SINTENO AI::
REDEFINING CONSUMER AND PRODUCT SUCCESS PROFILE

by YieldWise Inc.

The Challenge

Businesses need to know their consumers and which attributes of their product/service to focus on in their marketing.

For decades, **Consumer Profiles** have been used to identify consumers' preferences for products/services and create marketing programs.

Surveys serve as the foundation for the identification of consumer preferences/insights.

What can go wrong with survey data analysis?

Survey responses, the foundation of consumer insights, *are almost always wrongly analyzed, resulting in misleading conclusions*[1]. The main flaw in survey data analysis stems from completely ignoring major and fundamental characteristics:

1. Survey responses are ordinal data meaning they are ranked or ordered and not meant to be averaged or summed
2. The difficulty of survey questions varies among questions
3. The ability of survey respondents varies among respondents
4. Dependencies exist among survey questions

[1] Liddell, T. M., & Kruschke, J. K. (2018). Analyzing ordinal data with metric models: What could possibly go wrong? Journal of Experimental Social Psychology, 79, 328-348.

Responses are Ordinal Data

Responses to survey questions are data without values that have only category, rank, or order. In statistics, such data is called ordinal data and should be analyzed as such (e.g., they can't be averaged).

The survey responses may be coded as numbers, for example:

Very Unsatisfied = 1, Unsatisfied = 2, Neutral = 3,
Satisfied = 4, Very Satisfied = 5

But those codes only **look like numbers** and remain ordered categories because:

One, **the intervals between adjacent categories may not be equal,** and two, **the patterns of intervals between adjacent categories vary from question to question.**

Question 1	VU			U	N			S	VS
Question 2	VU		U				N	S	VS
Question 3	VU			U	N	S			VS

Question 1	1			2	3			4	5
Question 2	1		2				3	4	5
Question 3	1			2	3	4			5

Ability of Survey Respondents and Difficulty of Survey Questions

The two intersect and affect how questions are answered

Questions / Respondents	Question 1	Question 2	Question 3	Question 4	Question 5	
Respondent 1	2	1	1	2	1	
Respondent 2	2	2	4	2	1	
Respondent 3	5	3	3	3	1	**Ability of Respondent 3**
Respondent 4	5	3	3	4	1	
…	…	…	…	…	…	
Respondent N	5	3	4	5	2	
			Difficulty of Question 3			

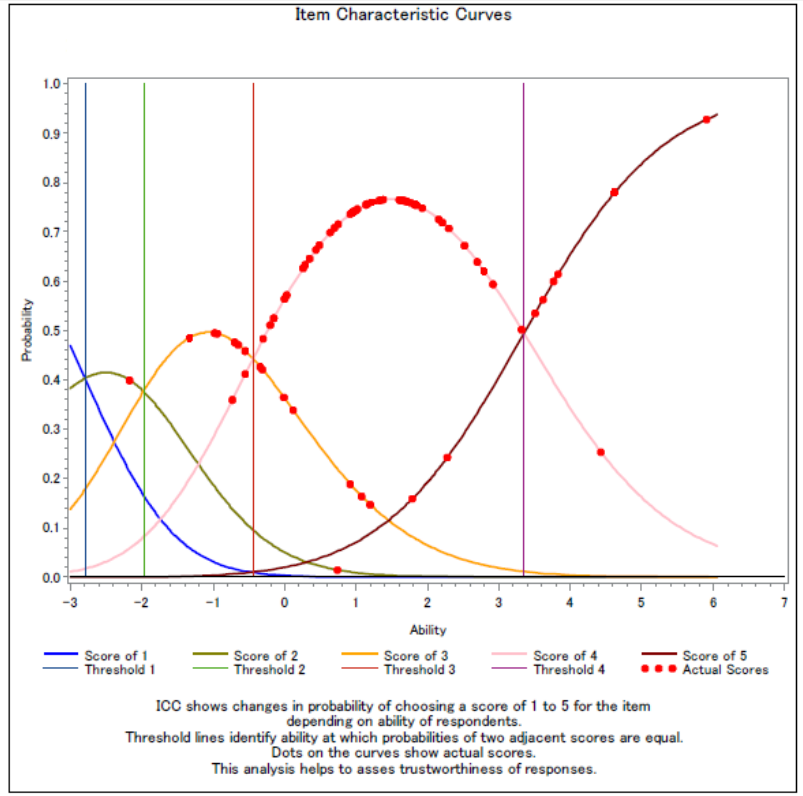
Ability is respondent property (or characteristic), and difficulty is question property. Sinteno's modified Polytomous Rasch Measurement Model helps to estimate these properties.

How Do We Do it?

Part One: Rasch Model

Georg Rasch
Danish Mathematician
and Psychometrician

- **A psychometric model that estimates question difficulty and respondent ability by looking at the totality of the responses and examining the probability of answering one way or another**
- **Originally used in academia, we've adapted it for use in the marketing world**

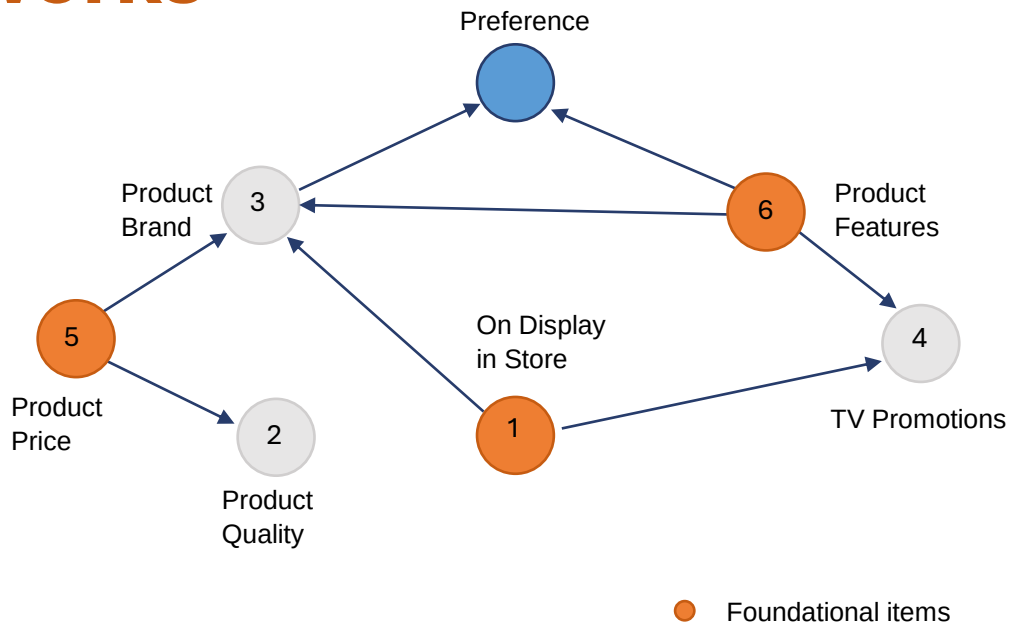


How Do We Do it?

Part Two: Relational Bayesian Networks

Reveals the causal relationships between questions and uncovers foundational items.

Understanding the causal relationships among questions helps identify which product attributes (presented as survey questions) determine consumer preference and thus lead to product success.



In this example, the three foundational attributes of the product and its advertising are:

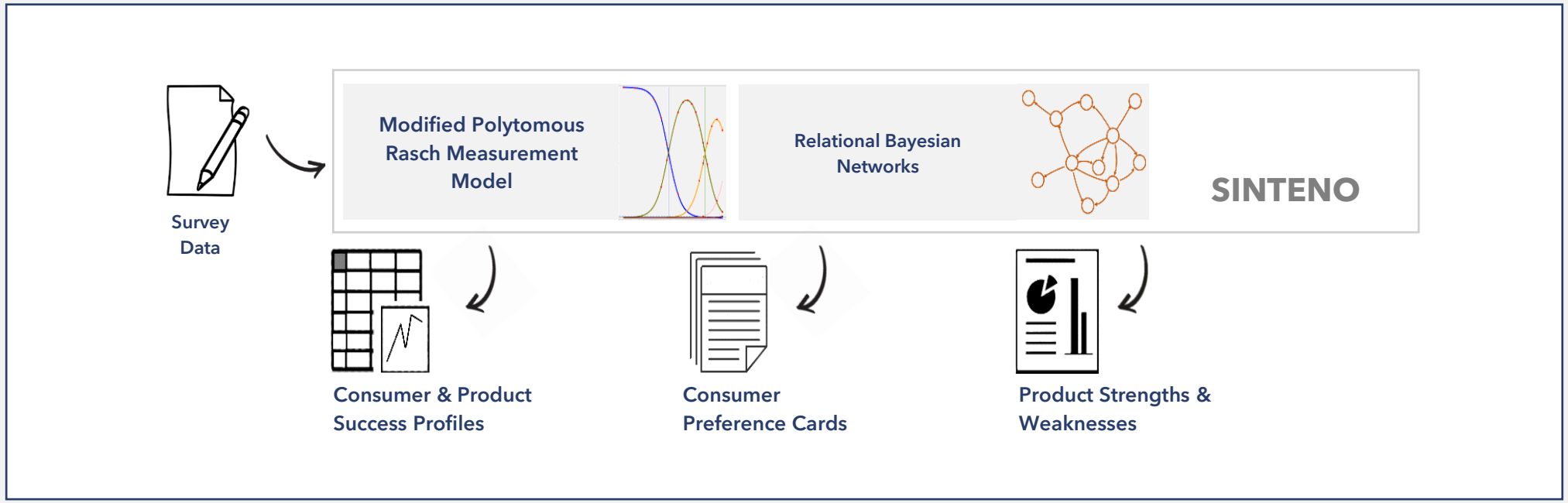
“On Display in Store”
“Product Price”
“Product Features”

The Solution

SINTENO addresses the challenges of survey data analysis by applying AI and proprietary algorithms:

1. Survey responses presented as ordinal data are converted to probabilities.
2. The difficulty of survey questions and the ability of respondents are simultaneously estimated, malfunctioning questions identified and eliminated, and untrustworthy responses removed.
3. Causal relations among survey questions established, and key (foundational) questions identified.

SINTENO AI/ML Input, Processing, Output



By conducting a **series of short consecutive surveys**, SINTENO can accurately identify consumer preferences and product strengths and weaknesses **eliminating the bias of sample under-representation**. This process creates a Consumer and Product Success Profile that quantifies the impact of foundational items on consumer preferences.

Consumer and Product Success Profile

SINTENO creates a Consumer and Product Success Profile by combining the Relational Bayesian Networks and the modified Polytomous Rasch Measurement Model. The "Success" can have different meanings depending on the nature of the survey. The profile allows for identifying foundational product attributes that align with consumer preferences, ensuring that **the product meets consumer needs now and in the future.**

The lowest rating that is expected by a consumer who exhibits a positive attitude. This is important because it varies for each question/attribute.

Foundational Attributes

#	Attribute	Difficulty	Rank	Attribute Importance
1	On Display in Store	-5.10	5	Foundational
2	Product Quality	-3.45	4	
3	Product Brand	-1.91	4	
4	TV Promotions	0.70	3	
5	Product Price	2.66	2	Foundational
6	Product Features	7.10	2	Foundational

Typically, on a five-point scale, a 4 or a 5 would be considered good, but here SINTENO shows anything less than a 5 would no longer be in positive territory.

Conversely, the rank of 2 on Product Price here might normally be considered negative. But here SINTENO shows it is "good enough" for the product success.

Consumer Preferences Cards

SINTENO creates Consumer Preferences Cards that estimate consumer-level preferences and can be used to create consumer segments.

By analyzing consumer preferences, SINTENO generates recommendations for enhancing the product/service, ultimately contributing to its success.

Preference Card for Consumer PID003, Preference 1.35, UNSATISFIED

Question	Actual Rank	Prob. Choosing Rank 1	Prob. Choosing Rank 2	Prob. Choosing Rank 3	Prob. Choosing Rank 4	Prob. Choosing Rank 5	Most Likely Rank	Consumer & Product Profile	Degree of Satisfaction
On display in store	4	0.00	0.00	0.01	0.22	0.78	5	5	Unsatisfied
Product brand	3	0.00	0.00	0.32	0.59	0.09	4	4	Unsatisfied
Product features	1	0.26	0.74	0.01	0.00	0.00	2	2	Unsatisfied
Product price	4	0.00	0.57	0.42	0.01	0.00	2	2	Satisfied
Product quality	5	0.00	0.00	0.06	0.55	0.38	4	4	Satisfied
TV promotions	3	0.00	0.15	0.75	0.10	0.00	3	3	Satisfied

Benefits

SINTENO helps identify target consumers and the relevant product attributes that can be effectively marketed to them:

1. Reveals genuine consumer opinions on product/service attributes and advertising.
2. Identifies crucial product attributes and aligns them with consumer preferences.
3. Provides actionable recommendations for product and advertising improvement.
4. Helps prevent costly errors in product and advertising decisions.
5. Aids in the refinement of the future surveys for maximum efficiency.

About Us

- YieldWise Inc., has developed an analytical platform that supports applications like SINTENO. The YieldWise application suite also includes:

  A-SCALA which focuses on redefining student success, and

  EXOUSIA which focuses on redefining employee success

- YieldWise is a leading provider of innovative analytical solutions specializing in the research and development of sophisticated analytical methods and software tools for various applications such as demand forecasting, design of experiments, survey analysis, statistical quality control, survival analysis, time series analysis and forecasting, computer and network performance evaluation and capacity planning, statistical and machine-learning consulting and training, as well as SAS, R and Stata software training and consulting services.