Consumer Insights on Sweetener Types and Energy Drinks

Ting Cao[1], Lisa House[1], Zhifeng Gao[1], and Yu Wang[2]
1. Food and Resource Economics Department; 2. Food Science, Citrus Research and Education Center

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RESEARCH QUESTIONS

- Began with a project to examine different mango cultivars
  - Long-term goal of creating a “multi-omics” platform to identify superior mango varieties.
  - Included a goal to identify sweet taste enhancers in mango that could be a source of non-caloric sweetener
- Consumer Survey
  - Needed to answer questions about consumer knowledge and perception of sweeteners
  - And determine potential for mango-based natural sweeteners

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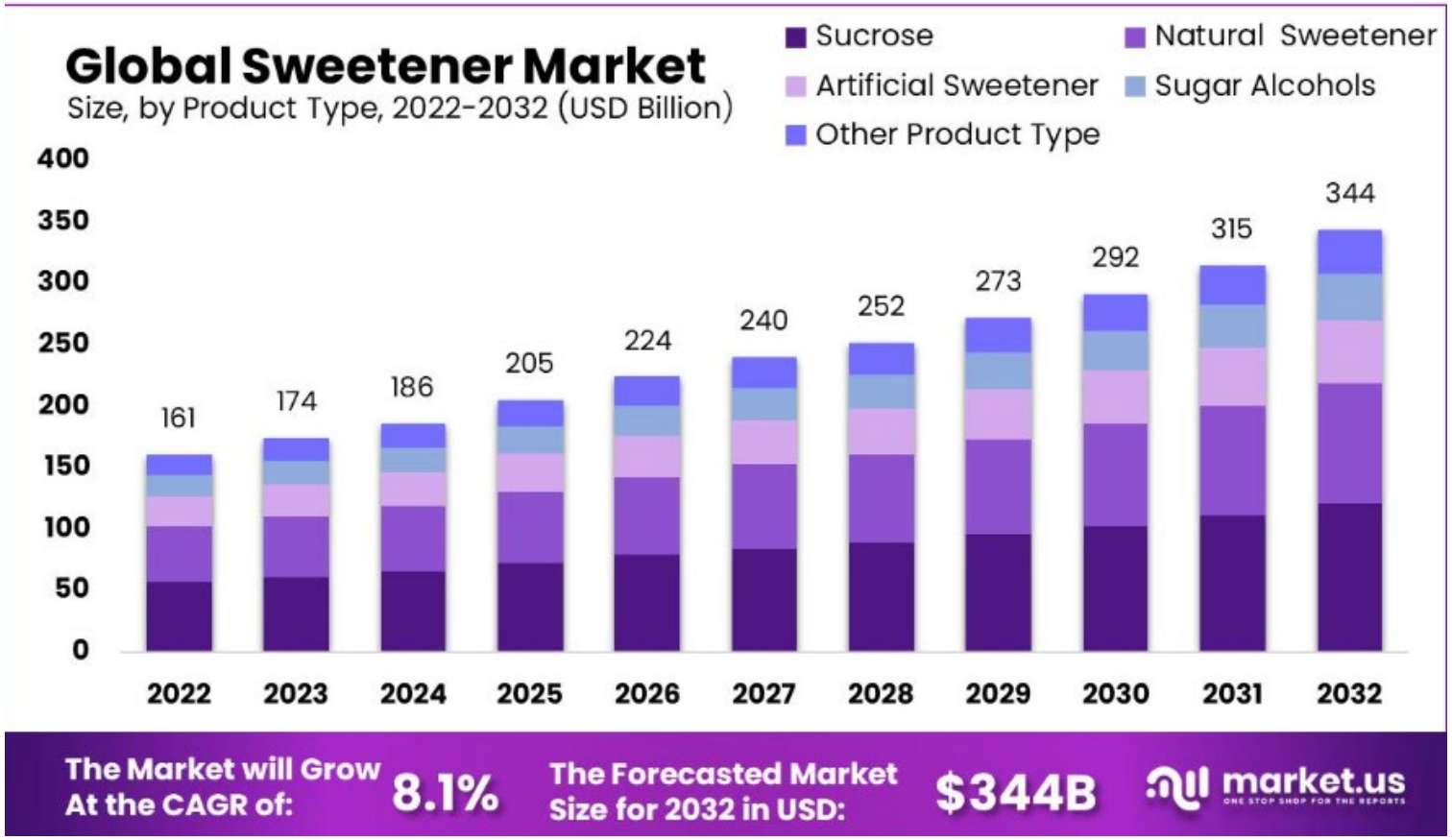
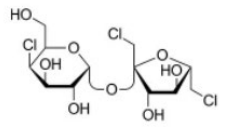
Trends in the Global Sweetener Market



BACKGROUND

Category	Examples	Characteristics
Artificial Sweeteners	Sucralose, Aspartame	Zero calories, intense sweetness, potential health concerns
Natural Sweeteners	Stevia, Monk Fruit	Derived from plants, varying sweetness levels, perceived as healthier



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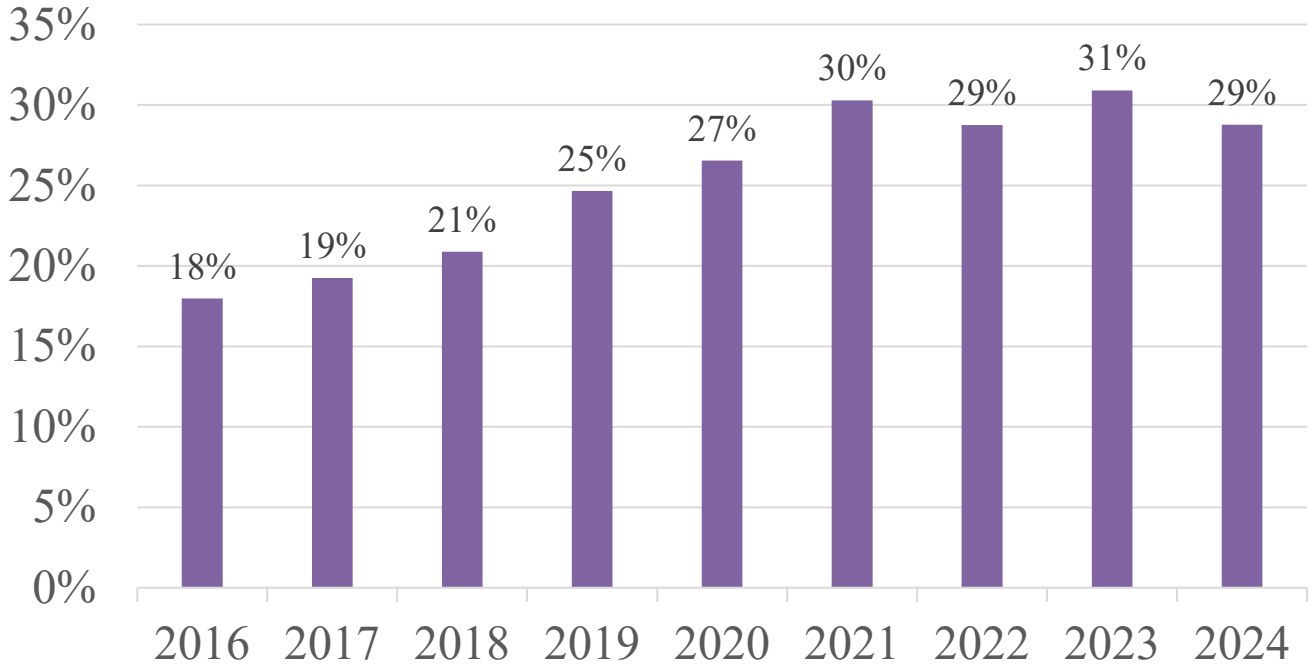
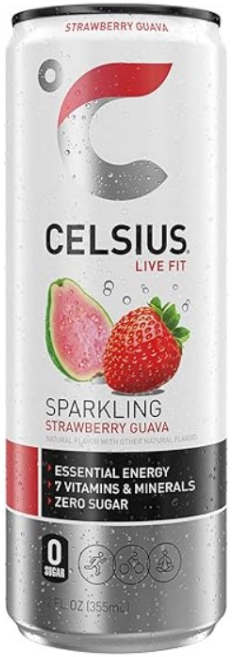
Why We Selected Energy Drinks as Our Target:

1. Growing market demand





2. Produced in various types, including sugar-sweetened, artificially sweetened, and naturally sweetened options.

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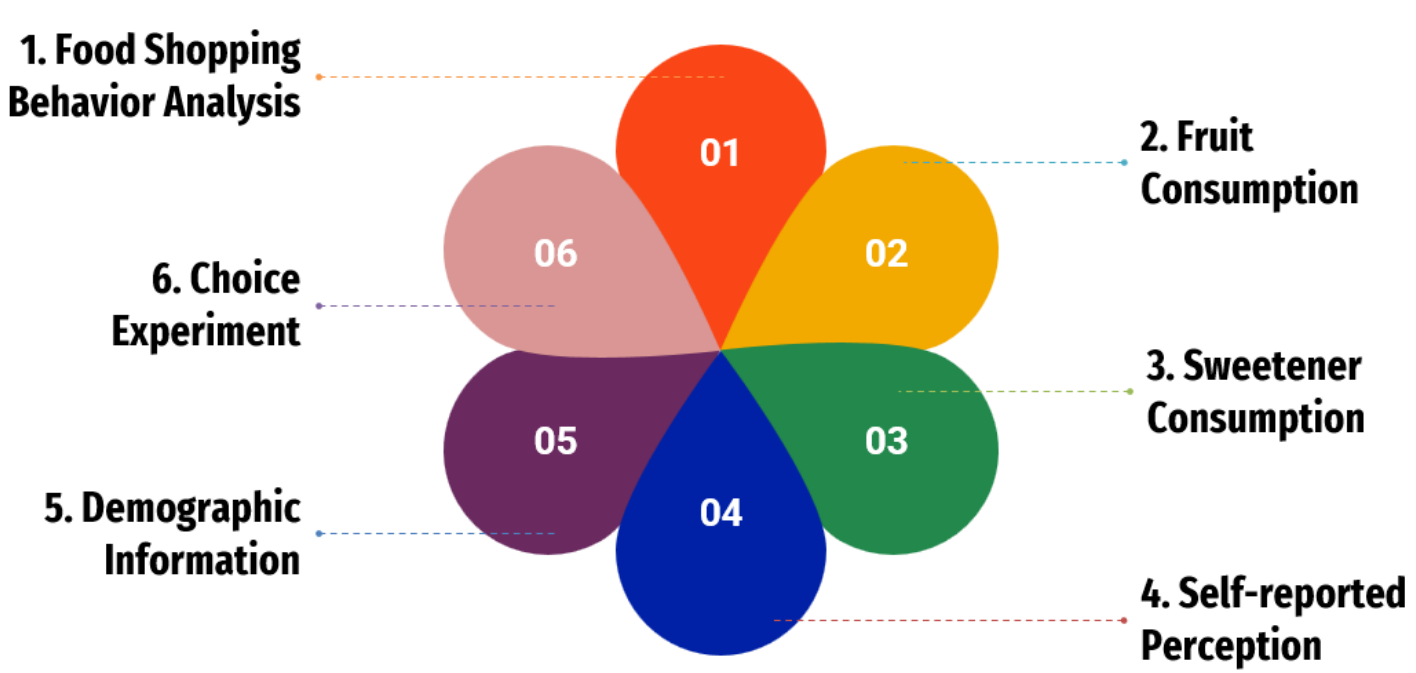
SURVEY DESIGN

- Primary data collected from a consumer survey, n=1,823 (Qualtrics) in May 2023, repeated in July 2024 with 1,002 (data combined unless noted)

- Validation check and "cheap talk" used to improve data quality



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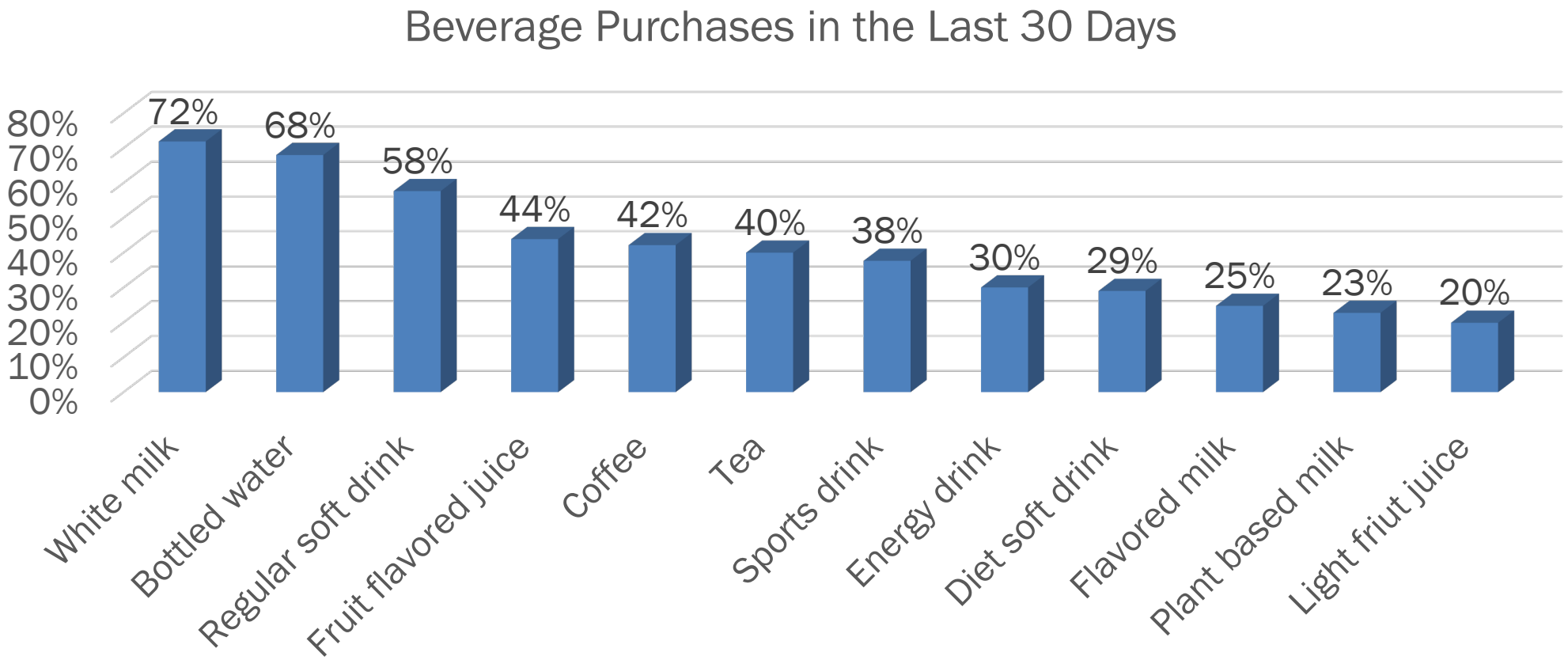
SURVEY RESULTS



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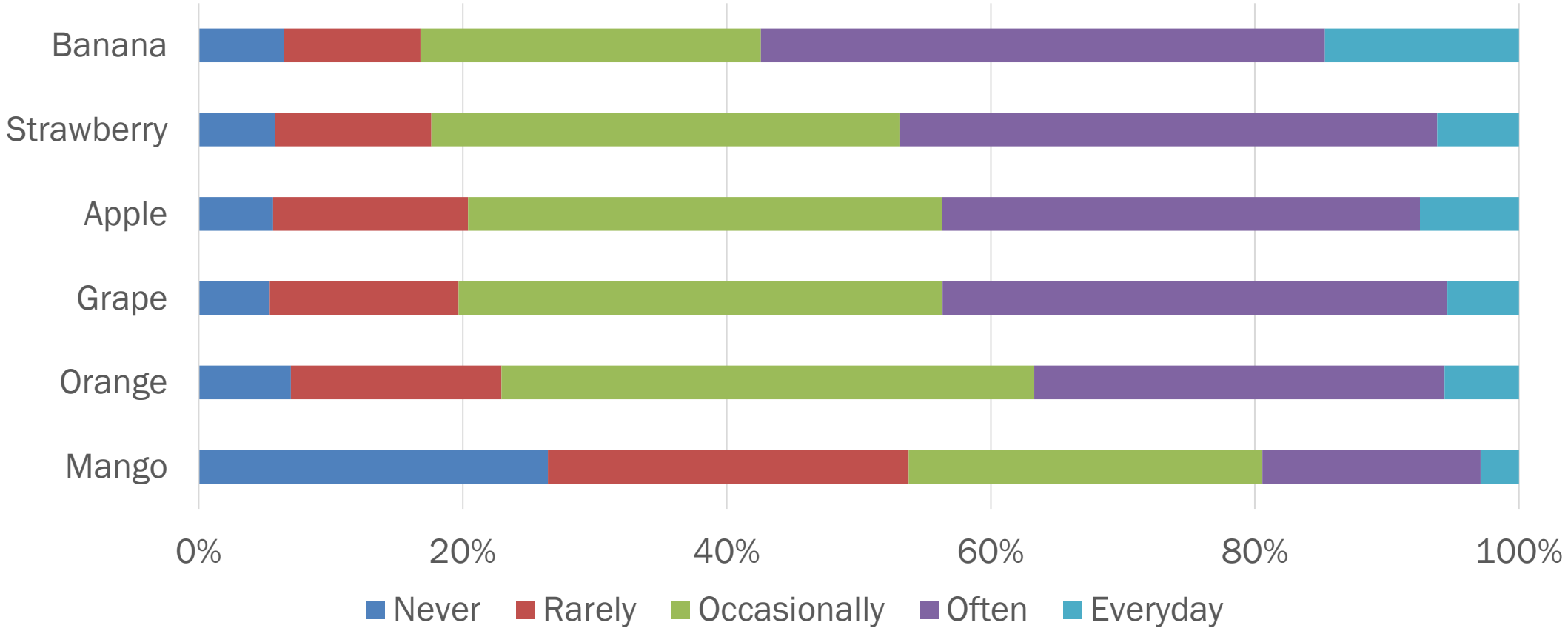
SURVEY RESULTS – Fresh Fruit Consumption



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SURVEY RESULTS – Food Attitudes

Purchase healthy foods, even if they are a bit more expensive.

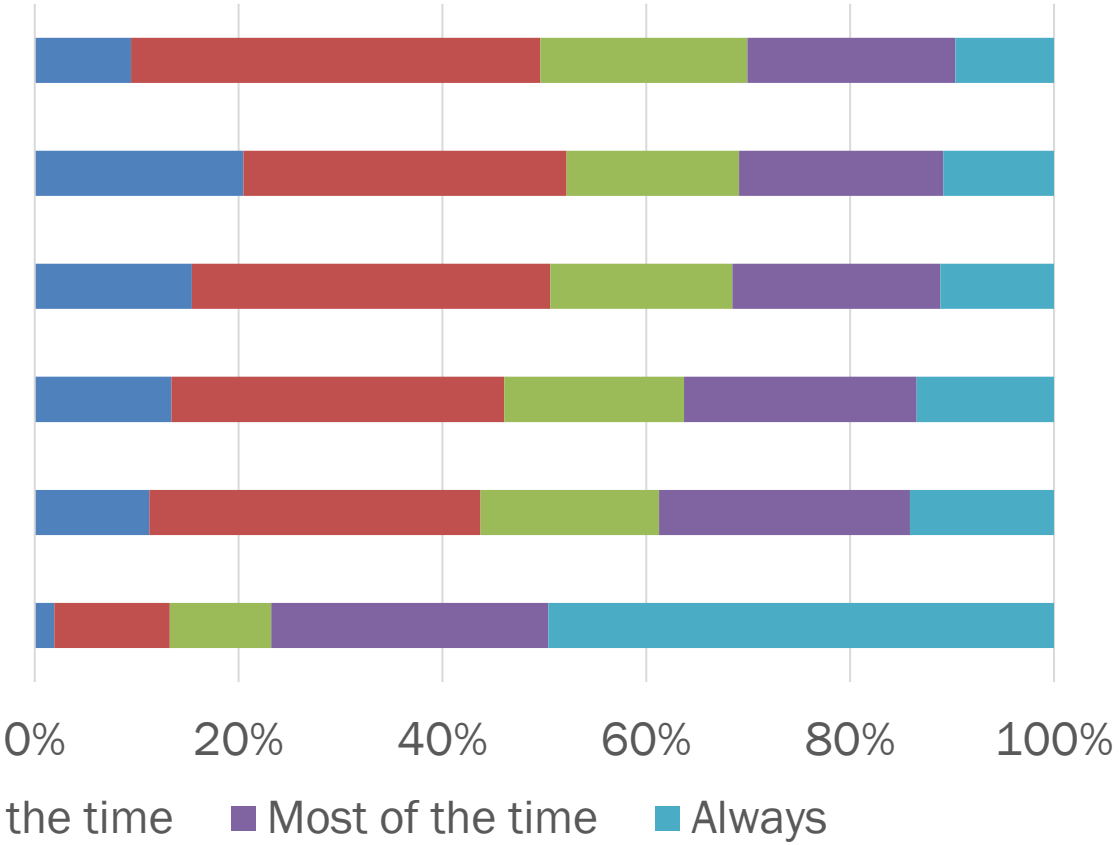
Compare the calories, fat, sugar or salt content of different food products.

Reflect on what you have eaten during the day.

Check the nutritional facts labels of food products.

Check the ingredients of the food products you are buying.

Check the price of the food products you are buying.



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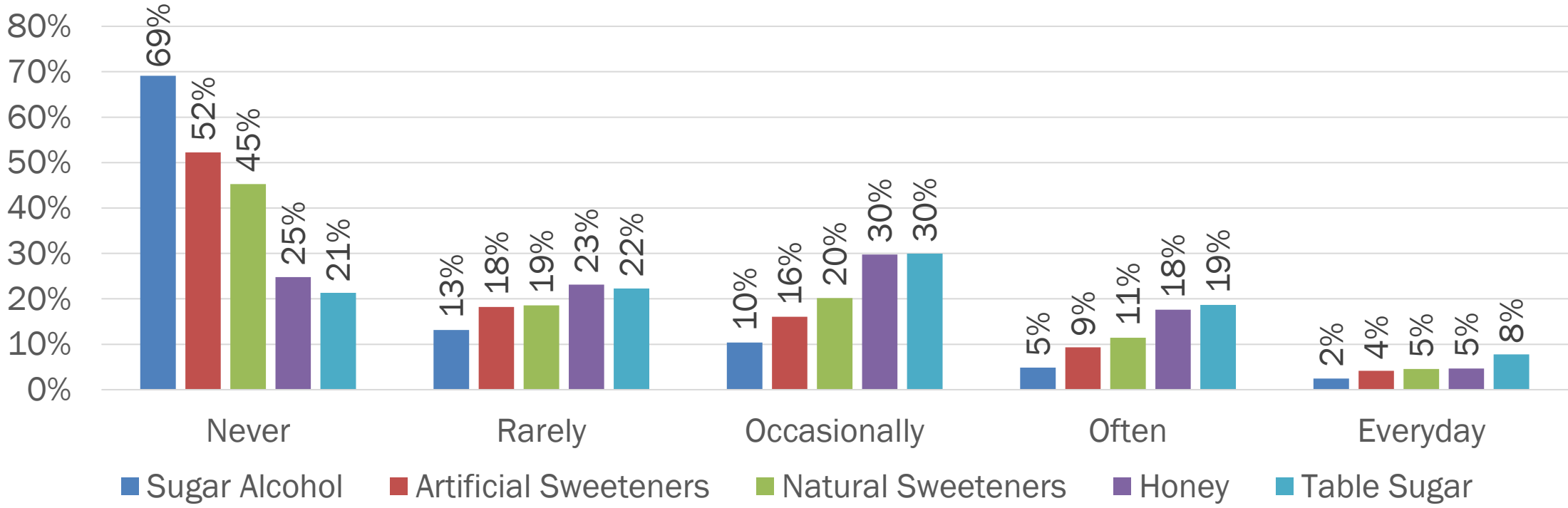
SURVEY RESULTS – Sweetener Use

How often do you add sweeteners to your food or beverages (e.g., table sugar, honey, natural sweeteners, artificial sweeteners, etc.)? This includes when you order products at restaurants/coffee shops or prepare in your home.



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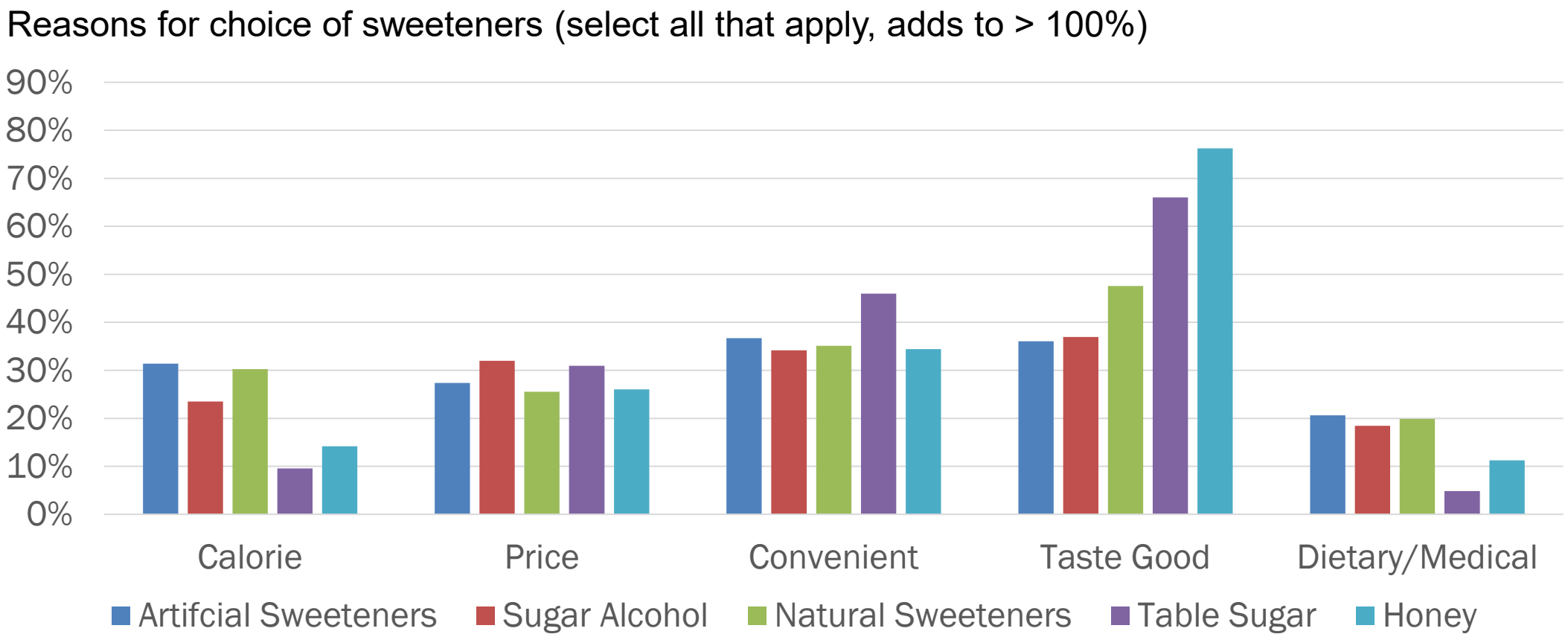
SURVEY RESULTS



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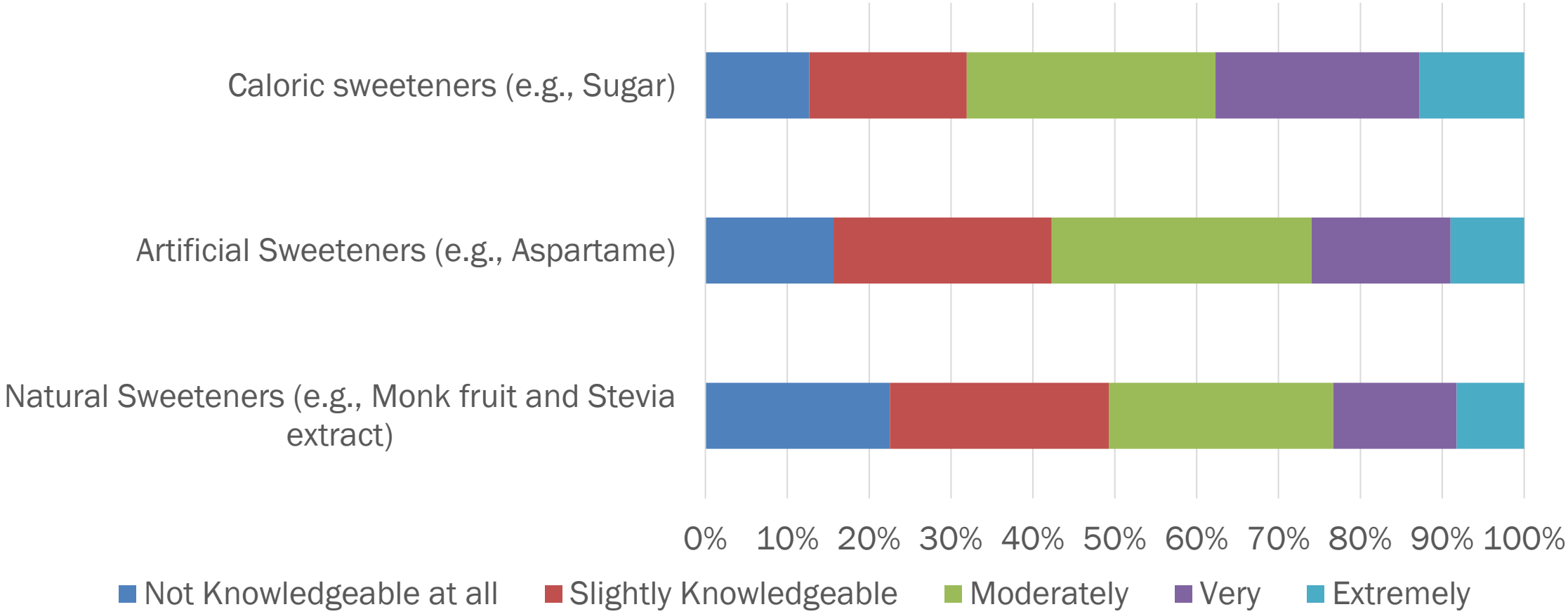
SURVEY RESULTS – Self- rated knowledge about different sweetener types



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SURVEY RESULTS – Sweetener Knowledge

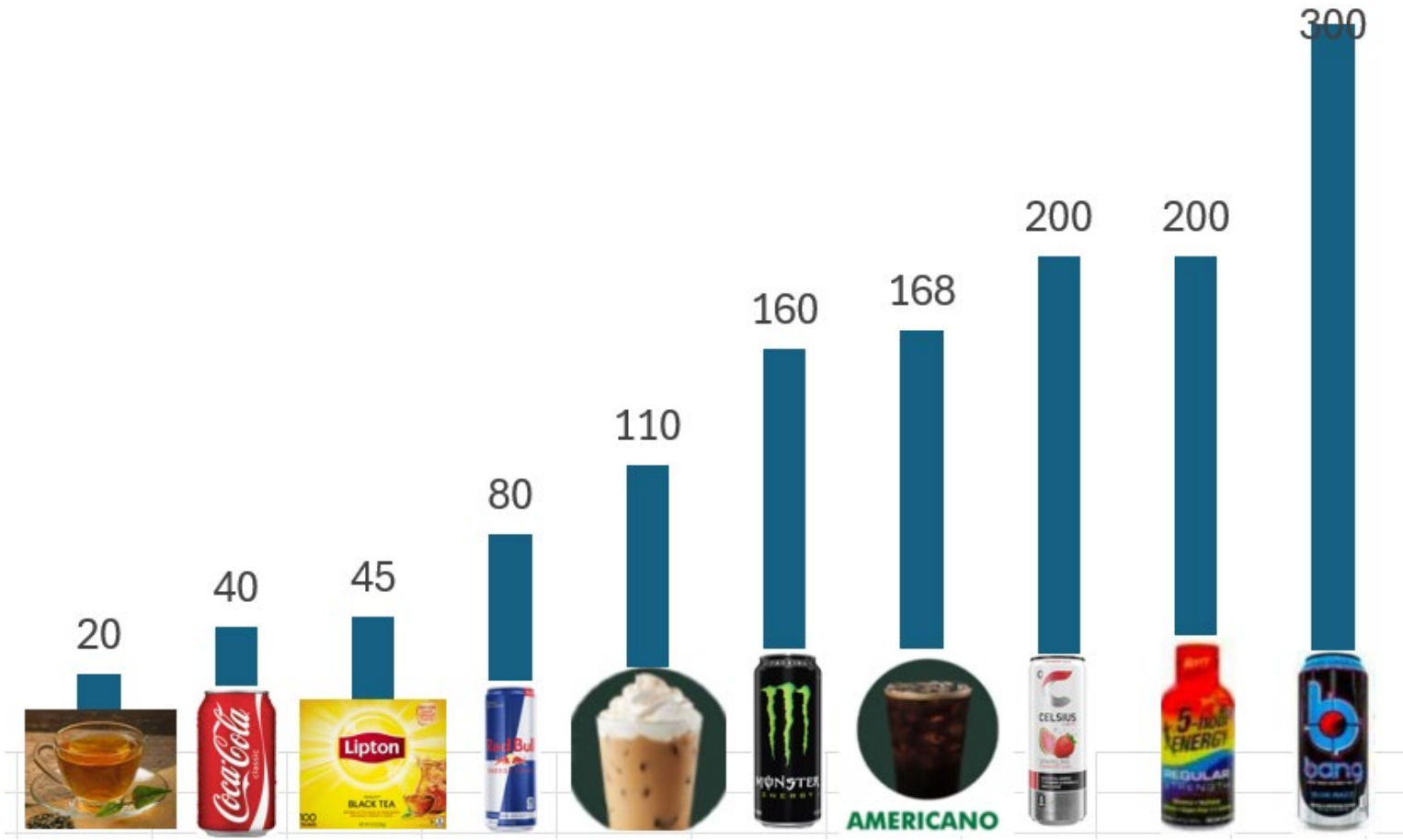
	TRUE	FALSE	NOT SURE
Natural sweeteners are calorie-free.	22%	49%	29%
Artificial Sweeteners are calorie-free.	33%	37%	30%
Stevia extracts are natural sweeteners.	50%	17%	33%
Monk fruit extracts are natural sweeteners.	52%	9%	38%
Natural sweeteners are less sweet than the same amount of table sugar.	32%	36%	32%
Artificial sweeteners are less sweet than the same amount of table sugar.	28%	43%	29%
Daily mild consumption of artificial sweeteners (e.g., aspartame) will cause cancer.	28%	29%	43%
Daily mild consumption of natural sweeteners (e.g., stevia) will cause cancer.	15%	44%	41%
When you eat something that contains natural sweeteners, you can taste the flavor of the plant that the sweetener came from.	33%	32%	35%

Choice Experiment

- Further Questions:
  - Do these perceptions influence choices?
  - If so, how strong is the influence?
  - Would having a natural sweetener derived from mango (something consumers are more familiar with) have a different impact?

- Choice Experiment
  - Participants are given different products to select from and asked to select one (or none).
  - This is repeated with an experimental design to determine the impact of attributes altered in different scenarios.
  - Mixed logit models used to analyze data

Comparing Regular Caffeine Levels in Tea, Coffee, and Energy Drinks (mg/12oz)



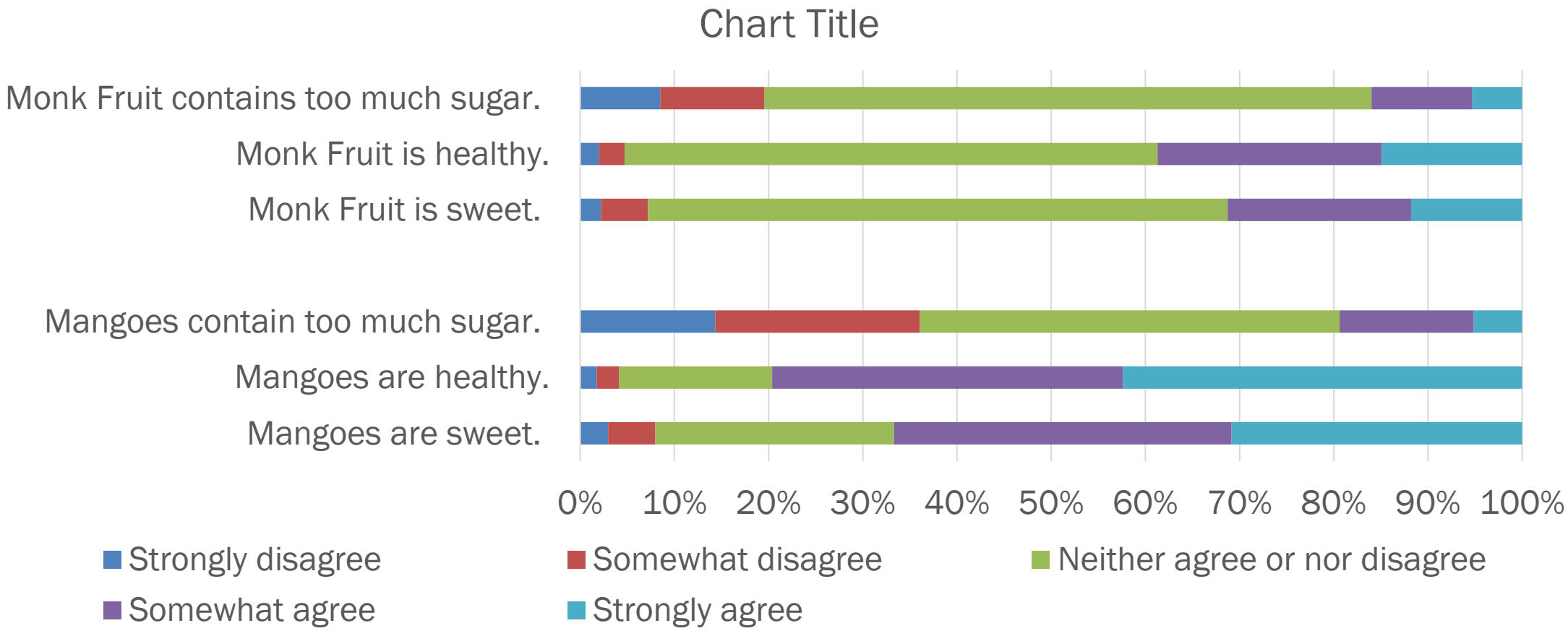
SURVEY DESIGN

Choice experiment conducted with those that drank energy drinks only (n= 537 and 311)

- Choice Experiment

Attributes	**Levels**
Price($/12 oz)	$1.50, $2.25, $3.00, $3.75
Sweetener	Unsweetened
	Table Sugar
	Sucralose
	Natural Sweeteners Derived from Stevia (n=537)
	Natural Sweeteners Derived from Monk Fruit (n=311)
	Natural Sweeteners Derived from Mangoes
	Sweetened with Mango Juice
Caffeine(mg/12 oz)	120mg, 180mg, and 240mg

SURVEY RESULTS



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SURVEY DESIGN

- Choice sets: 12 Questions

Please select the energy drink you are most interested in purchasing. If you would not purchase any of the drinks at the prices offered, please select "I do not want to purchase".

Mango Juice	Stevia	Table Sugar	
180mg caffeine	120mg caffeine	240mg caffeine	
$3.00	$1.50	$2.25	I do not want to purchase
○	○	○	○

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RESULTS: Mixed Logit Model

Variable	Estimate (Stevia)	Estimate (Monk Fruit)
None	-0.500***	-0.554***
Price	-0.210***	-0.244***
Table sugar	0.184**	0.287***
Sucralose	-0.467***	-0.370***
Natural sweeteners derived from Stevia/Monk Fruit	0.007	0.270***
Natural sweeteners derived from mangoes	0.657***	0.718***
Natural sweeteners derived from mango juice	0.729***	0.654***
180mg	-0.031	-0.081
240mg	0.080	0.100

*, **, *** *represent statistical significance at the 10%, 5%, and 1% respectively.*

CONCLUSION AND DISCUSSION

➢ **Price Sensitivity** (Important factor)

• Implication: Consumers prefer less expensive beverages. As prices increase, the consumption of energy drinks decreases.

➢ **Caffeine Levels** (Not the deciding factor)

• Implication: Caffeine levels do not significantly influence consumer choices. This could be due to regular consumers developing a tolerance to caffeine or a general unawareness of caffeine content among consumers.

CONCLUSION AND DISCUSSION

➢ Sweetener Preferences

	Significant	Insignificant	Negative Influence
Sweetener	• Natural sweeteners with mango juice(0.65-0.73) • Natural sweeteners derived from mango(0.66-0.72) • Natural sweeteners derived from monk fruit (0.27) • Table sugar(0.18-0.29)	Natural sweeteners derived from stevia	Sucralose(-0.47)

CONCLUSION AND DISCUSSION

- In conclusion, **price** and **sweetener type** are significant factors influencing consumer preferences for energy drinks, while **caffeine content** is not.

- Consumers show a clear preference for **natural sweeteners** over **artificial** ones, particularly those derived from **mango**.

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Questions?

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