Intro to Conjoint Analysis

Sawtooth

How do we make choices?


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Different perspectives, Different Objectives

- **Consumers** seek **maximum value**, the most attractive features at the lowest possible price.

- **Producers** aim to boost profits by:
  1. Minimizing the cost of delivering features
  2. Creating products that offer greater overall value than the competition

How do we understand customer needs?

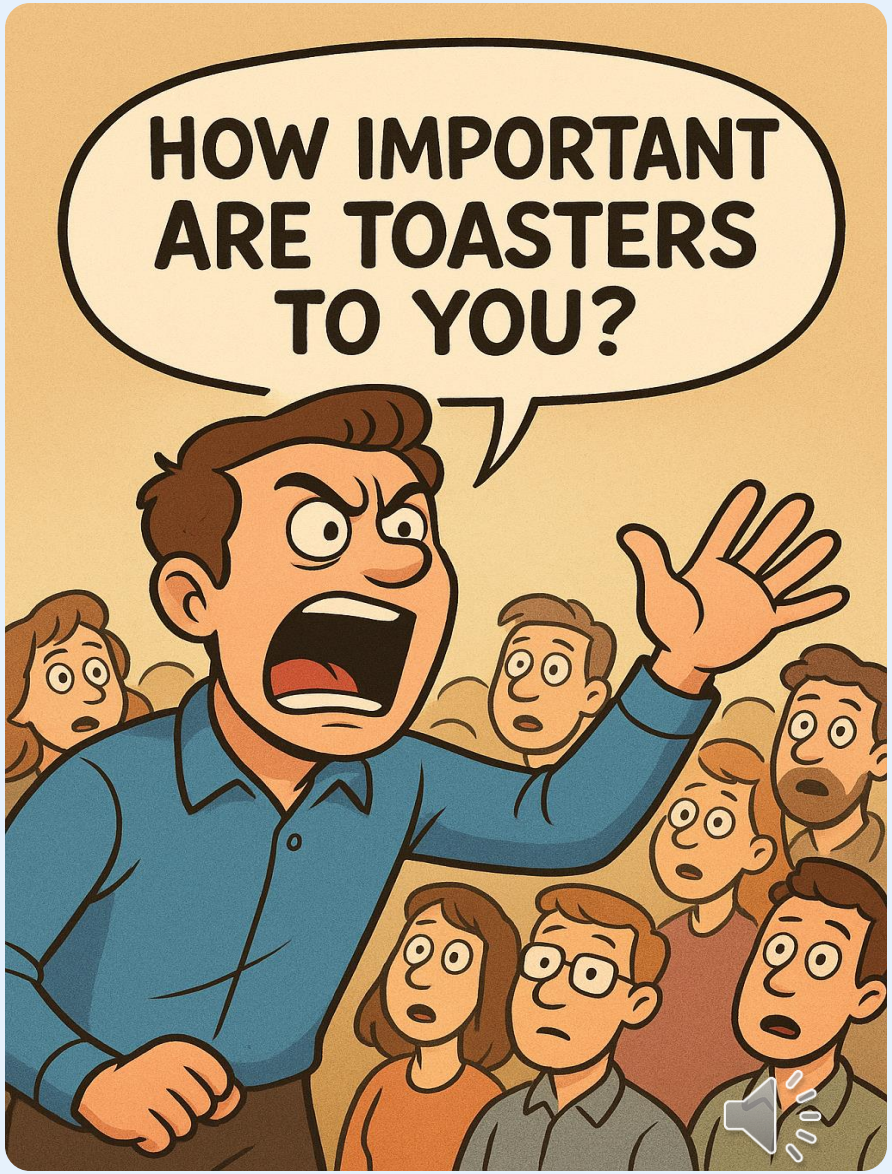
- Ask **Direct Questions** about preference:
  - What is your preferred brand?
  - What price would you consider reasonable to pay?
  - For how many slices do you typically use a toaster?

How do we learn what is important?

Ask Direct Questions About Importance:

- How important is it to you that the toaster has the **brand**, **number of slices**, **egg poacher**, or other features you want?

- When it comes to credit cards, how important are factors like the **brand**, **interest rate**, **annual fee**, and **credit limit** in your decision?



Limitations of Importance Ratings

- Responses often show **low discrimination** — most features are rated as “very important.”

- If a feature wasn’t important, we **wouldn’t have included it** in the research.

- Answers can help with **market segmentation**, but they’re often **not actionable.**

- We still don’t know **which specific product** the customer actually wants.

What Is Conjoint Analysis?

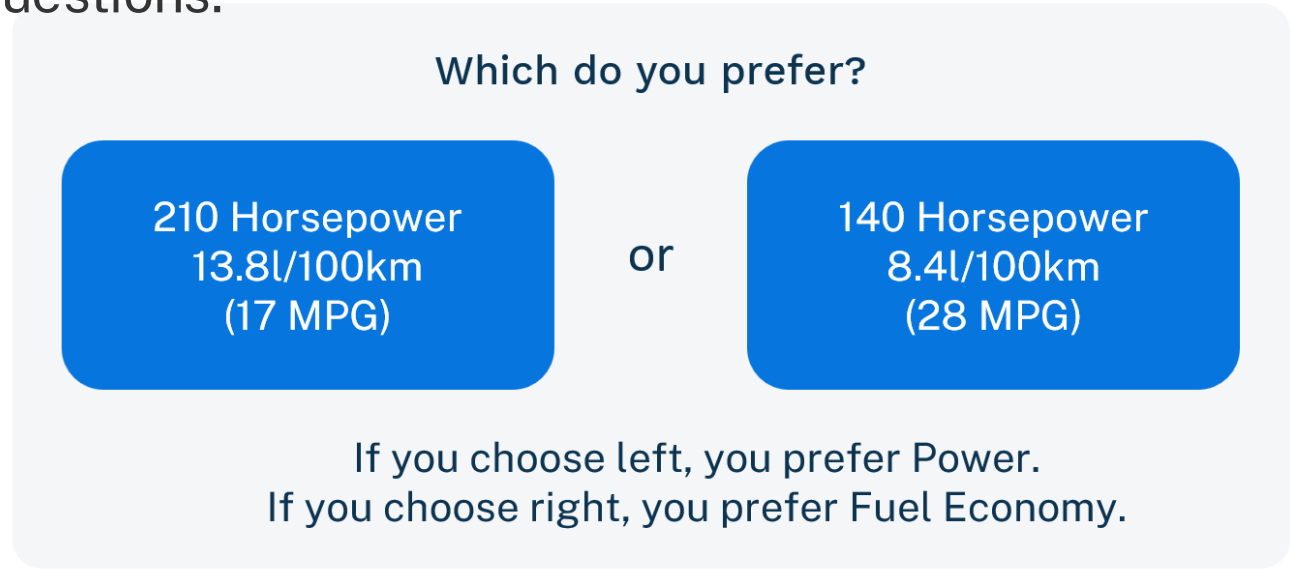
- A **research technique** developed in the **early 1970s**
- Measures how buyers **value individual components** of a product or service bundle
- From the dictionary:
  “Conjoint” = joined together, combined

How Does Conjoint Analysis Work?

- **Product features** (independent variables) are systematically varied to create multiple **product concepts** or **choice alternatives**
- Respondents are asked **to rate, rank, or choose** among a subset of these concepts (dependent variable)
- From their evaluations, we estimate the **unique value (utility)** each feature contributes to decision-making

What's So Good about Conjoint?

- More **realistic** questions:



- Rather than ask directly whether you prefer Power over Fuel Economy, we present realistic tradeoff scenarios and infer preferences from your product choices

What's So Good about Conjoint?

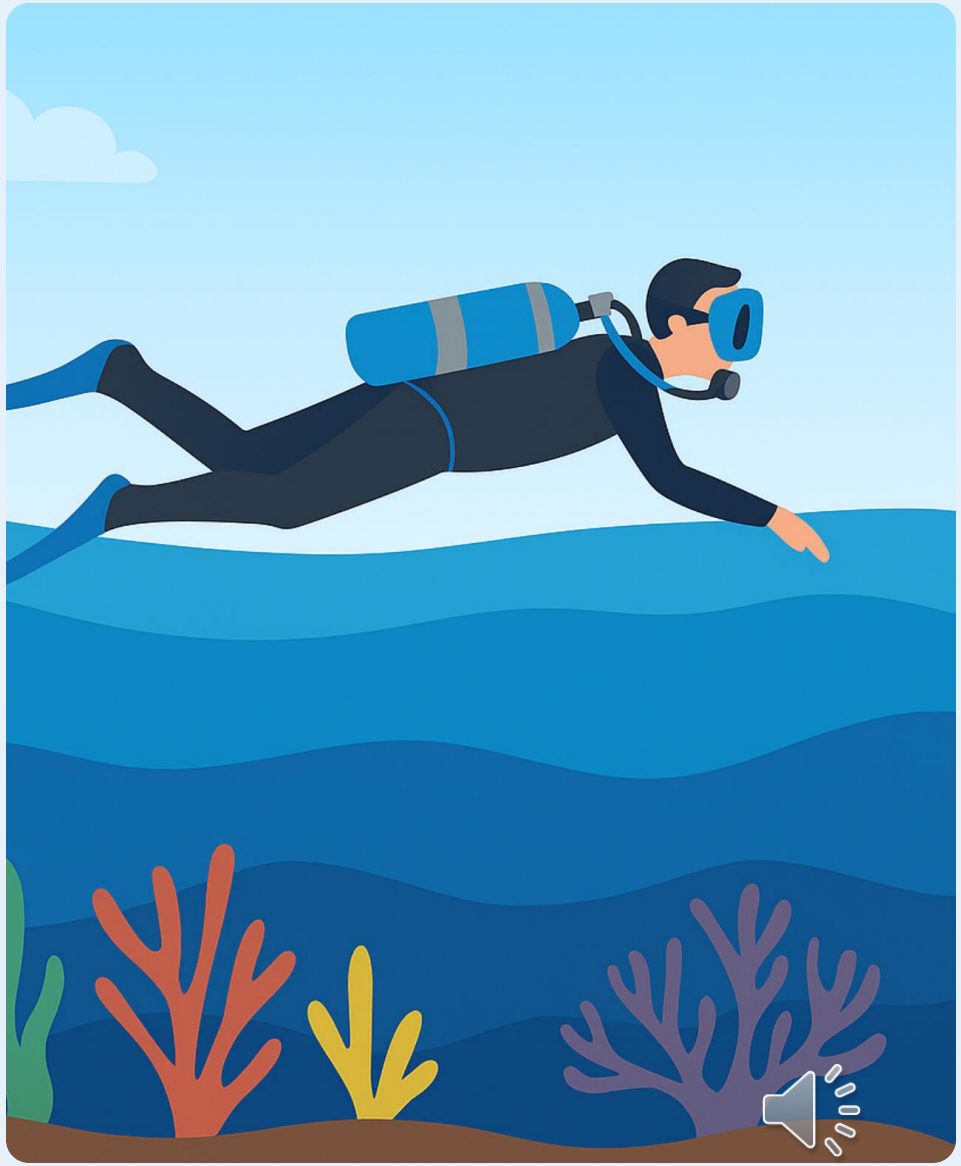
- By forcing respondents to make **difficult trade-offs,** we uncover what they **truly value**

- The resulting **utility scores** are tied to **specific, actionable attribute levels**

- These insights directly inform decisions related to the **business problem at hand**

More Than Just Transactions

- Business school wants to increase applications & student quality
- Balancing green space with development in a community
- Tourism – Scuba divers bring money to Caribbean islands to see coral reefs. More divers means more money, but more damage to the reef. Too much damage = no more divers.



Case Study

HR Benefits Research

- How do you keep your employees satisfied with their compensation, reduce turnover, and hold down the costs?
  - Identify drivers of job satisfaction
  - Quantify effect of each driver
  - Use cost information to optimize benefits packages
- Microsoft Case
  - Rumpel, Steven and Medcof, John W. 2006. Total Rewards: Good Fit for Tech Workers. Research Technology Management, Sept. 1, 2006.
  - Slade, Allen L., Davenport, Thomas O., Roberts, Darryl R., and Shah, Samir. 2002. How Microsoft optimized its investment in people after the dot-com era. Journal of Organizational Excellence 22, 1, Winter, pp. 43-52.

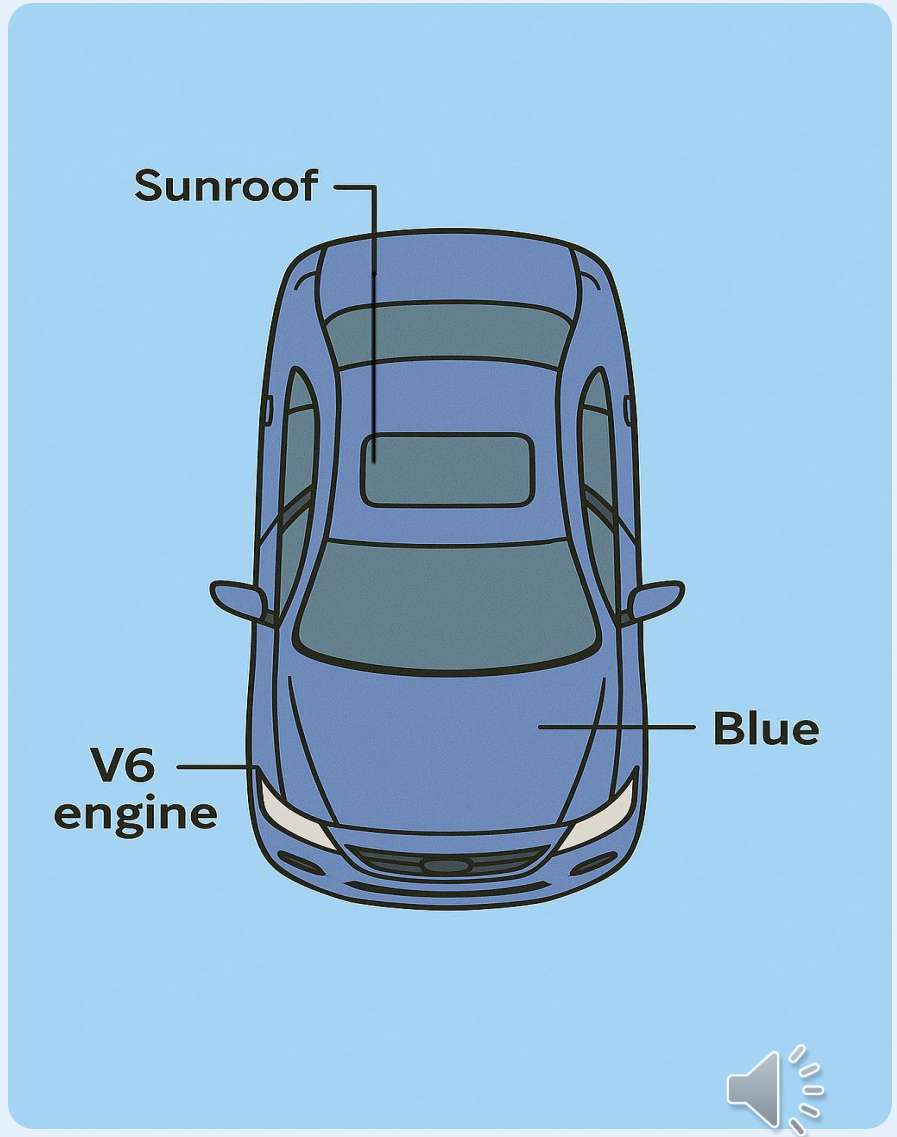
Microsoft

How do we build a conjoint

Attributes & Levels

- **Attributes are independent** aspects of a product or service (Brand, Speed, Color, Price, etc.)

- **Levels** are the factors within each attribute that we specifically want to test. ($5, $6, $7, or Coke, Pepsi, Sprite, etc.)



Defining Attributes

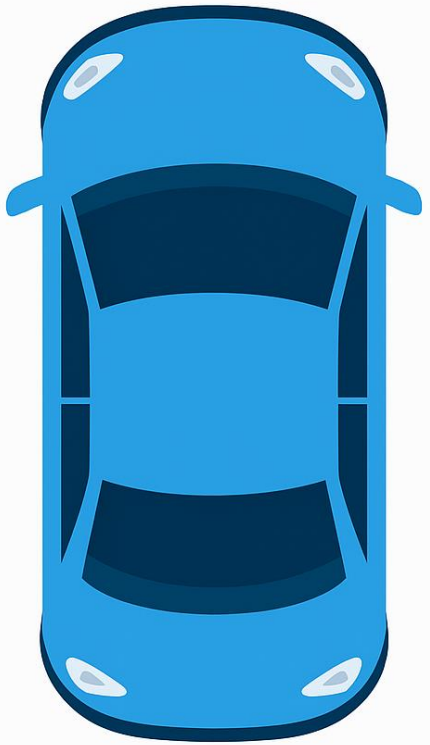
- Attributes are **independent aspects of a product** or service (**Brand, Speed, Color, Price, etc.**)
- How many attributes?
  - Depends on research objectives
    - Respondents can often deal with more information than previously thought possible, especially with well-organized grids of information, graphical representation of levels, and improved computer interviewing approaches.
  - Attributes **should be independent**, mutually exclusive
    - Brand, quality, product life expectancy may all measure the same thing.
  - Attributes **should be relevant**
    - They should reflect product features that people actually consider

Defining Attribute Levels

- Each attribute has varying degrees, or “levels”
  - Brand: Coke, Pepsi, Sprite
  - Speed: 5 pages per minute, 10 pages per minute
  - Color: Red, Blue, Green, Black
- Each level is **assumed to be mutually exclusive** of the others (a product has one and only one level of each attribute)
- If it is possible for a product to not have any level of a certain attribute, you must include a **“Not Present” (NULL) level!**

Defining Attribute Levels

- Levels are assumed to be **mutually exclusive**
- Attribute: Add-on features
  - level 1: Sunroof
  - level 2: GPS System
  - level 3: DVD Player
- If you define levels in this way, you can determine the value of having one feature but cannot determine the value of providing two or three of these features at the same time.



Defining Attribute Levels

Levels **Should Be Concrete and Unambiguous**

- Vague: “Very expensive”
- Clear: “Costs $575”
- Vague: “Weight: 5 to 8 kilos”
- Clear: “Weight: 6 kilos”

- One description leaves room for personal interpretation, while the other provides a **precise, consistent** meaning.

- Remember **we can interpolate** between levels!

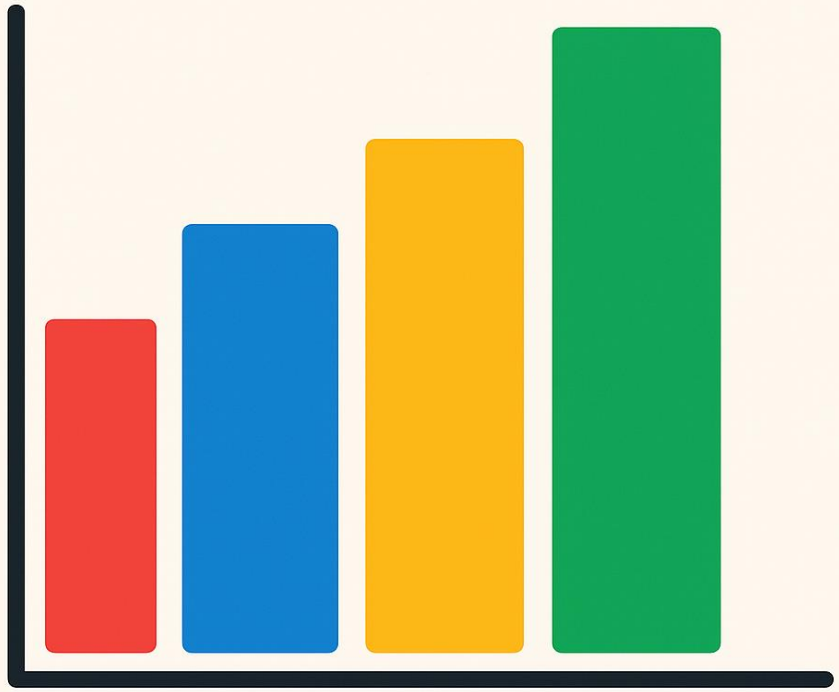
What do we get from conjoint?

Conjoint Utilities (Part Worths)

- Numeric values that reflect **how desirable different features are:**

Feature	Utility
Vanilla	2.5
Chocolate	1.8
25¢	5.3
35¢	3.2
50¢	1.4

- The higher the utility, the better



Conjoint Utilities

- Utilities are **interval scaled**, so **ratio comparisons are not valid**
- You **cannot directly compare** the utility of one level from one attribute to a level from another attribute, because utilities are scaled arbitrarily within each attribute
- However, you **can compare differences** between two levels within one attribute to differences between two levels of another attribute

Conjoint Importances

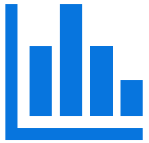
- **Ratio scaled data**
- Measures the potential influence each attribute can have on choices, based on the conjoint design
- Calculated as the difference between the best and worst level of each attribute
- Expressed as a percentage to **show relative importance among attributes**

Vanilla-Chocolate	(2.5-1.8)	=	0.7	15.2%
25¢ - 50¢	(5.3-1.4)	=	3.9	84.8%
	Total	=	4.6	100%

- Importance scores are directly **affected by the range of levels you choose** for each attribute, the number of attributes, etc.

Market Simulations

At what price will people switch to a competitor?



Can we modify our product to reduce cost while maintaining share?

Should we launch a high-end product or a budget model (or both)?

Will the new product cannibalize our own sales?

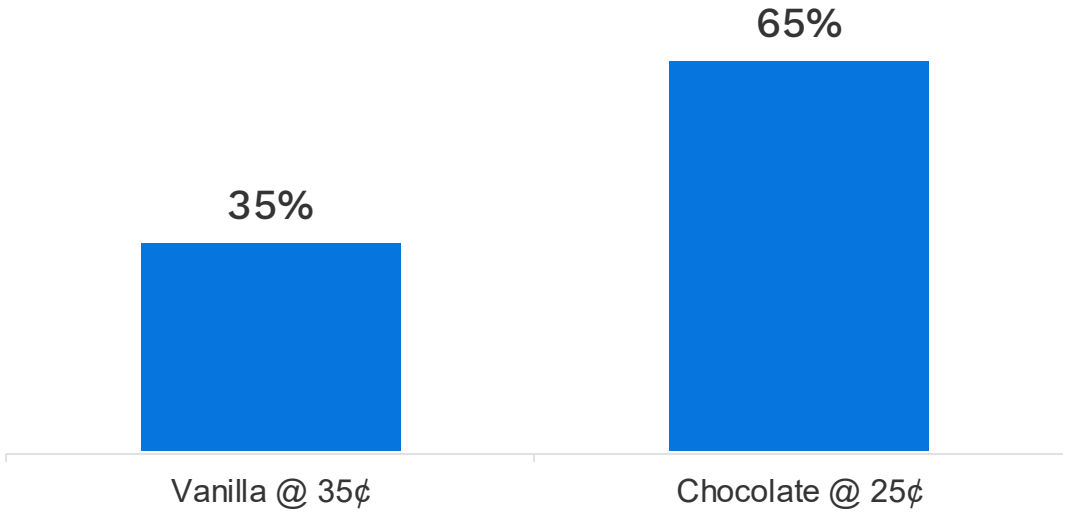
Market Simulation Example

- Predict market shares for 35¢ Vanilla cone vs. 25¢ Chocolate cone for each Respondent

	Respondent 1	Respondent 2	...	Respondent 500
Vanilla	2.5	-1.0		3.7
Chocolate	1.8	1.0		0.5
$0.25	5.3	1.2		1.0
$0.35	3.2	0.7		0.8
$0.50	1.4	-1.9		0.5
$0.25 Chocolate	7.1	2.2		1.5
$0.35 Vanilla	5.7	-0.3		4.5
Winner	Chocolate	Chocolate		Vanilla

Market Simulation Results

- Predict responses for 500 respondents, and we might see “shares of preference” like:



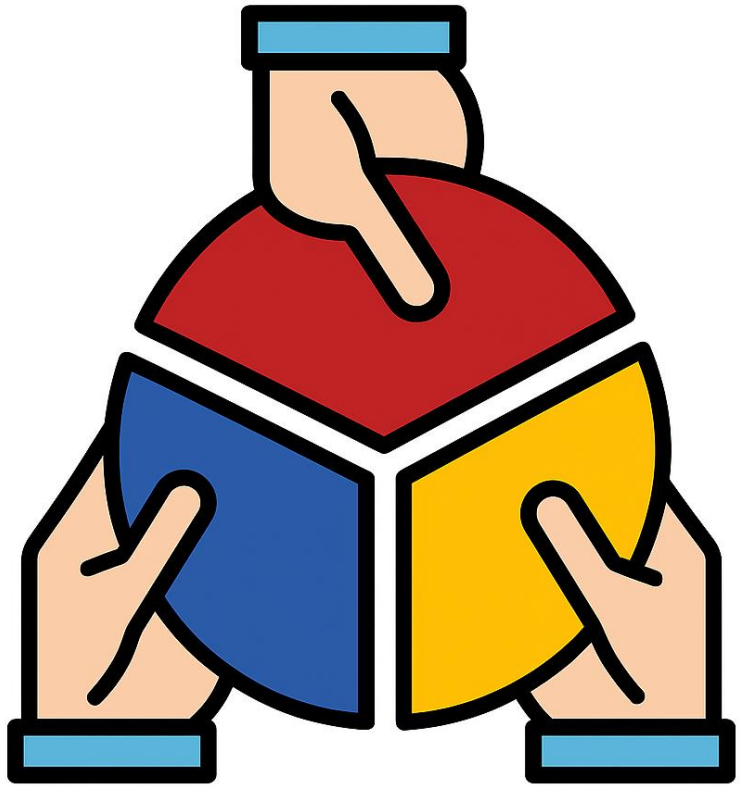
- 65% of respondents prefer the 25¢ Chocolate cone using “First Choice” rule (highest score wins)

Conjoint Market Simulation Assumptions

- We have interviewed the right people
- All attributes that affect buyer choices in the real world have been accounted for
- Equal availability across all products
- Zero barriers to switching
- Fully aware of all products

Shares of Preference Don’t Always Match Actual Market Shares

- Simulator assumptions often don’t perfectly reflect the real world (but that doesn’t reduce their value)
- They **translate abstract utilities into concrete market share predictions**
- Predict respondents’ preferences assuming a level playing field
- **Offer valuable insights** into how respondents make trade-offs, even for products that don’t yet exist.



Thank You!

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