The role and interaction of food labelling systems in promoting healthier and sustainable choices among the UK adult population: A study using choice-based conjoint analysis simulations

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Abstract

⇒ **Food labelling systems have garnered significant interest for their role in aiding consumers with clear and understandable details on the nutritional content of foods**.

⇒ However, academic discussions do not agree on the most efficient approach for integrating information on products to discourage unhealthy choices.

⇒ **This study offers insights into presenting nutritional information on packaging effectively**, aiming to assist consumers in making healthier and environmentally conscious decisions.

⇒ **We simulated data for a choice-based conjoint analysis (CA)** involving 1500 participants to explore how individuals adapt their selections based on different food labeling systems.

⇒ Overall, it appears that the majority of respondents have a moderate appreciation for both food labelling systems, implying that they could wield a comparable impact on food selection. However, analysis by social class indicates that some groups might prioritize food choices endorsed by Ecolabels over those supported by Food labels.

Figure 1. Food products with food labels and ecolabels in UK supermarkets.

Methodology

⇒ In the CA, respondents engaged in an **online scenario where they simulated purchasing cereals** across fourteen trials with randomized variations encompassing **multiple attributes such as food labels, ecolabels, nutritional claims, and prices**. The attributes were selected for their high prevalence in food packaging.
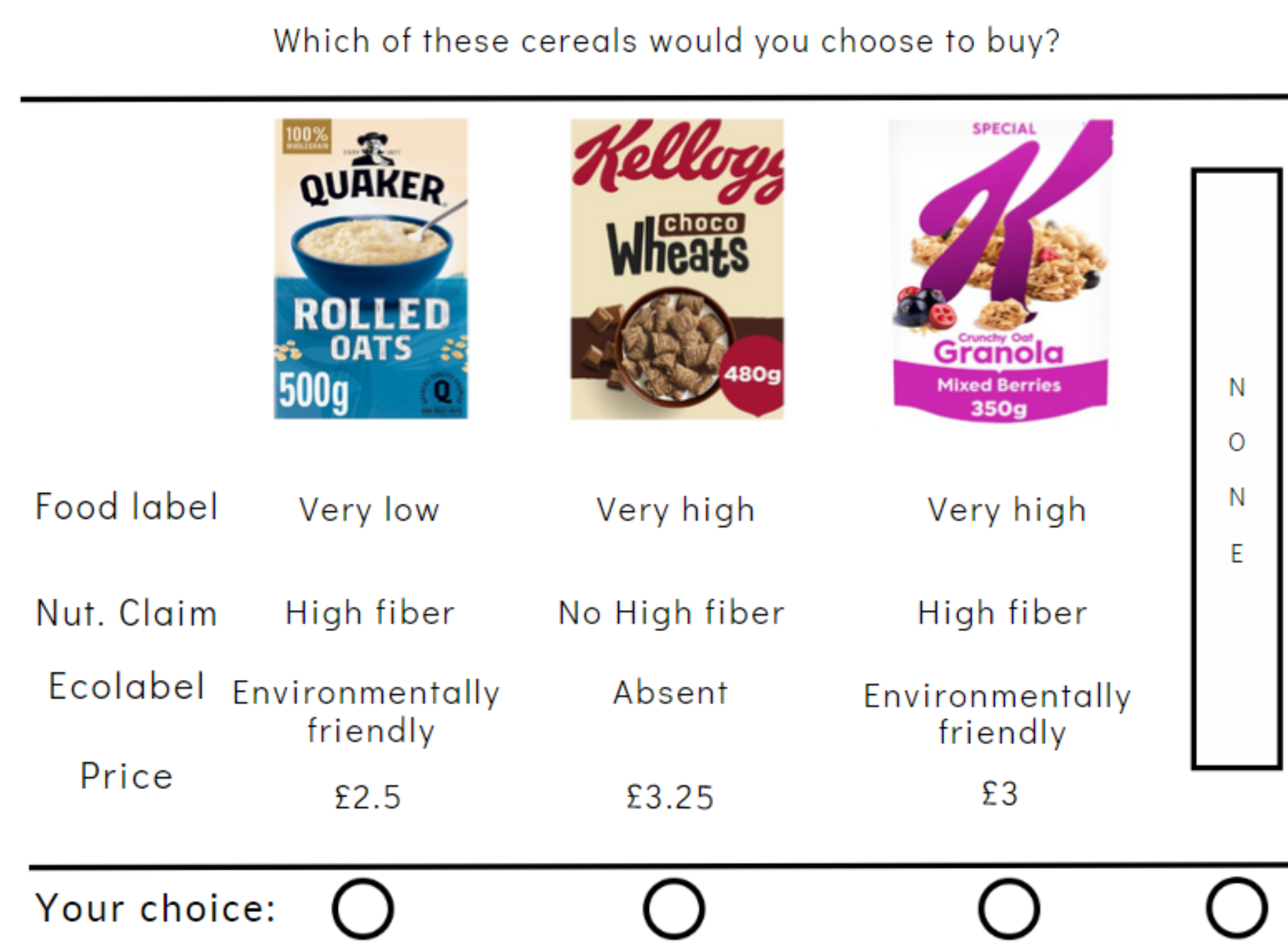

Figure 2. Example of attributes and levels of a choice trial.

⇒ **A mixed logit utility model was built considering the main effects of the attributes of the CA**. The utility for product j for individual i and choice occasion t in the mixed logit model can be described by:

$$U_{ijt} = \beta_{1i}\text{FoodLabel}_{ijt} + \beta_{2i}\text{Ecolabel}_{ijt} + \beta_{3i}\text{Claim}_{ijt} + \beta_{4i}\text{Price}_{ijt} + \epsilon_{ijt}$$

where β_{ni} represents the individual-specific random coefficients for the conjoint factors, and ϵ_{ijt} denotes the stochastic error. It was assumed that all random coefficients were drawn from a normal distribution and that individuals' random coefficients remained constant across their various choices.

⇒ The analysis was conducted using the mlogit package in R, and the experimental design was created using Sawtooth software.

Results

Table 1 and Fig.3 illustrate the relative importance of each attribute and levels, derived from the utility values assigned to each attribute. **The Latent Class Analysis (LCA) in Fig.4 classified respondents into five groups based on their different utility patterns**.

Table 1. Utility Values, Standard Errors, and T Ratios for Different Attributes

Attribute	Utility	Std Error	t Ratio
Food Label			
Very Low	-0.00095	0.01640	-0.05794
Low	-0.00344	0.01635	-0.21044
High	0.00690	0.01632	0.42295
Very High	-0.00251	0.01636	-0.15360
Eco-label			
Environmentally Friendly	0.00541	0.00913	0.59202
Absent	-0.00541	0.00913	-0.59202
Nutritional Claim			
High Fibre	-0.00209	0.00914	-0.22822
Absent	0.00209	0.00914	0.22822
Prices			
2.75	0.01871	0.01312	1.42548
3	-0.02168	0.01321	-1.64143
3.25	0.00297	0.01312	0.22660
None	-0.00768	0.01725	-0.44512

Key Findings

⇒ Food and Ecolabel hold a moderate level of importance relative to others. The difference between the two labels is 0.73.

⇒ LCA reveals that there is greater variation in groups preferences for the Food label attribute compared to the overall preference. Certain groups deviate from the overall preference for eco-friendliness by favoring products without such labels. See Group 3 in Fig.4.
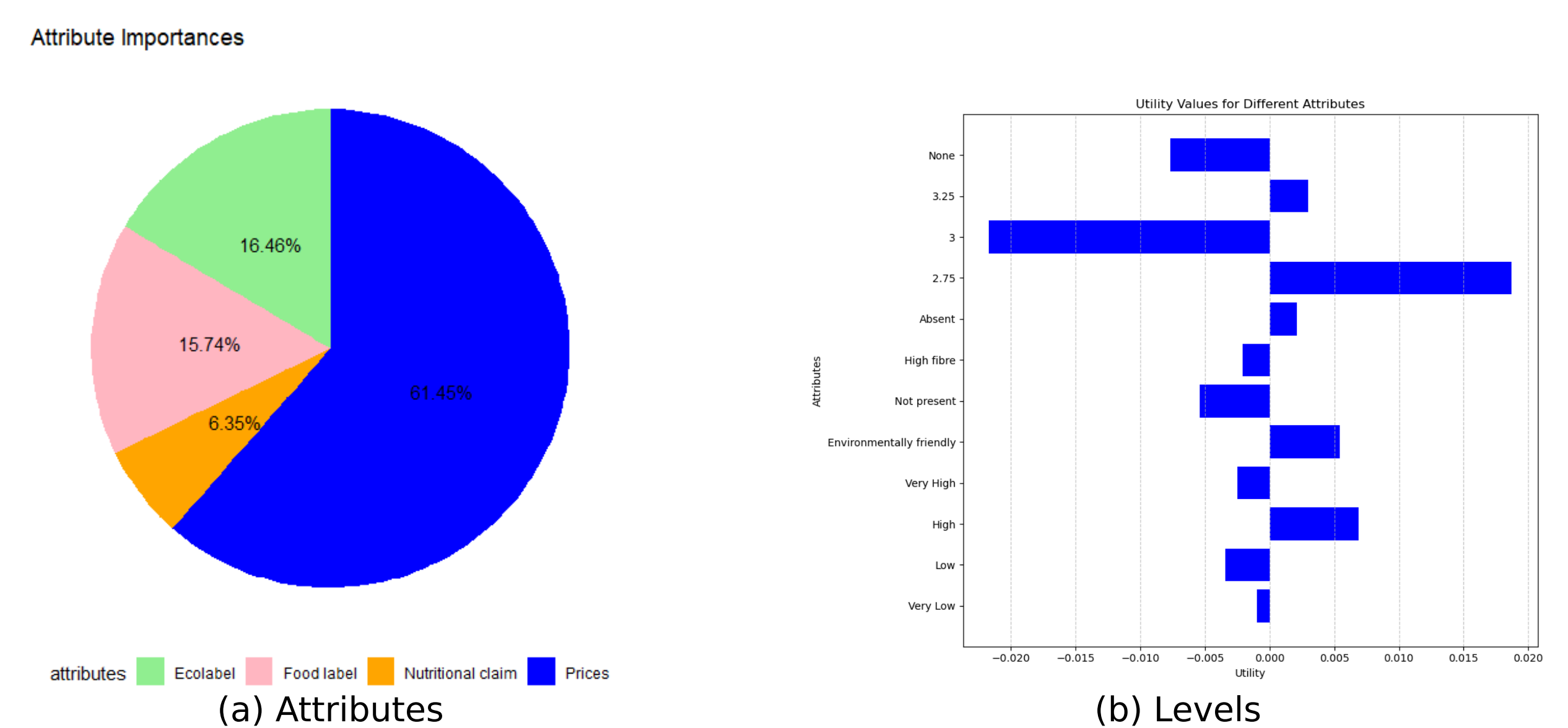

(a) Attributes   (b) Levels

Figure 3. Multinomial Logit model results. (a) Attribute importance. (b) Alternative importance.
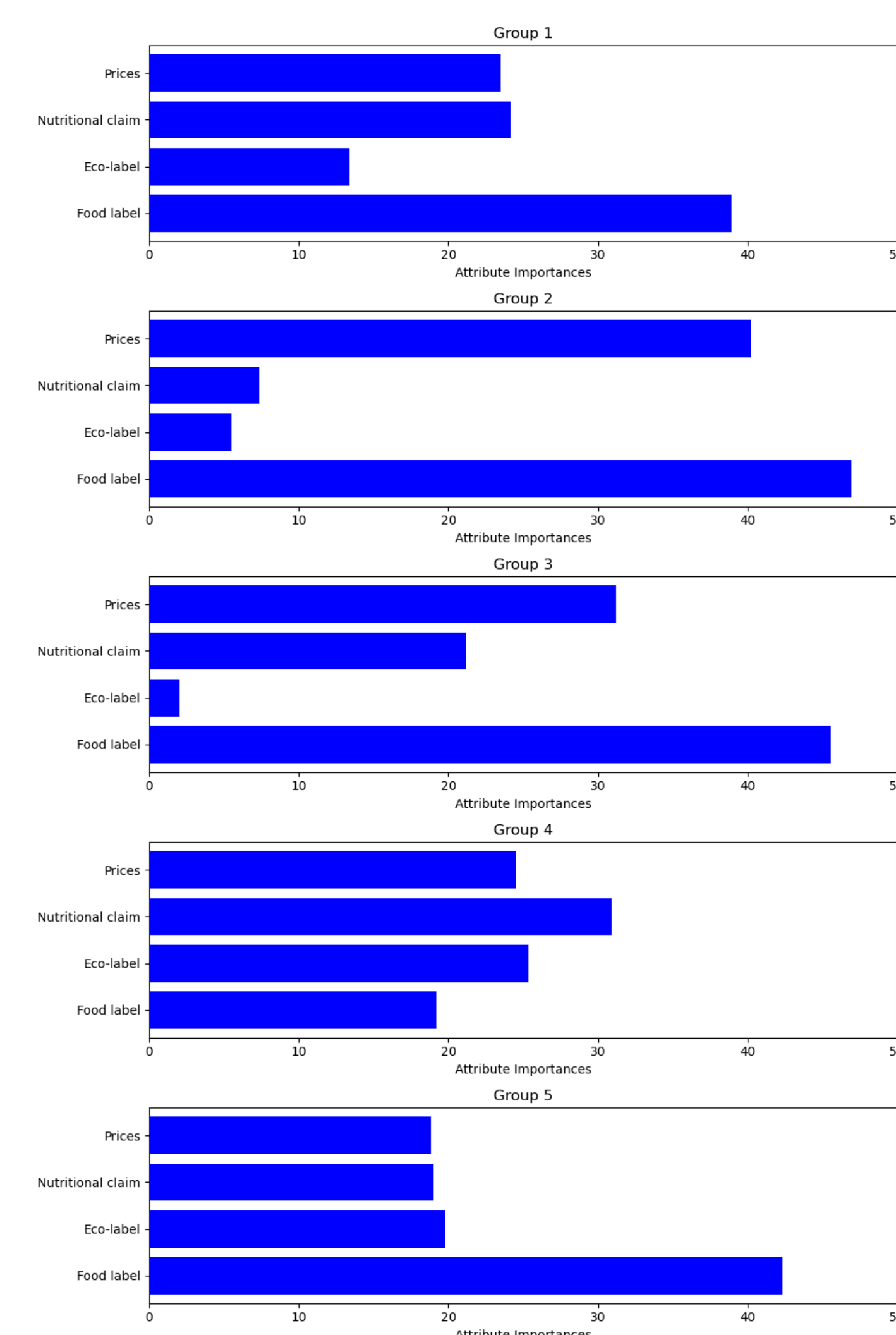

Figure 4. Latent Class Analysis.

Conclusion

Overall, respondents seem to moderately value both food labelling schemes, indicating that both could have a similar influence on food choice. But class analysis suggests that certain groups would value food choices based on Ecolabels (Group 4) while others would value those based on Food labels (Group 3).

References

[1] Ares, Gastón, et al. "Influence of label design on children's perception of two snack foods: Comparison of rating and choice-based conjoint analysis." Food quality and preference 53 (2016): 1-8.