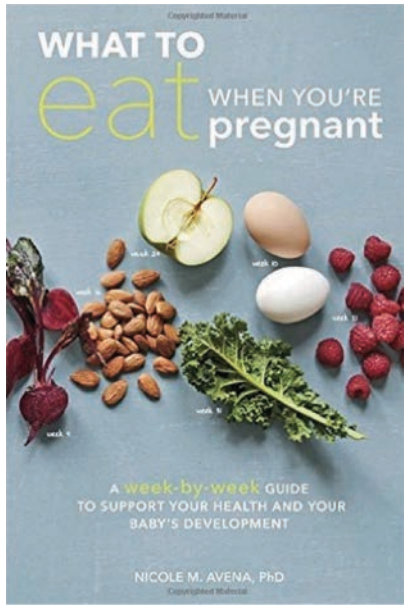


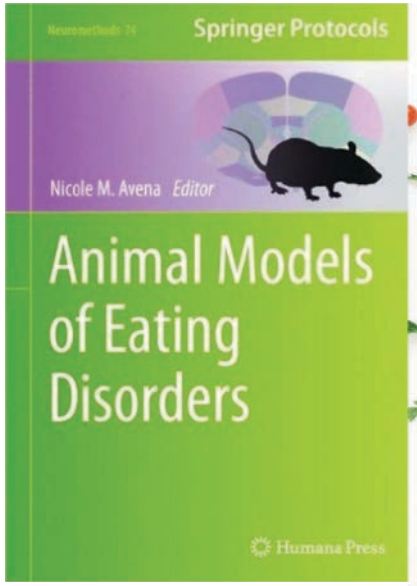


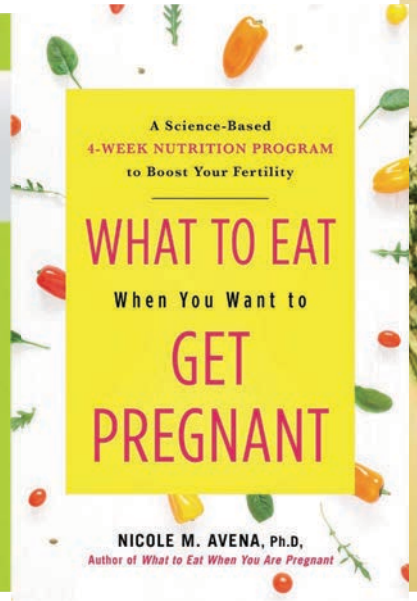
Contact:

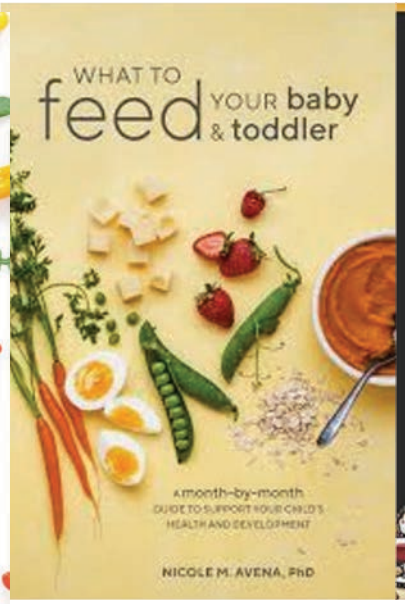
navena@princeton.edu

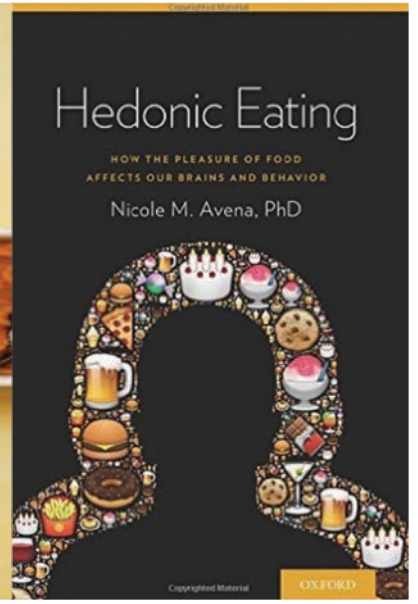
DrNicoleAvena.com











Thank you for joining us today.

Become an Orgain Ambassador Today!

Request an Orgain Ambassador account to access our on-line sampling portal so you can share Orgain products and discount offers with your patients or clients.

healthcare.orgain.com/ambassador

Orgain

Professional Education Series

Support. Inform. Educate. Empower.

WEBINAR HOST:

Keith Hine, MS, RD
VP of Healthcare, Sports & Professional Education
Orgain, LLC

keith.hine@orgain.com

WEBINAR PRESENTER:

Dr. Nicole Avena
Associate Professor of Neuroscience Mount Sinai School of Medicine

nicoleavena@gmail.com

GENERAL INQUIRIES:

medinfo@orgain.com