

THE IMPACT HERBS & SPICES HAVE ON IMPROVING DIET QUALITY

With Kristina Petersen, PhD, APD, FAHA



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Katie Calligaro

Director, Marketing & Communications

The Foundation for Fresh Produce



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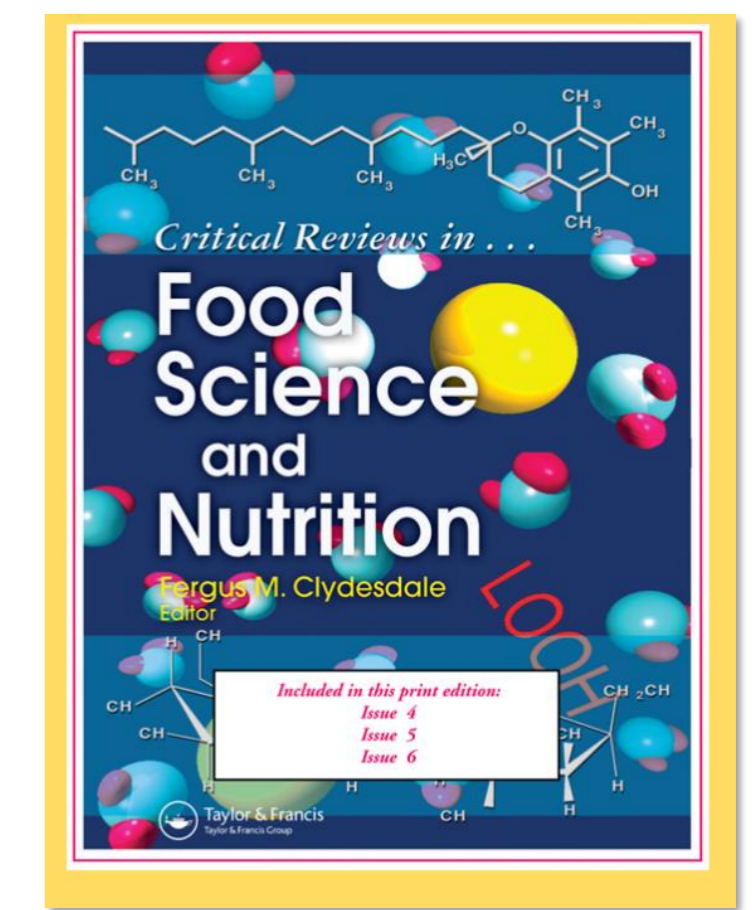
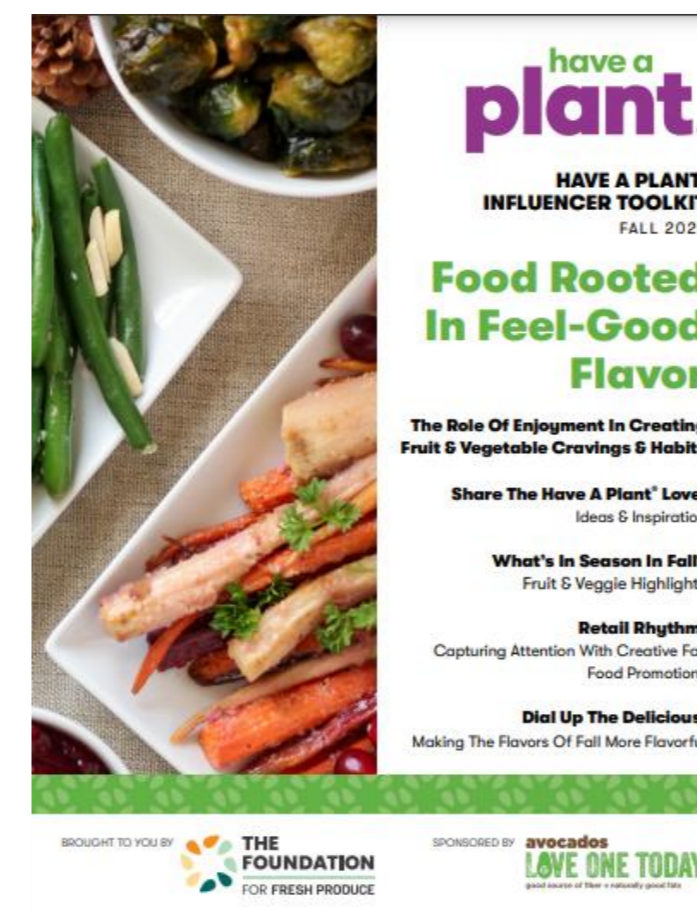
The award-winning Have A Plant[®] campaign is committed to helping consumers live happier, healthier lives by boosting appeal for fruits and vegetables.

Have A Plant[®] programs and the website fruitsandveggies.org are a valuable resource for health and wellness professionals.



EDUCATIONAL RESOURCES

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fruitsandveggies.org/educational-resources

HOUSEKEEPING

Completion of this webinar awards 1.0 CPEUs in accordance with the Commission on Dietetic Registration's CPEU Prior Approval Program.

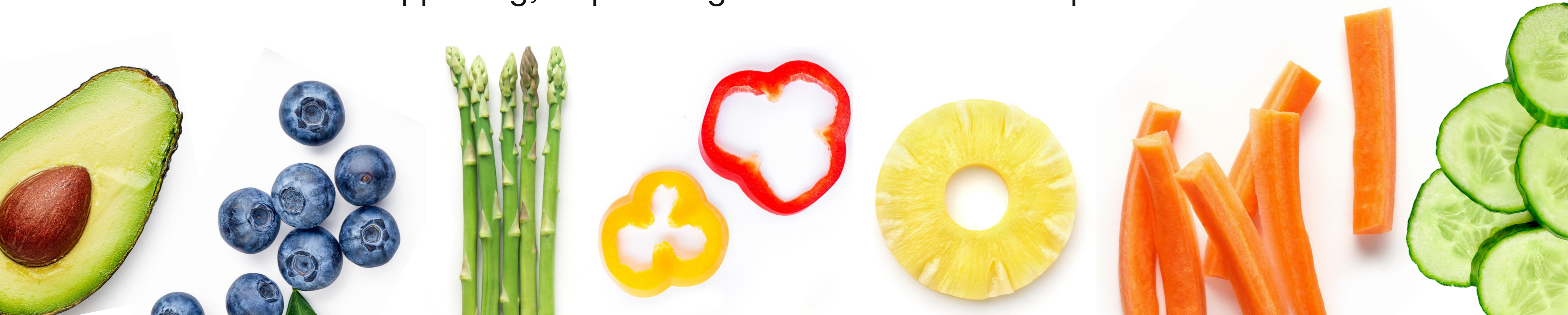
You will receive a link to the certificate of attendance, the webinar recording and PDF of the presentation once approval has been granted.

Type your questions and/or comments into the Q&A section located at the bottom of your screen at any time during the webinar.

Funding from non-CPE revenue for CPE planning, development, review, and/or presentation has been provided by the International Fresh Produce Association.

LEARNING OBJECTIVES

1. Understand how incorporating herbs and spices can improve the flavor of healthier foods, potentially leading to better overall diet quality for their patients and clients.
2. Use evidence-based strategies from recent research to lower the intake of saturated fat and sodium by enhancing food flavor with herbs and spices.
3. Implement practical techniques for using herbs and spices to make fruits and vegetables more flavorful and appealing, empowering consumers to increase produce intake.



TODAY'S SPEAKERS



Kristina Petersen, PhD, APD, FAHA

Associate Professor of Nutritional Sciences
Pennsylvania State University



Emily Holdorf, MS, RDN, CDN

Influencer & Community Manager
The Foundation for Fresh Produce

Disclosures:

Kristina Petersen

- Employed by Pennsylvania State University
- Research funding from McCormick Science Institute
- Serves on McCormick Science Institute's Science Advisory Council

Emily Holdorf

- Employed by the International Fresh Produce Association
- Serves on Cornell Cooperative Extension's Program Advisory Committee for Nutrition, Health & Safety

The Impact Herbs & Spices Have On Improving Diet Quality:

THE RESEARCH

Overview



Dietary quality in the U.S.

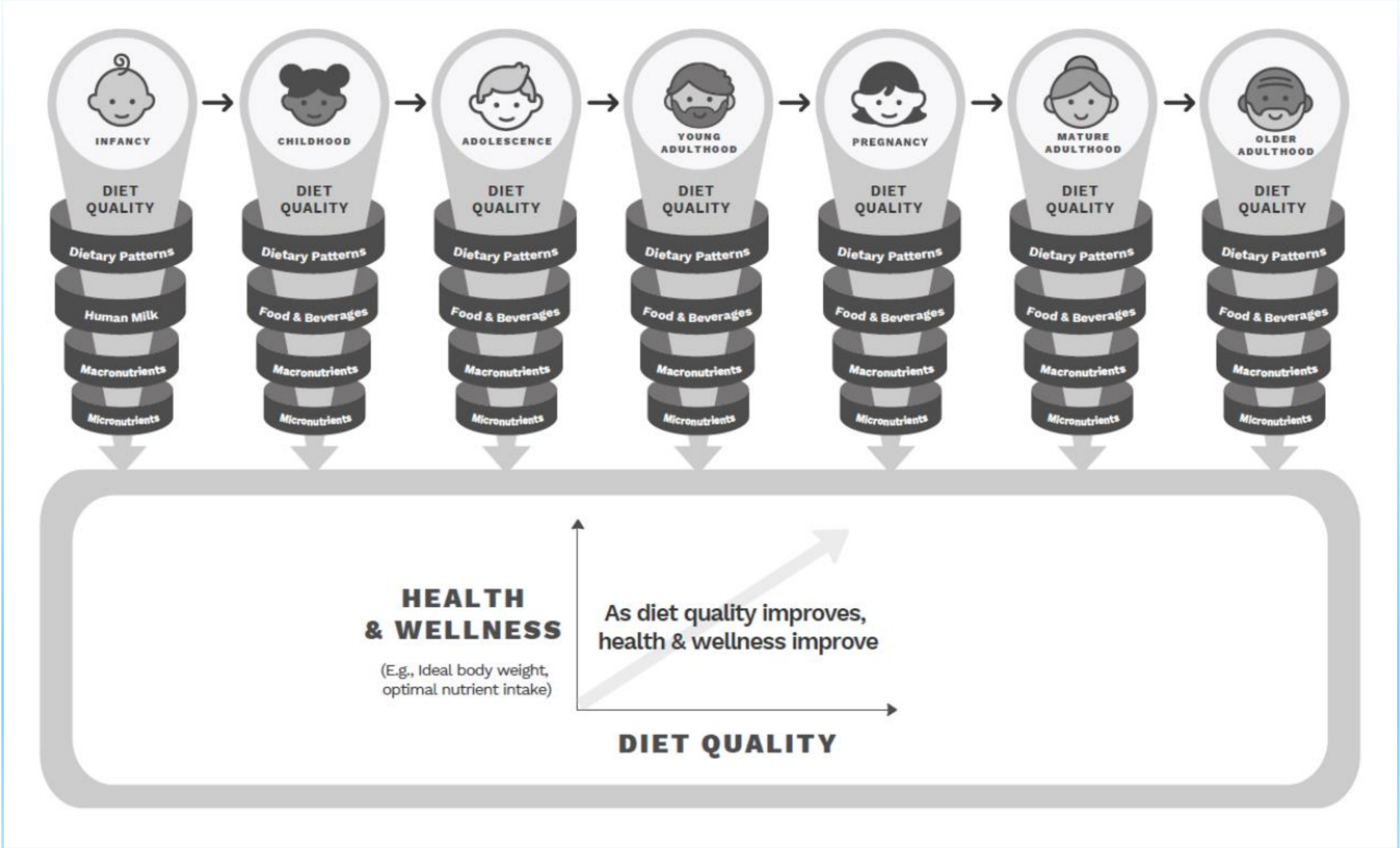
Role of taste in food choice

Potential for herbs & spices to improve diet quality

Highlighting herbs & spices through taste-focused labeling to promote intake of vegetables

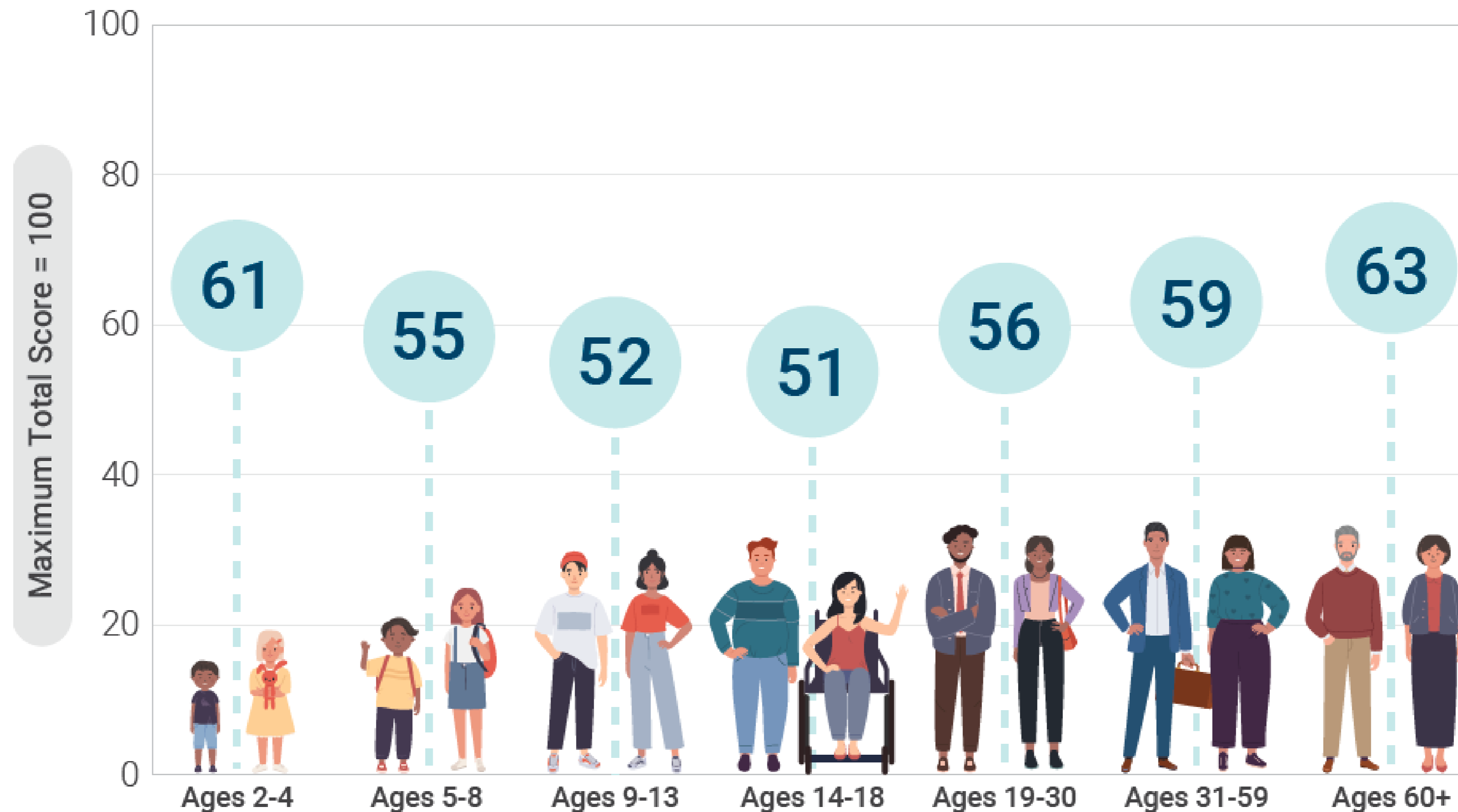


Diet Quality at Every Life Stage Affects Health and Wellness



Dietary Guidelines Advisory Committee. 2020. Scientific Report of the 2020 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Agriculture and the Secretary of Health and Human Services. U.S. Department of Agriculture, Agricultural Research Service, Washington, DC.

Diet Quality is Poor Across All Life Stages



U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025*. 9th Edition. December 2020. Available at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov).

Dietary Intake Compared to Recommendations

Percent of the U.S. Population Ages ≥ 1 who are meeting recommendations



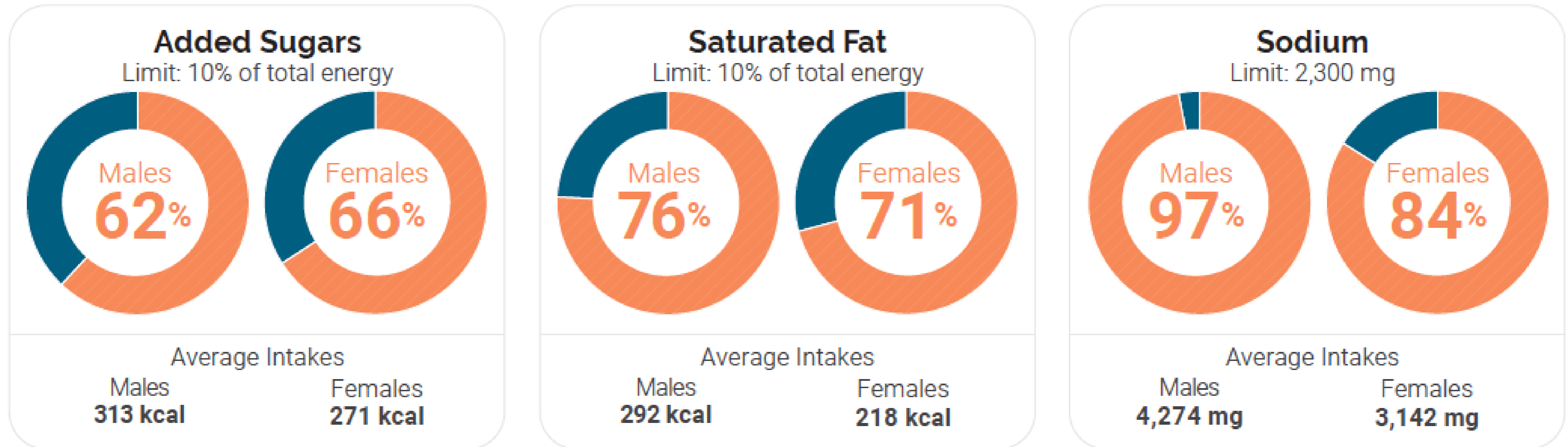
U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025*. 9th Edition. December 2020. Available at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov).

Added Sugars, Saturated Fat and Sodium are Overconsumed

Current Intakes: Ages 19 Through 30

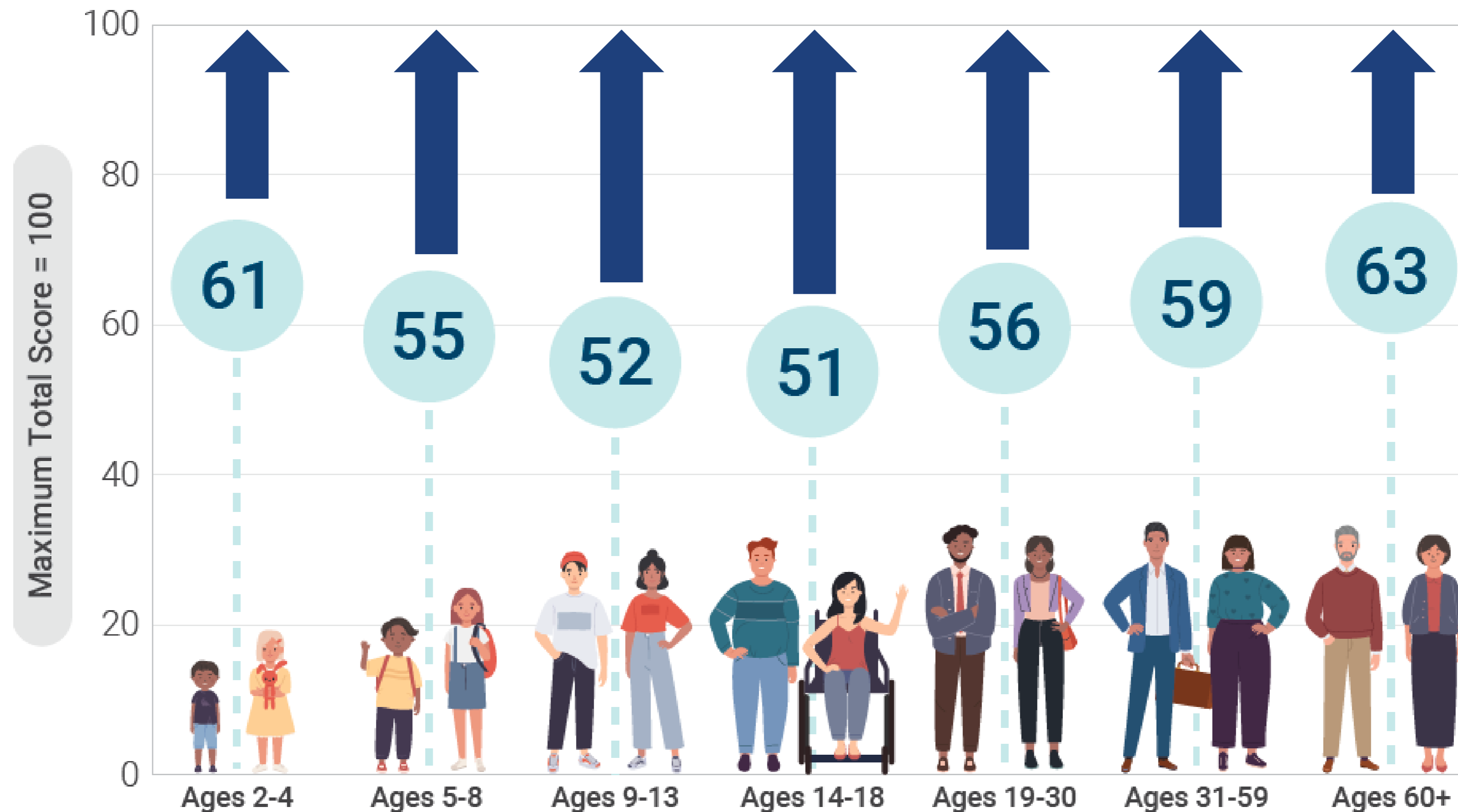
Percent Exceeding Limits of Added Sugars, Saturated Fat, and Sodium

● Exceeding Limit ● Within Recommended Limit



U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025*. 9th Edition. December 2020. Available at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov).

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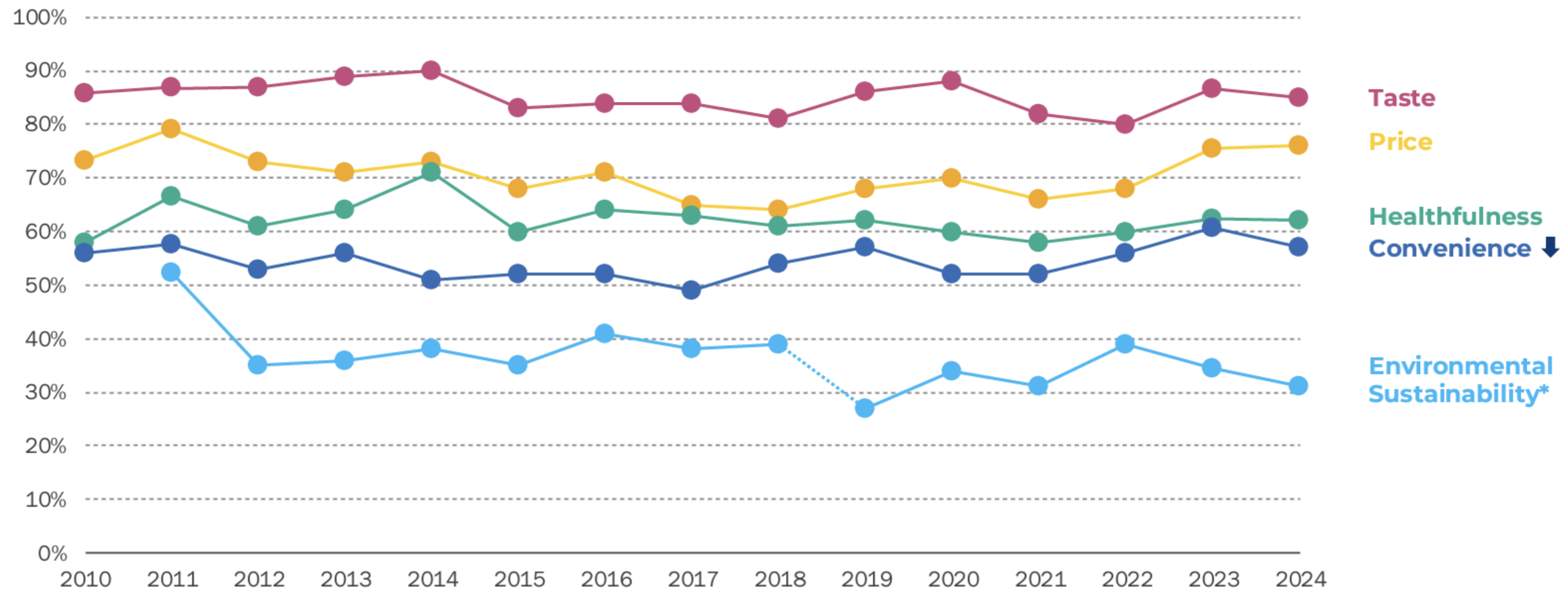
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Taste remains the top purchase driver, followed by price. The impact of convenience is down from 2023.

Baby Boomers, those with higher household incomes, and Asian Americans are most likely to find healthfulness impactful.

Food and Beverage Purchase Drivers Over Time
 (% reporting impact of 4 or 5 out of a 5-point scale)



[TREND] G5 How much of an impact do the following have on your decision to buy foods and beverages? (n=3,000)
 Note: Prior to 2019, "Environmental Sustainability" was phrased as "Sustainability"

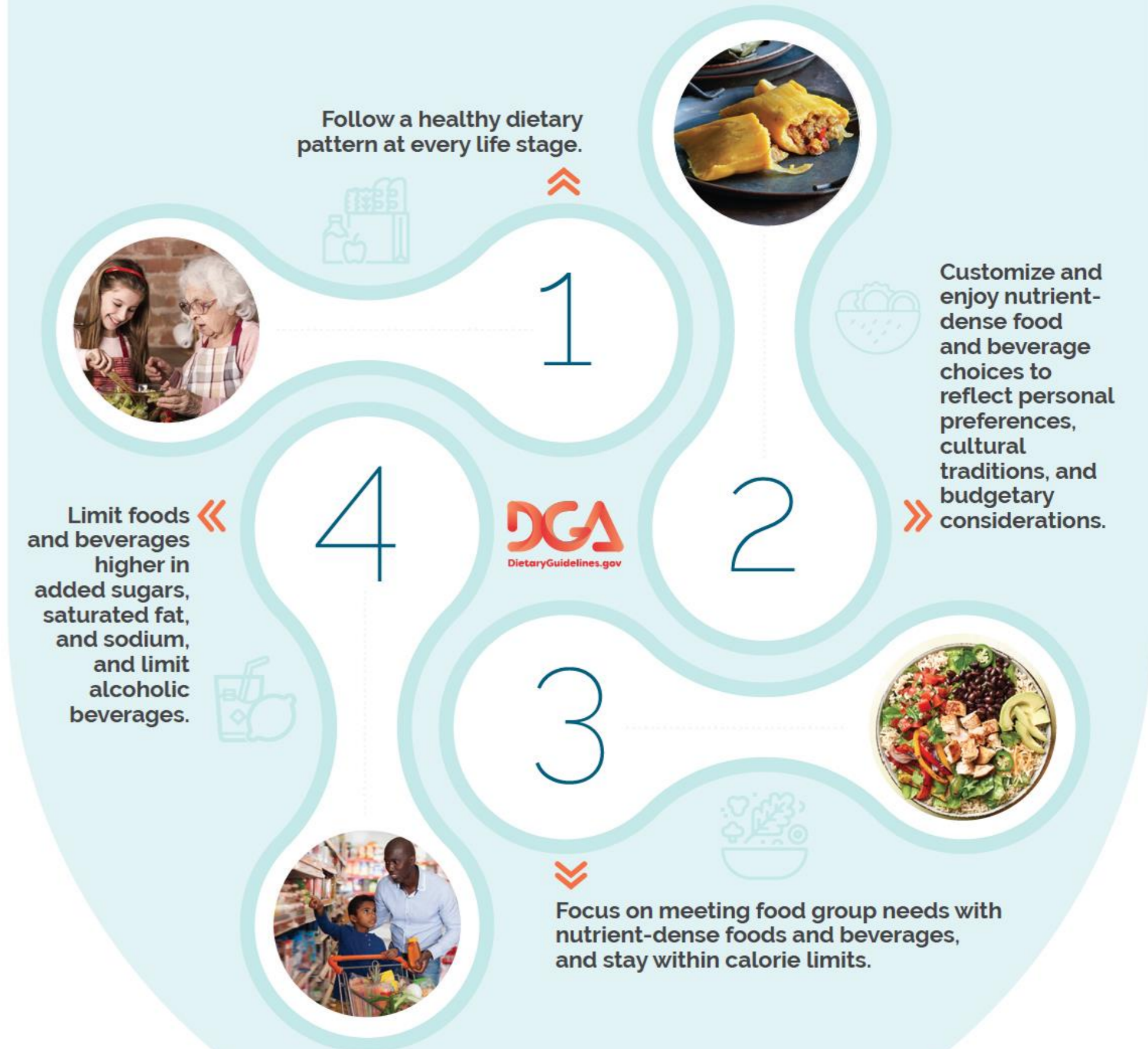
© 2024 International Food Information Council

2024 Food and Health Survey: International Food Information Council. 2024 Food & Health Survey. June 20, 2024

2020-2025 Dietary Guidelines for Americans

The Guidelines

Make every bite count
with the *Dietary Guidelines for Americans*. Here's how:



U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025*. 9th Edition. December 2020. Available at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov).



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Guideline 2

Customize and Enjoy Food and Beverage Choices to Reflect Personal Preferences, Cultural Traditions, and Budgetary Considerations



Start with Personal Preferences



Incorporate Cultural Traditions



Consider Budget

U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025*. 9th Edition. December 2020. Available at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov).



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Guideline 2

Customize and Enjoy Food and Beverage Choices to Reflect Personal Preferences, Cultural Traditions, and Budgetary Considerations



Incorporate Cultural Traditions

“Spices and herbs can help flavor foods when reducing added sugars, saturated fat, and sodium, and they also can add to the enjoyment of nutrient-dense foods, dishes, and meals that reflect specific cultures.”

U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025*. 9th Edition. December 2020. Available at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov).

Potential of Spices and Herbs to Improve Diet Quality

Increase liking of foods lower in overconsumed dietary components

- Do herbs & spices improve the acceptability of foods lower in saturated fat, sodium & added sugars?

Increase the liking of under-consumed dietary components

- Do herbs & spices increase intake of vegetables?



Potential of Spices and Herbs to Improve Diet Quality

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RESEARCH

Research Paper



Using Herbs/Spices to Enhance the Flavor of Commonly Consumed Foods Reformulated to Be Lower in Overconsumed Dietary Components Is an Acceptable Strategy and Has the Potential to Lower Intake of Saturated Fat and Sodium: A National Health and Nutrition Examination Survey Analysis and Blind Tasting



Kristina S. Petersen, PhD, APD, FAHA; Victor L. Fulgoni III, PhD; Helene Hopfer, PhD; John E. Hayes, PhD; Rachel Gooding; Penny Kris-Etherton, PhD, RDN, LDN

Petersen et al., *J Acad Nutr Diet.* 2024;124(1):15-27.



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Research Question & Aims

Research Question

Does using herbs and spices to enhance the flavor of commonly consumed foods lower in saturated fat, added sugars and sodium meaningfully lower population level intake of overconsumed nutrients and increase diet quality while being acceptable to consumers?

Aims

- To identify the top contributors to saturated fat, added sugars and sodium intake in the U.S. diet, conduct recipe modification to lower overconsumed nutrients and enhance flavor with herbs and spices.
- To model the potential impact of adoption of the seasoned healthier recipes on population level intake of saturated fat, sodium, added sugars, and diet quality.
- To evaluate consumer acceptance of these healthier recipes.

Petersen et al., *J Acad Nutr Diet.* 2024;124(1):15-27.



Methods: Identification of Sources of Overconsumed Nutrients & Targets for Recipe Modification

Data source: NHANES 2015-2018

- Identified top food category sources of calories, sodium, saturated fat, and added sugars.

Targets for Recipe Modification

- Aimed to identify 10 recipes that could be modified to lower 1 or more overconsumed nutrient(s).
- Herbs and spices could be added to enhance flavor.



Petersen et al., *J Acad Nutr Diet*. 2024;124(1):15-27.

Recipe Modification

Food category	Food	Percent difference per serving ^a			
		Energy	SFA ^b	Sodium	Added sugars
Pizza	Cheese pizza	-9.25	-34.65	-21.04	-69.49
Burritos and tacos	Taco (meat only)	-20.33	-41.94	-41.86	0
Pasta mixed dishes	Pasta with meat sauce	-5.16	-39.23	-33.02	-100
	Mac and cheese	-6.74	-31.53	-23.32	0
Cookies and brownies	Brownie	1.51	-24.19	-50.09	-11.38
Cakes and pies	Apple pie	-16.83	-25.73	-0.93	-58.11
Meat mixed dishes	Chili	-10.14	-51.38	-52.88	0
	Meatloaf	-18.88	-46.14	-48.88	-1.05
Poultry mixed dishes	Chicken pot pie	-1.24	-28.73	-38.90	0
	Chicken with cream sauce (sauce only)	-7.25	-84.50	-56.79	0

^aModified recipe (ie, nutritionally improved and flavor-enhanced and nutritionally improved) – original recipe.

^bSFA = saturated fat.

Petersen et al., *J Acad Nutr Diet*. 2024;124(1):15-27.



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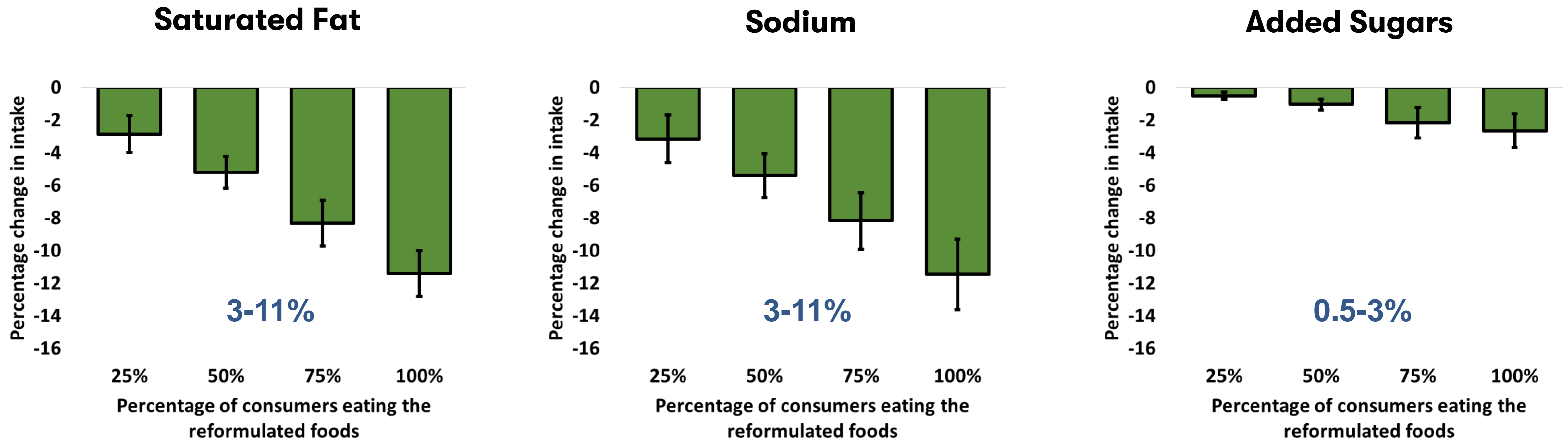
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Example Recipe Reformulation: Mac n Cheese

Original		Nutritionally Improved		Flavor Enhanced Nutritionally Improved	
Ingredients	Weight (g)	Ingredients	Weight (g)	Ingredients	Weight (g)
Butter, salted	77	Butter, unsalted	25	Butter, unsalted	25
		Vegetable Oil	20	Vegetable Oil	20
All Purpose Flour	22.8	All Purpose Flour	22.8	All Purpose Flour	22.8
2% Milk	711	Skim Milk	711	Skim Milk	711
American Cheese	329	American Cheese, reduced sodium + fat	164.5	American Cheese, reduced sodium + fat	164.5
		American Cheese	164.5	American Cheese	164.5
Salt	0.5				
Pasta, cooked	1020	Pasta, cooked	1020	Pasta, cooked	1020
Breadcrumbs, dry, plain	157	Breadcrumbs, dry, plain	157	Breadcrumbs, dry, plain	157
Butter, salted	25	Butter, unsalted	15	Butter, unsalted	15
		Oil	10	Oil	10
				Onion Powder	6
				Garlic Powder	3
				Mustard Seed, ground	1
				Paprika	0.5
				Cayenne	0.25

All recipes available [here](#)

Modeling Showed Intake of the Reformulated Recipes Would Lower Daily Intake of Saturated Fat, Sodium & Added Sugars



Petersen et al., *J Acad Nutr Diet*. 2024;124(1):15-27.

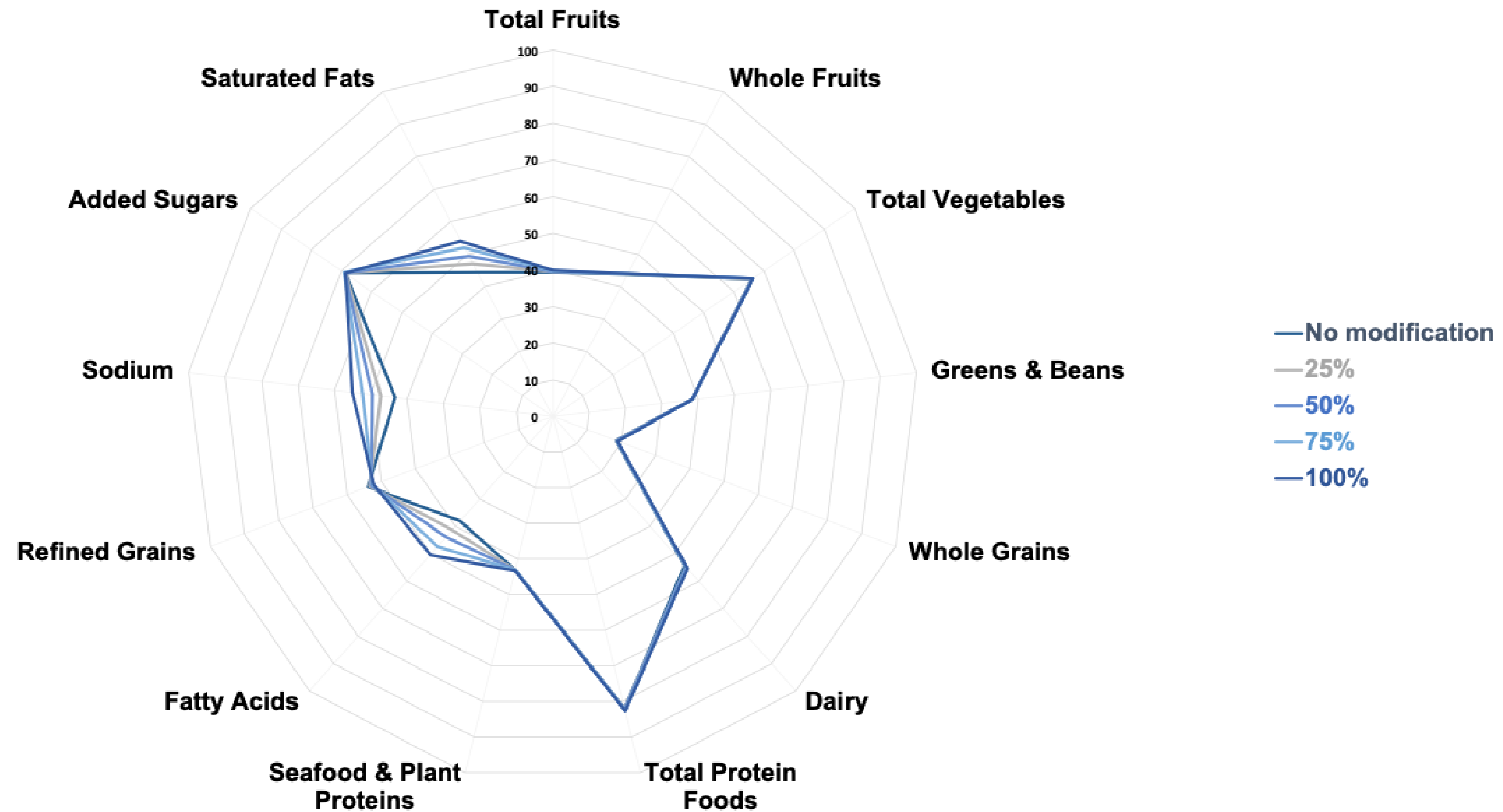


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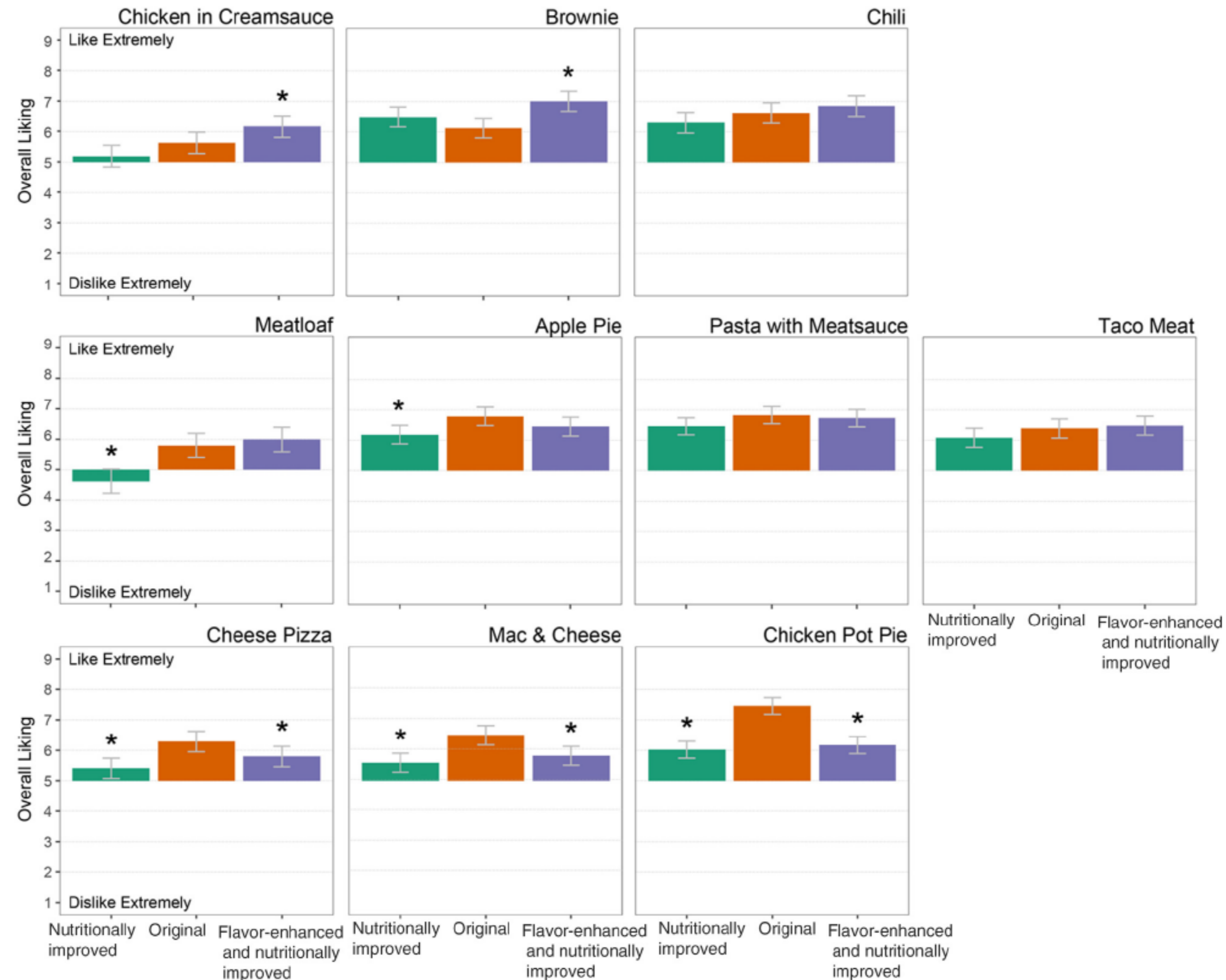
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Modeling Showed Diet Quality Assessed by the HEI-2020 Would Improve with the Reformulated Recipes

The HEI-2020 would improve by 1.0-3.5 points (2.2-7.2%) with 25% to 100% adoption of the reformulated recipes



The Overall Liking Ratings for 7 of the 10 Reformulated Foods with Herbs/Spices were Superior or at Parity with the Original Foods



Potential of Spices and Herbs to Improve Diet Quality

Increase liking of foods lower in overconsumed dietary components

- Herbs & spices have the potential to improve the acceptability of foods lower in saturated fat, sodium & added sugars

Increase the liking of under-consumed dietary components

- Do herbs & spices increase intake of vegetables?



Potential of Spices and Herbs to Improve Diet Quality

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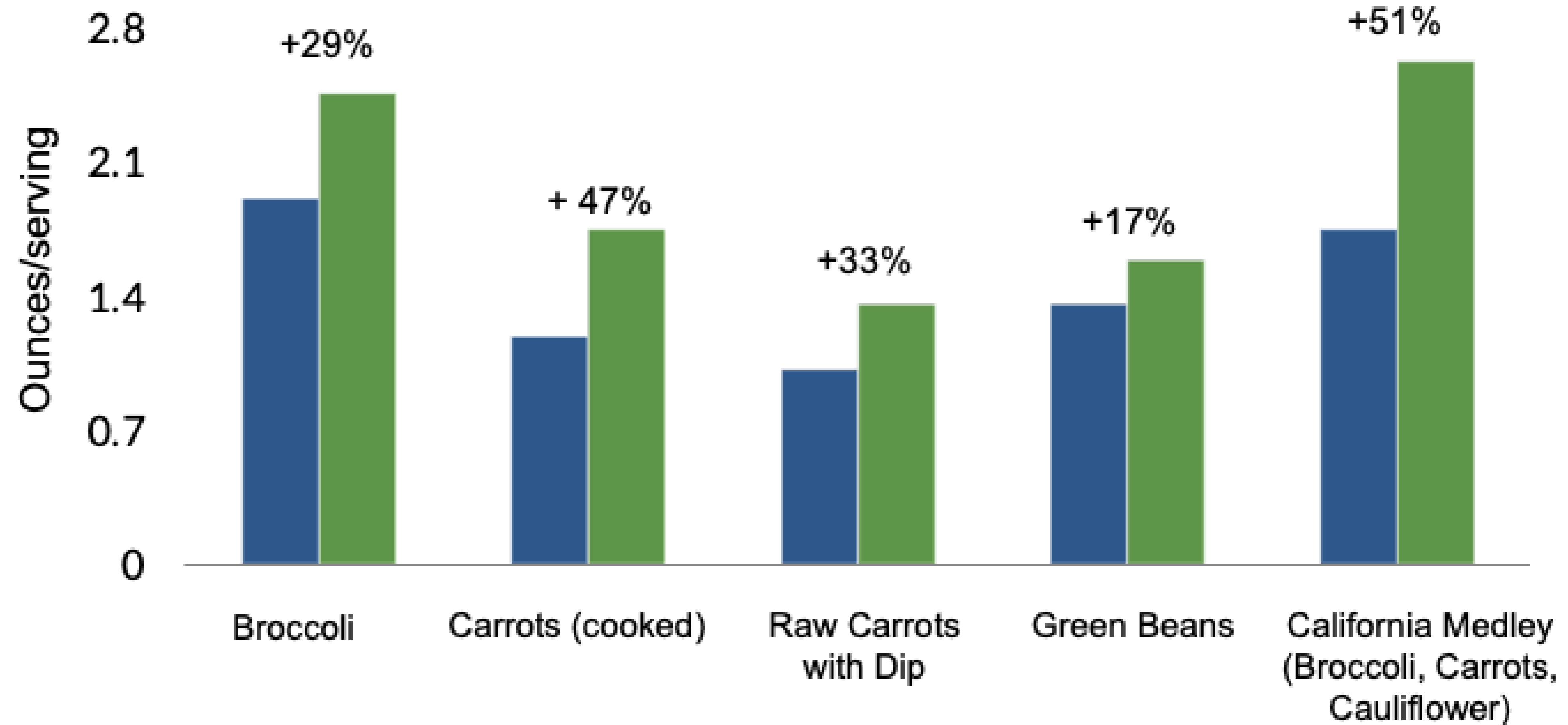
- Herbs & spices have the potential to improve the acceptability of foods lower in saturated fat, sodium & added sugars

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Spices & Herbs Increased Consumption of Vegetables in an Urban High School Cafeteria

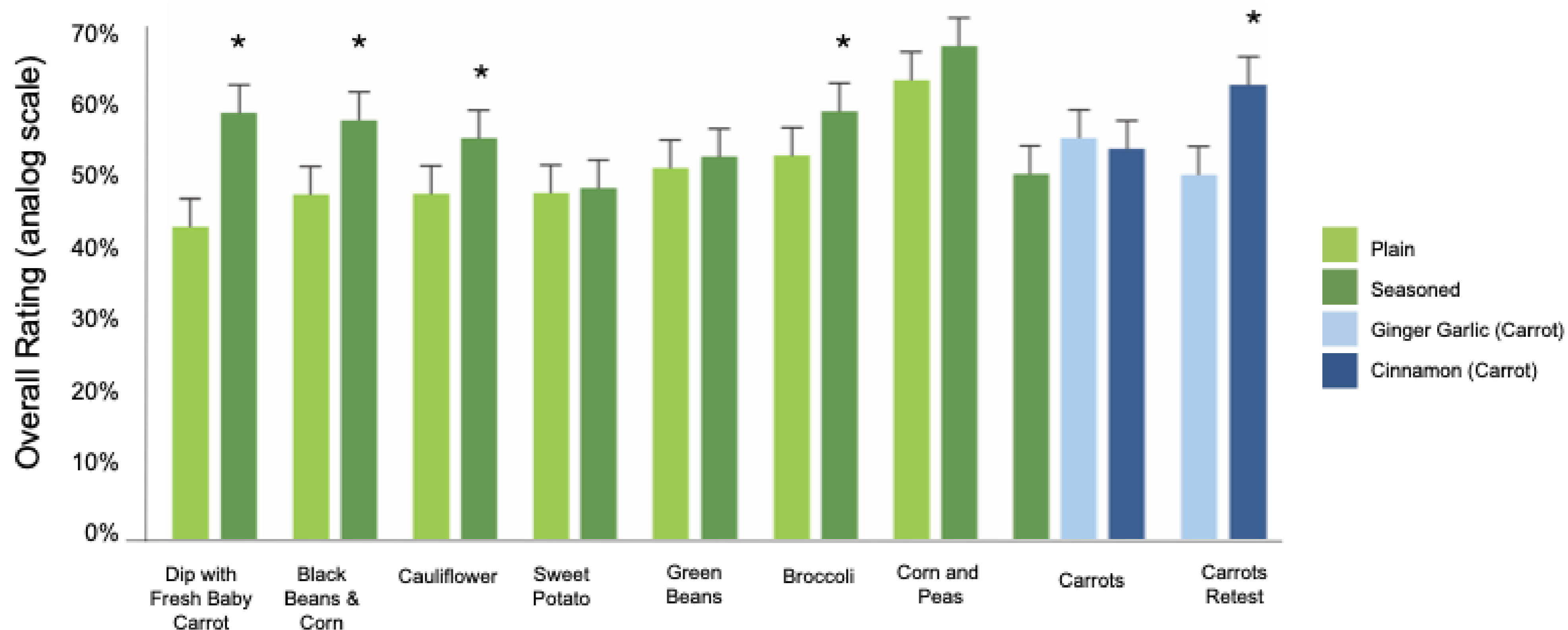


D'Adamo et al., *Food Qual Pref* 2021; 88:104076



Spices & Herbs Increased the Liking of Most Vegetables Among Rural High & Middle School Students

Overall Rating of Food (MM)



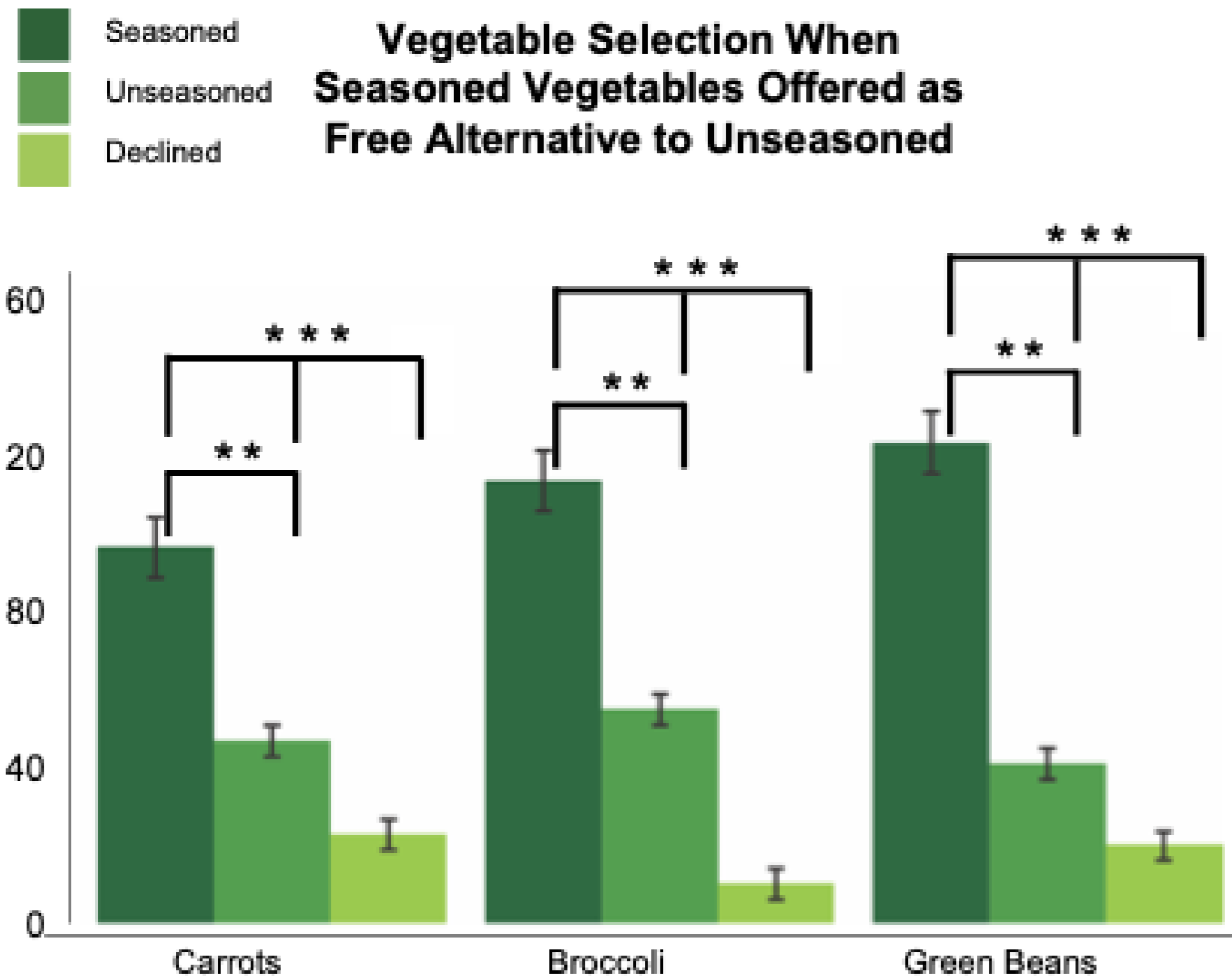
Fritts et al., *Food Qual Pref* 2018;68:125



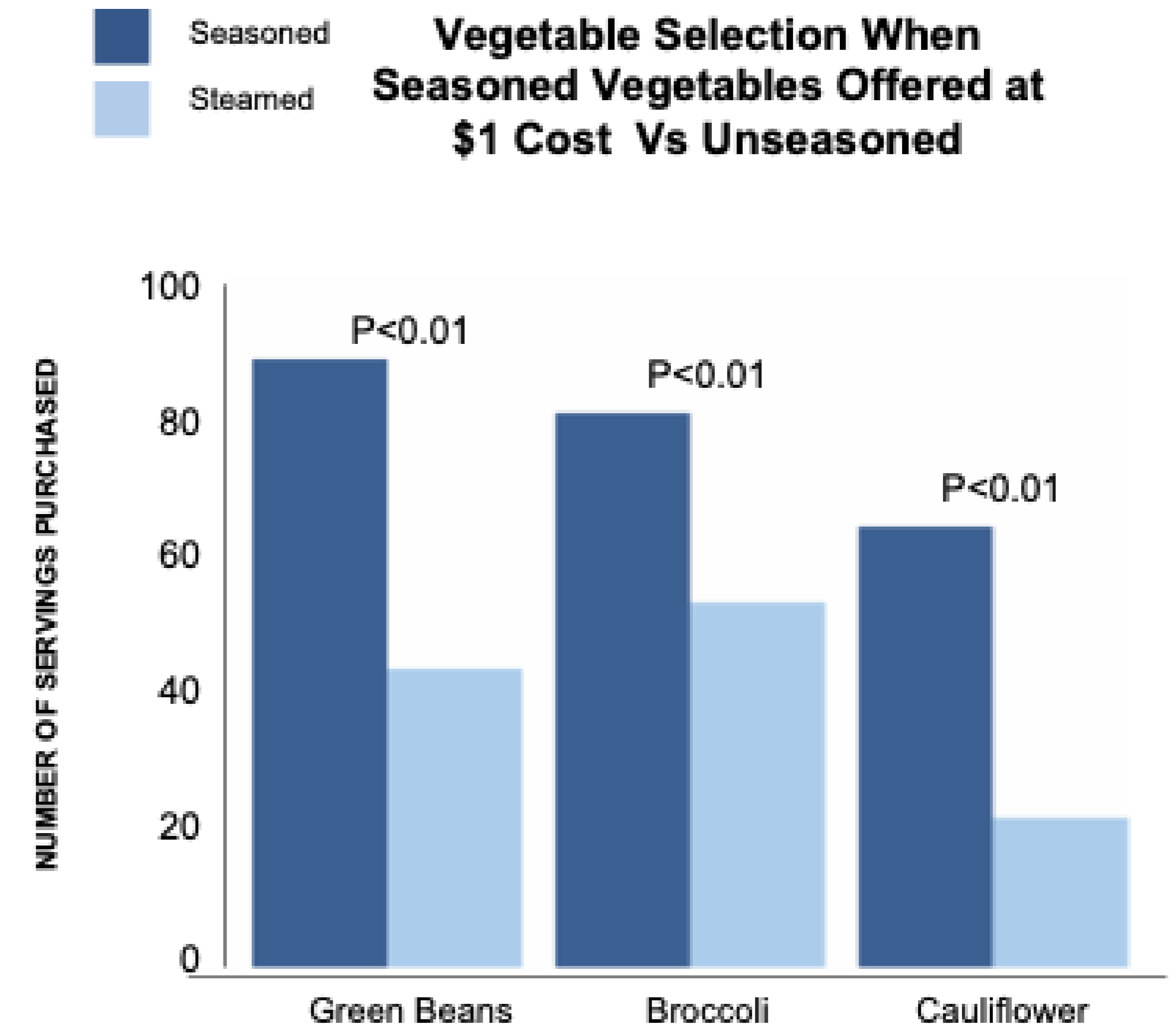
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Cafeteria Patrons Preferred Vegetables Seasoned with Spices/Herbs More Often Than Their Unseasoned Counterparts



Manero et al., *Appetite* 2017;116:239



Luu et al., *Food Qual Pref* 2020;82:103890



Potential of Spices and Herbs to Improve Diet Quality

Increase liking of foods lower in overconsumed dietary components

- Herbs & spices have the potential to improve the acceptability of foods lower in saturated fat, sodium & added sugars

Increase the liking of under-consumed dietary components

- Seasoning vegetables with herbs & spices may increase intake of vegetables



Taste-focusing Labeling

Taste-focused labels elevate diners' expectations of a positive taste experience with vegetables and other plant-based foods.

- Specific flavors
- Positive experiences

Zesty ginger-turmeric sweet potatoes

Fragrant Herbes de Provence Vegetable Ratatouille

Sizzlin' Cajun spice inspired Cabbage

Caramelized Balsamic and Herb Vegetable Medley

Dynamite chili and tangy lime-seasoned beets

[Edgy Veggie Toolkit](#)



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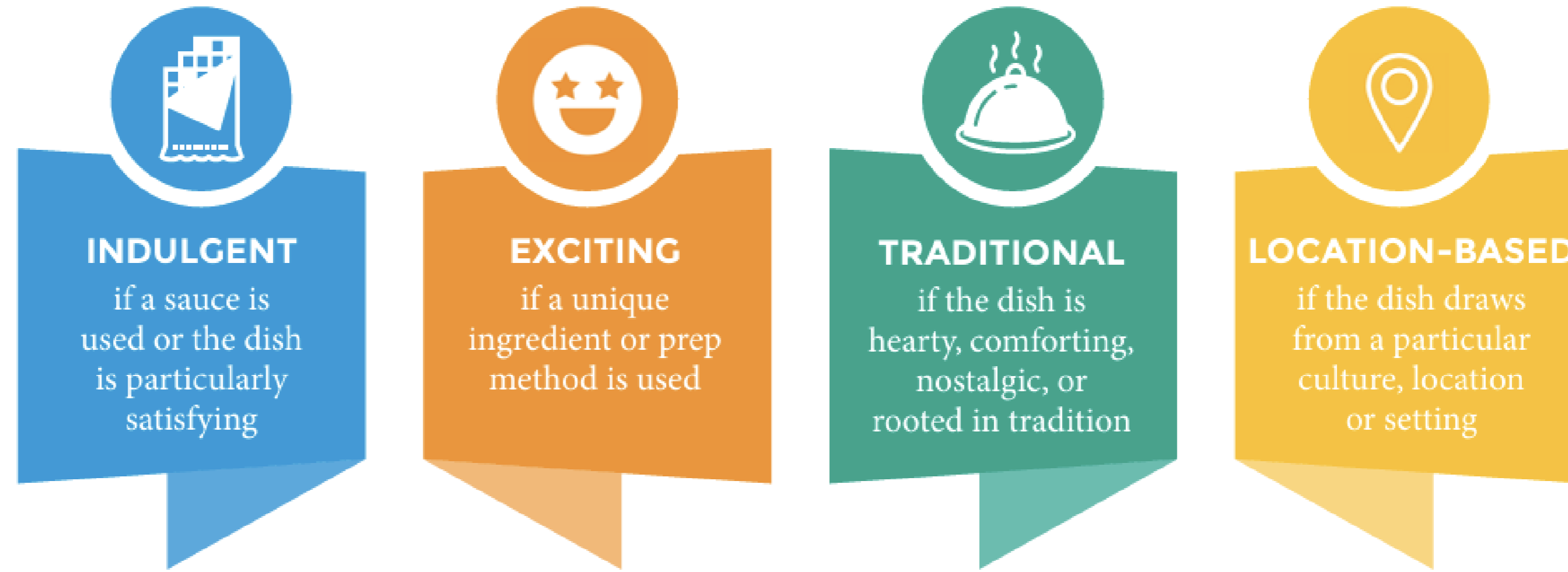
Unhealthy = Tasty Intuition

The less healthy the item is portrayed to be:

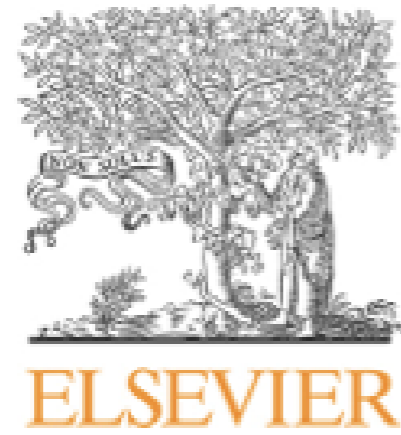
1. The better its inferred **taste**
2. The more it is **enjoyed** during actual consumption
3. The greater the **preference** for it is in choice tasks when a hedonic goal is more (versus less) salient



Taste-focusing Labeling



OLD-FASHIONED **SIZZLIN'** SPLASHED
MOUTHWATERING
NEW ORLEANS **CARAMELIZED** **HOMESTYLE**
GLAZED ABUELITA'S PROVENCE
SHANGHAI **INSPIRED**
BOLDLY **COUNTRYSIDE** **JUICY** MAMA'S
CREAMY TAVERN STYLE **CLASSIC** TWISTED **THAI**



Contents lists available at [ScienceDirect](#)

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed



Smart food policy for healthy food labeling: Leading with taste, not healthiness, to shift consumption and enjoyment of healthy foods

Bradley P. Turnwald*, Alia J. Crum

Department of Psychology, Stanford University, 450 Serra Mall, Stanford, CA 94305, USA

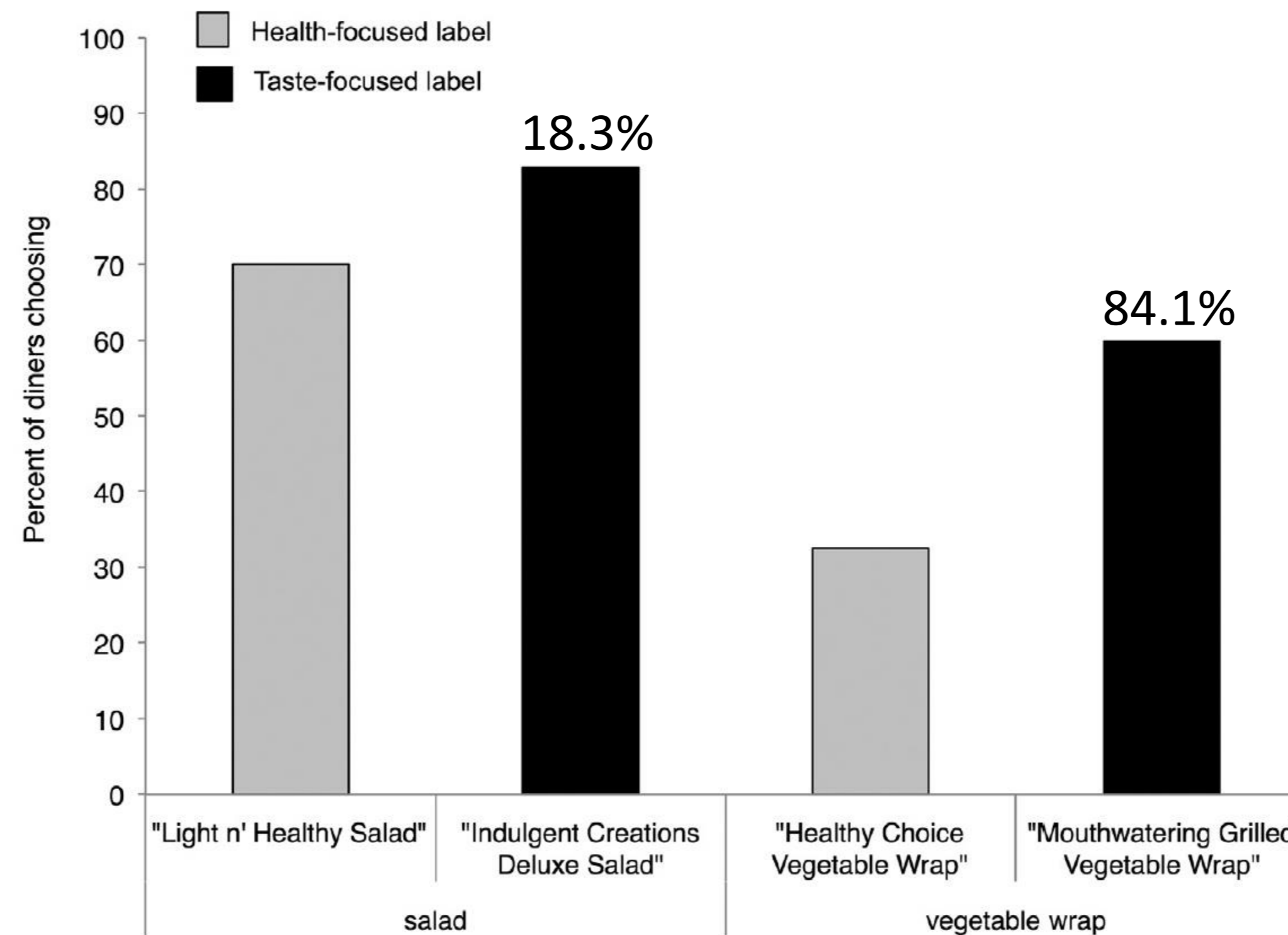


What is the effect of traditional health-focused labeling compared to taste focused labeling on adults' selection and enjoyment of healthy foods?



Taste-Focused Labels Increase Adults' Selection of a Variety of Healthy Foods

Percentage of diners (n=202) selecting salads and vegetable wraps with health-focused and taste-focused labels at a conference lunch buffet in northern California



Labeling Vegetables with Indulgent Descriptors

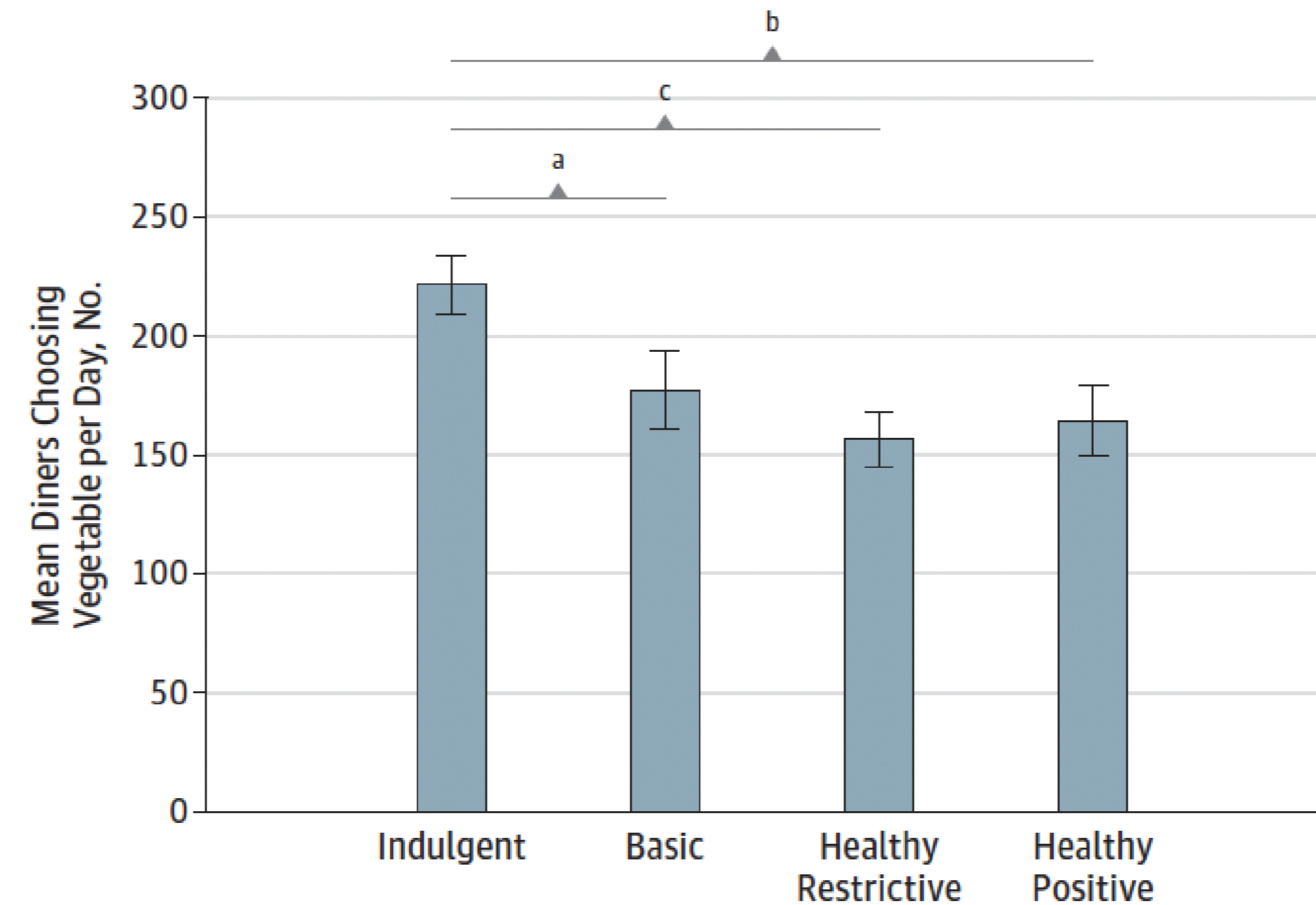
Study in a large university cafeteria serving ~600 meals per day at lunch

Table. Example Vegetable Descriptions by Condition

Indulgent	Basic	Healthy Restrictive	Healthy Positive
Dynamite chili and tangy lime-seasoned beets	Beets	Lighter-choice beets with no added sugar	High-antioxidant beets
Rich buttery roasted sweet corn	Corn	Reduced-sodium corn	Vitamin-rich corn
Sweet sizzlin' green beans and crispy shallots	Green beans	Light 'n' low-carb green beans and shallots	Healthy energy-boosting green beans and shallots
Zesty ginger-turmeric sweet potatoes	Sweet potatoes	Cholesterol-free sweet potatoes	Wholesome sweet potato superfood
Twisted garlic-ginger butternut squash wedges	Butternut squash	Butternut squash with no added sugar	Antioxidant-rich butternut squash
Slow-roasted caramelized zucchini bites	Zucchini	Lighter-choice zucchini	Nutritious green zucchini
Tangy ginger bok choy and banzai shiitake mushrooms	Bok choy and mushrooms	Low-sodium bok choy and mushrooms	Wholesome bok choy and mushrooms
Twisted citrus-glazed carrots	Carrots	Carrots with sugar-free citrus dressing	Smart-choice vitamin C citrus carrots

JAMA Intern Med. 2017;177(8):1216-1218.

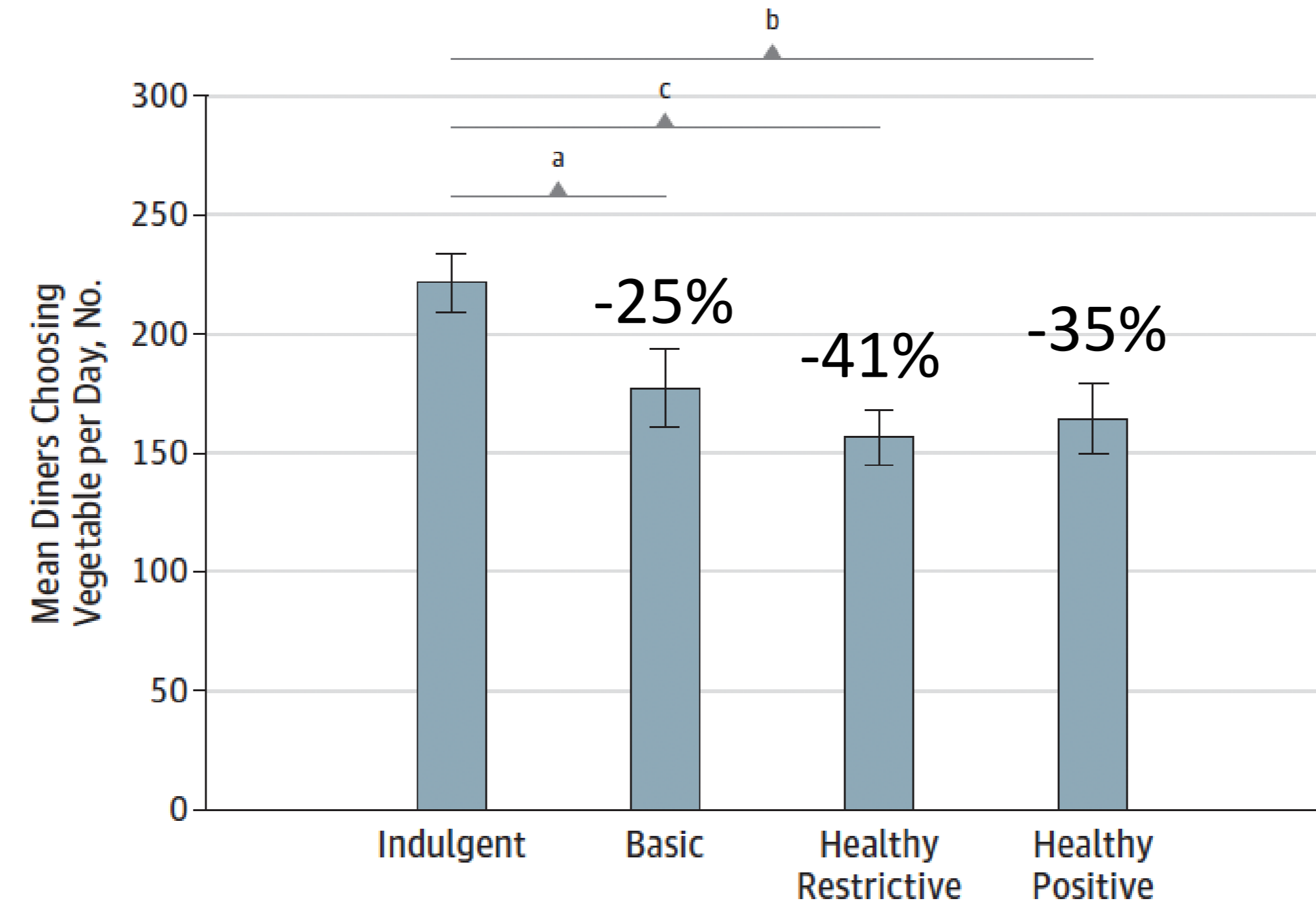
Labeling Vegetables with Indulgent Descriptors Increased Vegetable Selection



Bars represent mean number of diners choosing the vegetable per day by condition; error bars represent standard error. Two-tailed *t* tests were used for pairwise comparisons, and $P \leq .05$ were considered statistically significant.

^a $P < .05$; ^b $P < .01$; ^c $P < .001$.

Labeling Vegetables with Indulgent Descriptors Increased Vegetable Selection



Bars represent mean number of diners choosing the vegetable per day by condition; error bars represent standard error. Two-tailed *t* tests were used for pairwise comparisons, and $P \leq .05$ were considered statistically significant.

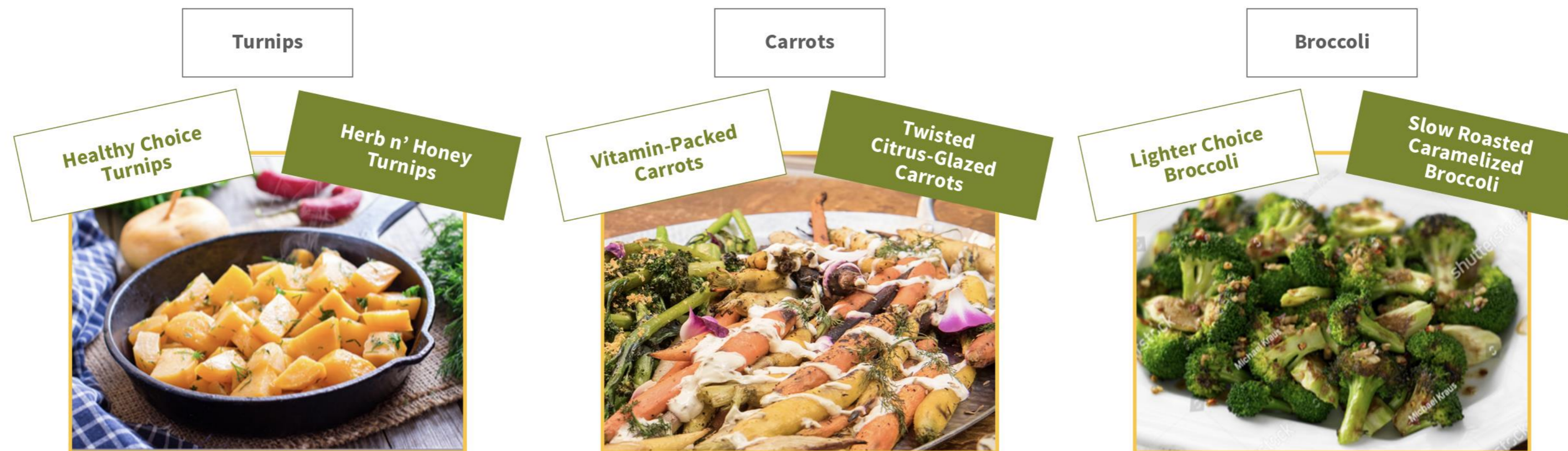
^a $P < .05$; ^b $P < .01$; ^c $P < .001$.



Delicious Impressions Support Healthy Eating (DISH) Study

The Menus of Change University Research Collaboration (MCURC)

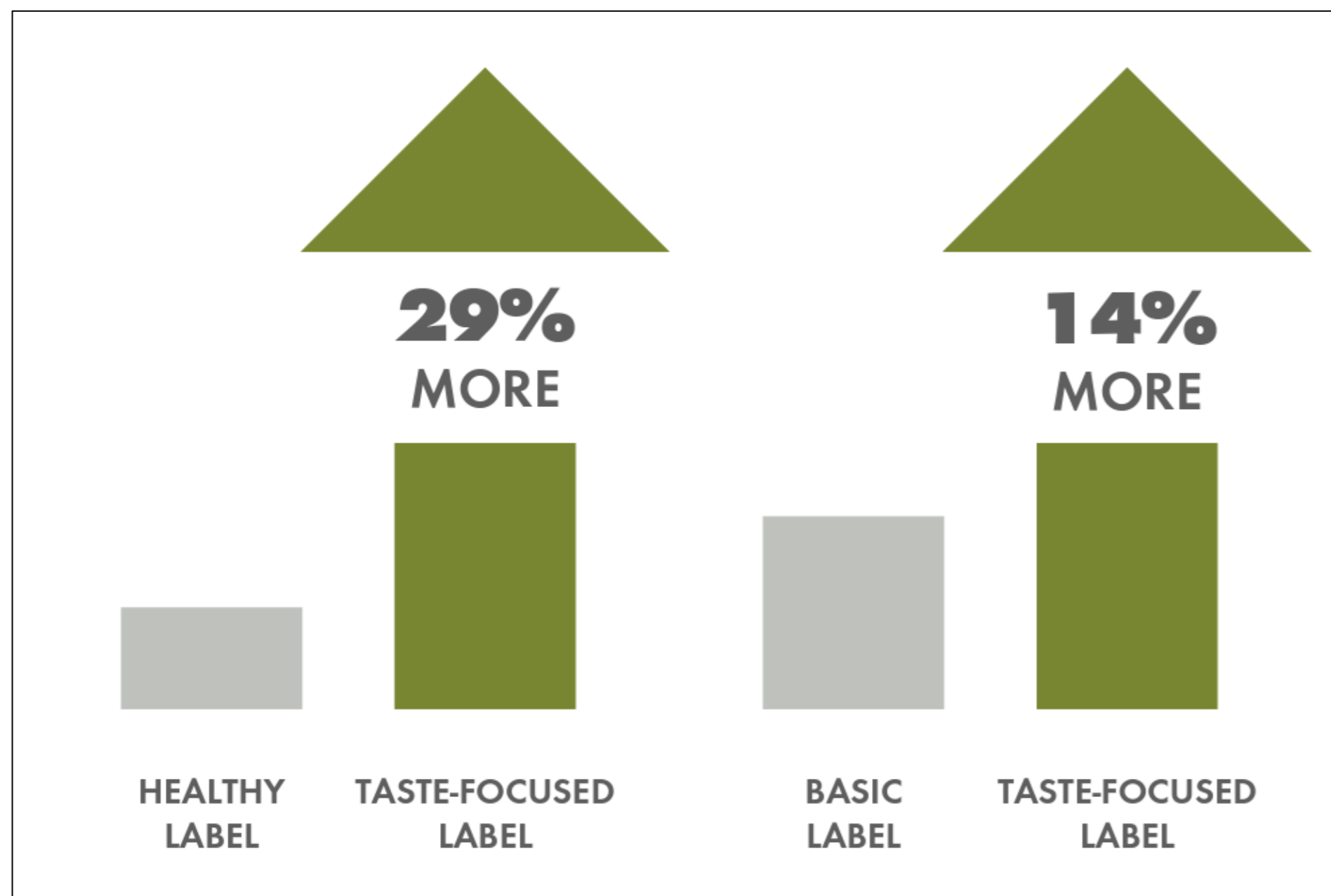
Over 185 days, researchers tracked nearly 140,000 decisions about 71 vegetable dishes that had been labeled with **taste-focused**, health-focused or basic names.



Psychological Science 2019, Vol. 30(11) 1603–1615 & https://www.ciaprochef.com/MCURC_DISH_Study_Executive_Summary/

Taste-Focused Labels Increased Vegetable Selection & Consumption

Vegetable Selection

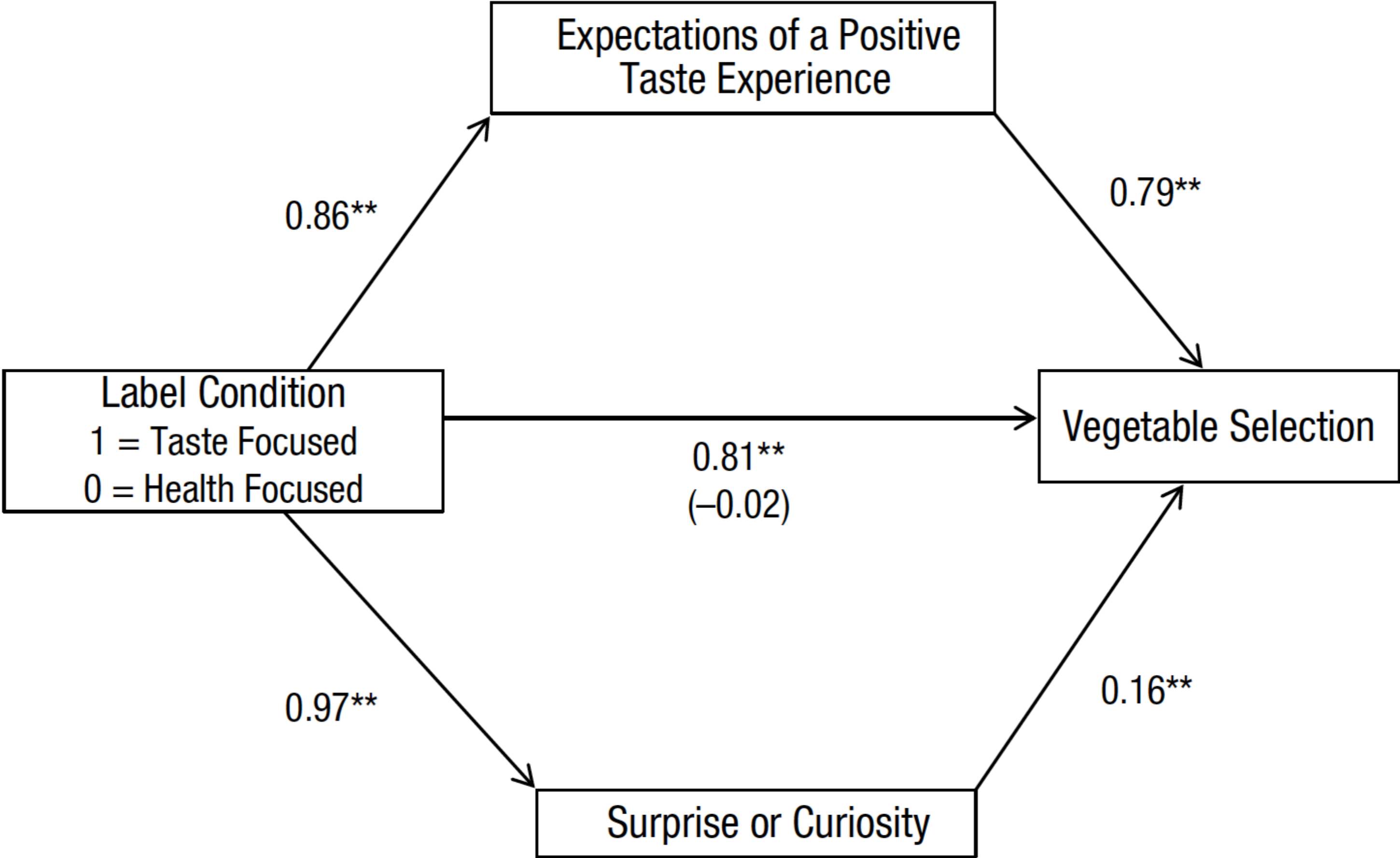


Vegetable Consumption



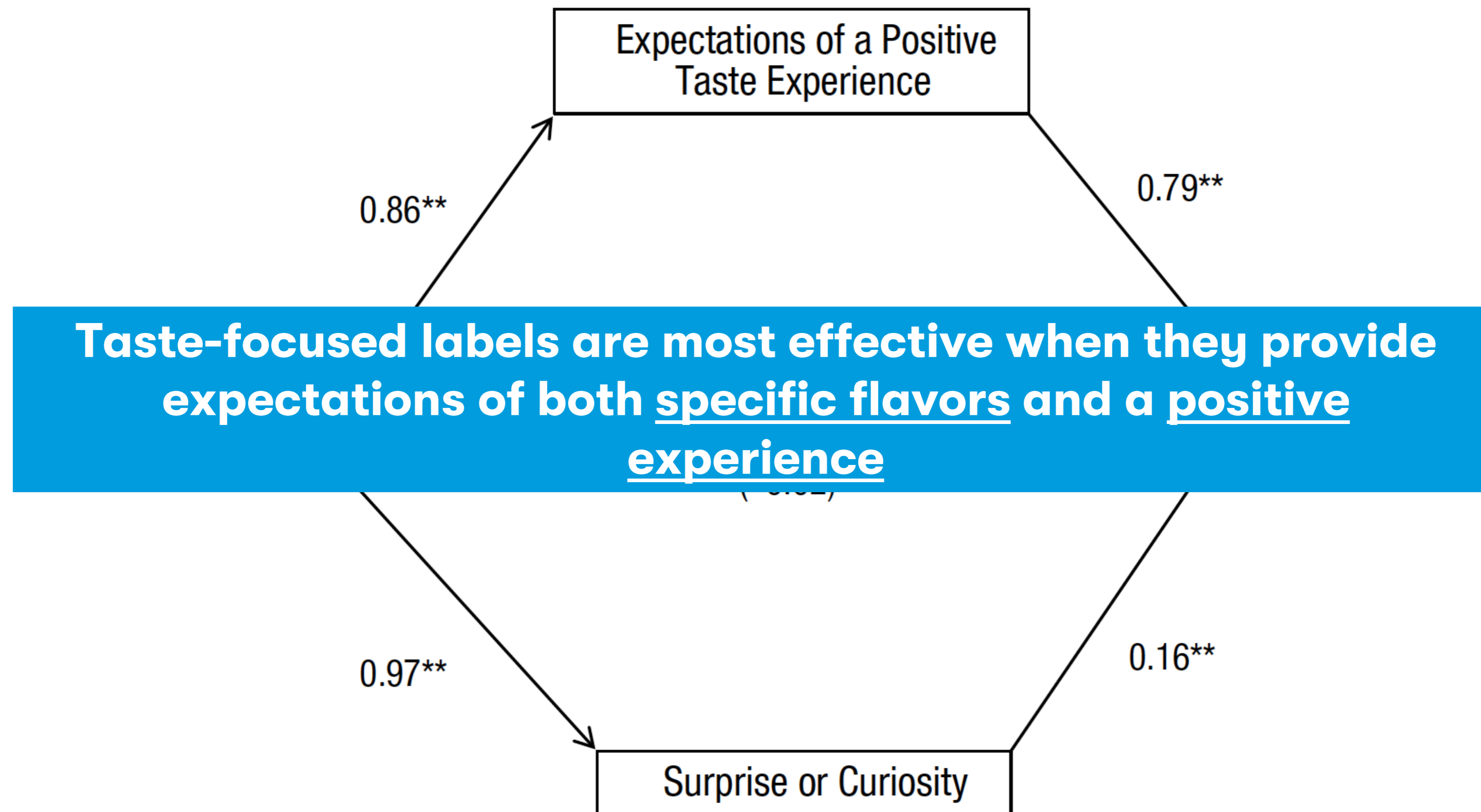
Psychological Science 2019, Vol. 30(11) 1603–1615 & https://www.ciaprochef.com/MCURC_DISH_Study_Executive_Summary/

Expectations of a Positive Taste Experience Strongly Mediates the Effect of Taste-Focused Label on Vegetable Selection



Psychological Science 2019, Vol. 30(11) 1603–1615

Expectations of a Positive Taste Experience Strongly Mediates the Effect of Taste-Focused Label on Vegetable Selection



Psychological Science 2019, Vol. 30(11) 1603–1615

The Impact Herbs & Spices Have On Improving Diet Quality

- Herbs & spices have the potential to improve the acceptability of foods lower in saturated fat, sodium & added sugars
- Seasoning vegetables with herbs & spices may increase intake of vegetables
- Highlighting herbs & spices through taste-focused labeling may promote intake of vegetables



The Impact Herbs & Spices Have On Improving Diet Quality: **PRACTICAL APPLICATIONS**

Applications In Retail

“Pantry play”

- Merchandising strategies
 - Cross-aisle promotion
 - E-commerce opportunities
 - Recipe cards in-aisle




Fresh herbs are now eligible for the WIC Cash Value Benefit (CVB) based on the updated WIC food packages released in April 2024


Photo credit: Anna Stories (Canva); Kali9 (Getty Images Signature)


Applications In Foodservice

- Menu Planning & Usage
 - In-service trainings: best practices on storage & utilization
- Menu Labeling
 - Taste focused
 - Flavor profiles


Garlic Chickpeas, Tomatoes and Onions AG VG 


Chickpeas with tomatoes, onions and tasty garlic

 Nutritional Info


Herb Roasted Mushrooms AG VG 

Garlic and thyme roasted button mushrooms


 Nutritional Info


Dal and Spinach Coconut Curry PR AG VG 

Curried spinach and chickpeas


 Nutritional Info

Basmati Rice AG VG

 Nutritional Info


Roasted Tomatoes AG VG 

Oven roasted tomatoes **with herbs**

 Nutritional Info

Vegetable Pakoras PR

Crispy Vegetable Fritter

 Nutritional Info

[Colgate University](#), Dine on Campus, 9/19/24

Applications In Digital & Social

- Recipe labeling & tagging
 - Taste focused
 - Flavor profiles
- Keep it short
 - 5-10 ingredients/steps
- Experimentation
 - Let kids explore herbs & spices at the table
 - Get creative with dips

Spice is a way to learn about a culture & share an appreciation for good food



@shelikesmilk, Instagram, 9/19/24

QUESTIONS & DISCUSSION

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JOIN THE MOVEMENT



- Join the Have A Plant[®] community at fruitsandveggies.org/jointhenetwork
- Follow our social channels! #haveaplant



- Celebrate National Fruits & Veggies Month to elevate fruit and vegetable consumption to a national priority.
- Use the [NEW Toolkit](#) to join the NFVM 2024 celebration before it's over! #NFVM2024

CONTINUE TO EXPAND YOUR EXPERTISE

fruitsandveggies.org/webinars

Visit our on-demand catalog of webinars on various fruit and vegetable topics including the following and many, many more!



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Health & Wellness Webinar | March 19th, 2pm EST

**PRODUCE PRESCRIPTIONS:
Blazing The Trail For Better Health**

With **Kathy Taylor, MS, RD, LD & Kurt Hager, PhD**

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TRENDS & DATA-DRIVEN STRATEGIES
FOR INCREASED PRODUCE CONSUMPTION

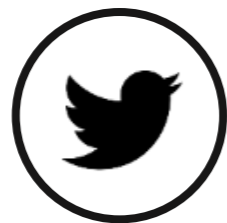
With **Jonna Parker, Mollie Van Lieu & Emily Holdorf, MS, RD**

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THANK YOU!

We live at the center of produce,
partnership and passion.

**WE'RE SO HAPPY
YOU'RE WITH US!**



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