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Are Results from Non-Hypothetical Choice-Based Conjoint Analysis and Non-Hypothetical Recoded-Ranking Conjoint Analysis Similar?



Faical Akaichi¹, Rodolfo M. Nayga, Jr.², and José M. Gil³

(1) Scottish Agricultural College (SAC); (2) University of Arkansas; (3) CREDA-UPC-IRTA
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1. Introduction

Over the past two decades conjoint analysis (CA) has been a popular method used to measure and analyze consumers' preferences for market and non-market goods. Two of the widely used CA formats are choice-based conjoint analysis (CBCA) and ranking conjoint analysis (RCA).

The ability of CBCA to mimic the actual purchasing process and the capacity of RCA to provide information on consumer's preferences for all the profiles shown in a choice set have attracted the interest of many researchers.

For example, some studies have compared both CA formats and found differences in results due to among others, different statistical techniques and experimental designs used.

In our study, we compared CBCA and RCA using identical experimental design for both CA formats (e.g. we used the same number of choice cards and number of options per choice card (see Figure 1 and 2)).

Furthermore, our study differs from previous studies in a number of ways including (1) the non-hypothetical nature of our experiments, (2) the inclusion of the holdout task to test the external validity of the estimates, (3) inclusion of the no-choice option, and (4) the use of the hierarchical Bayesian multinomial logit model to estimate individual level partworths and thereby accommodate possible heterogeneity in the results across respondents.

This topic is important since if the estimated preferences are indeed similar across these two popularly used CA formats, then researchers could comfortably and confidently use either one of these formats depending on among others research objectives, and be assured that estimates are generally robust across both formats. However, if there are differences in the results, then it would be more of a challenge to pick which format to use when using CA for preference elicitation since one cannot be sure how reliable the findings will be.

2. Experimental design

To assess the differences or the similarities between non-hypothetical CBCA (NH-CBCA) and non-hypothetical RCA (NH-RCA), we recruited a random sample of 86 undergraduate students to evaluate different combinations of a sandwich and a drink (four types of sandwich (Hamburger, Frankfurter, Omelet, and Vegetarian) and four different drinks (Classic Coke, Diet Coke, Water, and Juice)). Each combination was priced at one of four price levels (3.35€, 3.80€, 4.30€ or 4.75€).

In the experiment, students were then randomly assigned to two CA formats. Each participant was presented with 16 choice sets of four options each.

In the NH-CBCA, each participant was asked to choose between one of the three combinations and the no-choice option while in the NH-RCA, each participant was asked to rank the three combinations from the most preferred to the least preferred combination or to select the no-choice option if she/he does not prefer any of the three combinations.

Since both CA formats are non-hypothetical, participants were informed that they have to purchase one of their choices that will be randomly picked and pay the price corresponding to that choice.

The two data sets obtained from the NH-CBCA and the NH-RCA treatments were coded and estimated similarly.

Figure 1: An example of a choice set presented in the NH-CBCA

Choice set 1			Identification number:	
	OPTION 1	OPTION 2	OPTION 3	NO-CHOICE OPTION
Drink:	Light Coke	Classic Coke	Water	None
Sandwich:	Vegetarian	Hamburger	Omelet	of
Price:	4,75€	3,35€	4,30€	them
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please mark the option you would choose.

Figure 2: An example of a choice set presented in the NH-RRCA

Choice set 1			Identification number:	
	OPTION 1	OPTION 2	OPTION 3	NO-CHOICE OPTION
Drink:	Light Coke	Classic Coke	Water	None
Sandwich:	Vegetarian	Hamburger	Omelet	of
Price:	4,75€	3,35€	4,30€	them
	1* <input type="checkbox"/> 2* <input type="checkbox"/> 3* <input type="checkbox"/>	1* <input type="checkbox"/> 2* <input type="checkbox"/> 3* <input type="checkbox"/>	1* <input type="checkbox"/> 2* <input type="checkbox"/> 3* <input type="checkbox"/>	<input type="checkbox"/>

Please Rank the option 1, 2 and 3 from the most preferred to the least preferred or mark the option None.

3. Results

Table1: Internal validity and external validity tests

Mechanism	Internal validity (in sample = main task)				External Validity (out sample = holdout task)			
	Total number of choices	Number of correct predictions	%	p-value	Total number of choices	Number of correct predictions	%	p-value
NH-CBCA	688	608	88	.29	43	22	51	.66
NH-RRCA	688	595	87		43	20	47	

Table2: Internal validity and external validity tests (Choice options (options1, 2 and 3) vs. No-Choice option ("None of them" option))

Mechanism		Choice options (options 1,2,3)				No-choice option ("None of them" option)			
		Total number of choices	Number of correct predictions	%	p-value	Total number of choices	Number of correct predictions	%	p-value
Internal validity	NH-CBCA	391	335	86	.90	297	273	92	.06
	NH-RRCA	399	343	86		289	252	87	
External validity	NH-CBCA	30	14	47	.18	13	8	62	.43
	NH-RRCA	27	8	30		16	12	75	

Table 3: Estimated willingness to pay values for each level of attribute

Attribute	Level	NH-CBCA	NH-RRCA	p-value
Drink	Juice	-.32	-.28	.93
	Soft Light	-.48	-.48	.83
	Soft Classic	-.76	-.61	.84
	Water (Base level)	.03	-.81	.39
Sandwich	Omelet	-.25	-.68	.59
	Frankfurt	-.39	-.35	.11
	Hamburger	.61	.49	.81
	Vegetarian (Base level)	.04	-.15	.71

4. Conclusion

Incentivizing participants to behave truthfully and eliminating design's differences we found that participants in a NH-CBCA and a NH-RRCA behave similarly.

In fact our results showed that the estimated partworths from both mechanisms have a statistically similar predictive power in-sample and out-of-sample as well. In other words participants respond similarly when they are asked to state the option they would choose or the option they would most prefer (i.e. through a ranking exercise).

This is an important result because it points out the promising use of the NH-RCA that not only provides similar results to the NH-CBCA but also make available to the researcher important additional information on consumers' preferences for the no-chosen profiles.

We also found that, in general, the estimated WTP is statistically indifferent between the NH-CBCA and the NH-RCA. This is also an interesting finding since the CBCA and the RCA are increasingly used to estimate consumers' WTP for different products and services (e.g. environmental products, health insurance etc.).