

Can Paired Product Preferences Be Predicted from Liking Ratings?

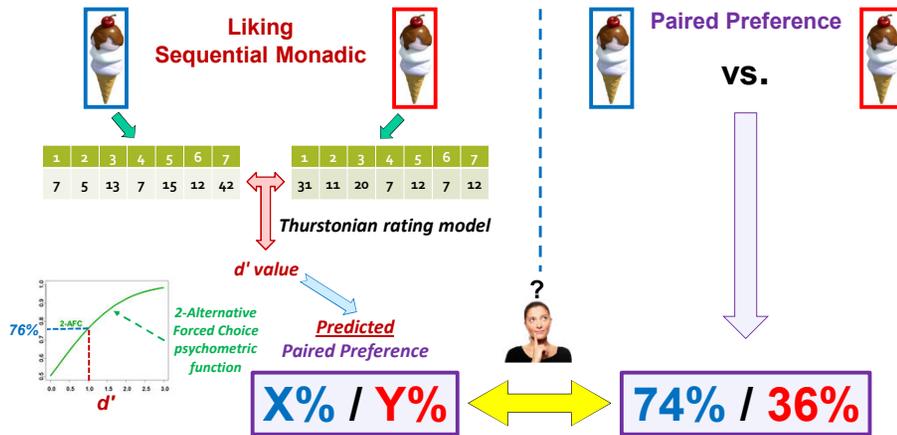
B. Rousseau¹, M. O'Mahony² & R. Ishii²

¹The Institute for Perception, Richmond, USA, ²University of California, Davis, USA

1. Introduction

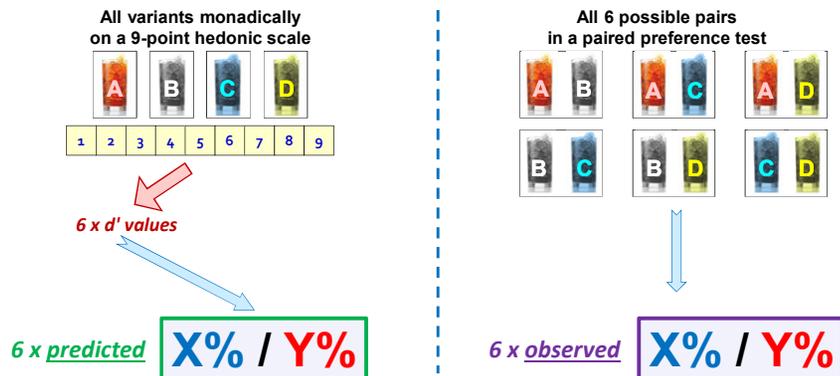
- ❖ Product liking ratings often collected with consumers as part of an evaluation questionnaire
- ❖ Products' relative hedonic strength compared using liking mean comparisons
- ❖ Pairwise preference information also of interest (e.g., 63/37 or 54/46), but more cumbersome to collect, especially as number of products increases
- ❖ Predicting preference from liking information is possible using various approaches such as Thurstonian models on an hedonic continuum or *R*-Indices
- ❖ Current research was conducted to study the reliability of the preference predictions from liking ratings

2. Experimental Approach



3. Materials & Methods

- ❖ Subjects: N = 288, 130/158 M/F, age 18-64 years old
- ❖ Stimuli: Four variants prepared from Nestea®, Sweet Iced Tea Mix - Lemon
 - ❖ A: Normal
 - ❖ B: Diluted
 - ❖ C: Apple flavored
 - ❖ D: Orange flavored
- ❖ Each consumer evaluated in one session (conditions and sample evaluations balanced):



4. Results

4.a. Liking Means vs. Preference Proportions

Sample 1	Sample 2	Mean		Paired preference*		Hedonic direction agreement
		Sample 1	Sample 2	Sample 1	Sample 2	
Normal	Diluted	6.29 ^b	5.92 ^c	62% ⁺	38%	✓
Normal	Apple	6.29 ^b	6.53 ^a	34%	66% ⁺	✓
Normal	Orange	6.29 ^b	6.31 ^{ab}	49%	51%	✓
Diluted	Apple	5.92 ^c	6.53 ^a	29%	71% ⁺	✓
Diluted	Orange	5.92 ^c	6.31 ^{ab}	37%	63% ⁺	✓
Apple	Orange	6.53 ^a	6.31 ^{ab}	65% ⁺	35%	✓

- *Paired preference: NP answers split proportionally; Statistics conducted using Thurstonian 2-AC model
- Mean analysis: a,b,c - Means with no letter in common are significantly different
- Paired preference analysis: + - Proportion is significantly greater than 50%

- ❖ Initial data analysis confirms that results obtained using a 9-point hedonic scale correspond to those from a paired preference test in terms of hedonic direction
- ❖ Direct paired comparison shows slightly more significant differences

4.b. Observed vs. Predicted Preference Proportions

Comparison	Observed	Predicted
Normal vs. Diluted	62 / 38	57 / 43
Normal vs. Apple	34 / 66	46 / 54
Normal vs. Orange	49 / 51	49 / 51
Diluted vs. Apple	29 / 71	39 / 61
Diluted vs. Orange	37 / 63	43 / 57
Apple vs. Orange	65 / 35	53 / 47



- ❖ The **predicted** and **observed** preference proportions show the expected positive relationship
- ❖ However, the **observed** proportions are about twice the size of the **predicted** values
- ❖ This can be explained by the fact that consumers use ratings scale categories differently, which in turn lowers the measured size of the underlying preference proportions

- ❖ **Note:** Alternate approaches to predicting preference proportions from the liking data, such as using an *R*-Index measure or an unfolding model of the individual consumer product liking ratings did not uncover as good of a relationship as that obtained using Thurstonian models for rating and 2-AFC data

5. Conclusions

- ❖ Consumer goods companies are often interested in the relative pairwise performance of products
- ❖ Consumer testing is effort intensive and conducting direct pairwise comparisons of multiple samples can be cost prohibitive
- ❖ Thurstonian models for ratings scales and the 2-Alternative Forced Choice method allow the prediction of pairwise preference proportions from hedonic rating data
- ❖ The research presented here showed that the prediction accuracy is acceptable, even though additional experimentation is needed to confirm the quality of the approach
- ❖ Finally, the results illustrate that preference prediction from liking data might underestimate the true preference proportion by up to a factor of 2 due to the scale usage variability associated with the consumers; such multiplier should be used to ensure predicted outcomes more in line with actual data collected using direct pairwise product comparisons