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Consumers' preferences for health related and environmental friendly food attributes: New insights from an ABR approach

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Summary

Paper explores Italian consumer appreciation for health-related and environmental friendly attributes of whole-wheat pasta and compares two approaches in the information provision: a “holistic” approach (inform consumer on the overall product characteristics) with an “attribute-specific” one. A modified version of the attribute-based referenda model (ABR) has been estimated on sequence of two dichotomous choice questions randomly administered to a sample of households, starting only with a one attribute version (“adding” treatment) or the complete product one (“subtracting”). Results suggest that taste and habits are great barriers to overcome, since only whole-wheat pasta consumers are willing to pay for the health-related attribute. It gets worse for the environmental attribute for which people are not willing to pay even if informed on the environmental-friendly method of production. However, the way in which information is provided, holistically or attribute-based, is important, with higher value attached to attributes when evaluated in the subtracting context, supporting prospect theory and endowment effect.

Keywords: environmental food attributes, health food attributes, attribute-based (ABR) model

JEL Classification codes: D12

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1. INTRODUCTION

Food in recent years is becoming an ever more complex good in which consumer looks not only for nutritional characteristics and taste but also for “new” attributes which contributes in defining the perceived quality of the final product. These attributes can be considered to pursue private goals, such as the health-related ones, or public goods, such as the environment protection. Usually the health-related attributes have a major attractiveness on consumers than the environmental ones (Magnusson et al., 2003; Grankvist and Biel, 2001). The latter have been mainly related to organic production (Grunert et al., 2014; Yue et al. 2016). The fact that consumers often perceive organic product as healthier than its conventional counterpart (Magnusson et al., 2003; Grankvist and Biel, 2001; Hughner et al., 2007) contributes to blur the assessment of the environmental characteristic “per se” as they are often shadowed by healthy attributes (Nasir and Karakaya, 2014). Health related characteristics have instead a clearer effect on the household willingness to pay a premium price, even if other product and consumer may show a moderating effect. In fact, especially for certain products, eating habits and taste are too great obstacles to be overtaken by a perspective of positive effects on health (Williamson et al., 2000). Furthermore the preference for these types of attributes (both health and environment related) is higher among certain social groups depending on their health consciousness (Sabbe et al., 2009), age (Holkanken and Frewer, 2009; Ginon et al., 2009; Brecard et al., 2009), gender (Grunert et al., 2009; Brecard et al. 2009) etc..

However consumer choice is not only based on the number and kind of attributes included in the product but, accordingly to the prospect theory (Kahneman and Tverski, 1979), the way in which they are perceived (i.e. as gains or losses) in respect to a reference point can be of primary importance. Considering this, in a context with multiple attributes, can be essential for the decision to bundle or unbundle them within a product, since gains (positive attributes) seem to be attached with more value when evaluated individually and losses (negative attributes) look as less salient when bundled together (Johnson, 1999).

Given this literature framework the aim of our work is to address three different research questions. The first two questions concern the willingness of Italian pasta consumers to pay an additional price premium for healthy and environmental attributes of pasta, a main item of their traditional diet. The third

question is related to the bundling-unbundling debate, trying to understand how a different approach can affect the consumers' WTP about such credence attributes.

2. DATA AND METHODS

The sample was selected among the North-Eastern and Central regions of Italy population through a two-stage procedure where a random set of municipality was first identified for each region and then, within each of them, the households were randomly chosen from telephone books taking into account the size of the municipality population. On the 1.568 selected households a telephone survey was conducted using 4 different types of questionnaire. Each questionnaire has some common sections aimed at retrieving information about pasta consumption habits and family characteristics, such as socio-demographics, income, environmental attitudes etc. Table 1 reports some descriptive statistics of the households' sample.

Table 1. Sample descriptive statistics.

	Que1	Que2	Que3	Que4	Total
	Healthy; healthy& Environmental friendly	Environmental friendly; healthy& Environmental friendly	Healthy& Environmental friendly; healthy	Healthy& Environmental friendly; Environmental friendly	
N	391	393	391	391	1566
BID1 mean	0.58	0.59	0.78	0.77	0.68
Standard dev.	0.34	0.34	0.35	0.34	0.36
% Yes	33.6	42.2	33.5	30.7	35.1
BID1 mean	0.63	0.65	0.69	0.67	0.66
Standard dev.	0.33	0.34	0.35	0.35	0.34
% Yes	31.7	28.5	29.7	26.9	29.2
Whole-wheat pasta consumers (%)	30.7	29.2	33.3	29.7	30.7
Environmental attitude (mean scores' sum) ¹	30.7	30.8	31.3	30.9	30.9
Wealthy households (%)	49.6	44.0	47.5	42.5	45.9

¹ Environmental attitudes based on 9 statements, each of them was rated on a five point Likert scale, ranging from "strongly disagree" to "strongly agree".

The questionnaire types differ for the choice section in which the interviewee is asked to accept or refuse a fixed BID for a predetermined product, i.e. a new type of pasta. The reference questionnaire format for eliciting the consumers' WTP was the attribute-based referenda (ABR) model, which has the major advantage of not relying on few levels for the price attribute (Holmes and Boyle, 2005). This format, based on a sequence of dichotomous choices between the status quo and several alternatives, has been slightly modified. Our survey format indeed comprises a sequence of two choices whereby a product with a given mix of attributes is first offered to the household, then the same product is offered again with a larger

(adding) or smaller (subtracting) number of attributes adjusting the bid accordingly (see below). Table 2 clarifies the choice set. To each household only one type of questionnaire was randomly administered.

Table 2. Different types of administered questionnaires.

Questionnaire ID	Product attribute(s) in the first choice	Product attribute(s) in the second choice	Treatment
1	Healthy	Environmentally friendly and healthy	Adding
2	Environmentally friendly	Environmentally friendly and healthy	Adding
3	Environmentally friendly and healthy	Healthy	Subtracting
4	Environmentally friendly and healthy	Environmentally friendly	Subtracting

This way of organising the questionnaires allows us to look for some differences in results switching from a single attribute to a complete version of the product and along the reverse path, taking into account the bundling-unbundling debate (Johnson et al., 1999). It's worth noticing anyway that the sequential nature of the choices and their being highly framed by bundling or unbundling lead to a setting in which a certain degree of context dependence naturally emerges.

With respect to the BID, in the first two types it was selected randomly an additional price premium within a range of 0.10 € - 0.90 € in the first choice and higher or equal (up to 1.30 €) in the second choice. For the other questionnaire types the range of the BID is 0.10 € - 1.30 € in the first choice and is lowered in the second one.

Data obtained from the survey were of a panel structure (two answers for each respondent) and were processed through a random effect probit model, performed at first on the entire dataset, in order to answer to the first two research questions, and then separately for the two treatment, thus addressing the last research question. The dependent variable was the YES-NO interviewee's answer to the offered product, explanatory variables included the attribute dummies and their interaction with several household characteristics, namely whole-wheat pasta consumption habit, environmental attitude and subjective wellbeing.

3. RESULTS

Table 3 reports the results of the analysis conducted on the entire sample. The numbers in bold are statistically significant at the 5% level.

As expected the BID coefficient is negative showing the usual negative price effect. Negative significant parameters are also found for both the healthy and the environmental attributes, indicating that consumers are not willing to pay more for a different pasta product, despite its credence attributes. In a context of strongly rooted pasta consumption habits – as in the Italian case – results show that it is difficult for health- related attributes – which in whole-wheat pasta are usually accompanied by a less appreciated taste by general consumer – to compete with hedonic attributes, in particular taste supported by habits. This is nevertheless not always true: we can indeed find sub-samples which assign a certain importance to these attributes being willing to choose the innovative product. This is the case of consumers already using whole-wheat pasta in respect to both attributes and of environmental conscious and wealthy consumers, which demonstrate to be more sensible to environmental friendly production methods.

Table 3. Pooled model results.

Variable	Coefficient
BID	-2.39
Environmentally friendly	-2.51
Healthy	-1.44
Healthy*whole-wheat	3.11
Environmentally friendly*whole-wheat	0.85
Environmentally friendly*environmental attitude	0.09
Healthy*environmental attitude	0.00
Environmentally friendly*wealthy	0.76
Healthy*wealthy	0.16
Constant	0.17
$\ln \sigma_u^2$	2.15
Rho	0.90
Log L	-1291.1
N	1566

Table 4 offers a comparison between results of the “adding” and “subtracting” models.

These results can be considered pretty similar to the previous ones with the BID showing a still negative coefficient in both treatments as well as the environmental attribute does. The same similarity is found in almost all the other variables with the exception of the healthy attribute (in the subtracting treatment) and the constant term of the regression which is now statistically significant.

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These two variables are also the very ones for which a difference emerges between the two treatments. In the healthy attribute case the “adding” treatment shows a significant negative coefficient, while in the “subtracting” one no significance is found. The constant term has instead a positive value in the “adding” treatment and a negative value in the “subtracting” treatment, demonstrating a higher share of “NO” answers in the latter case *ceteris paribus*. While in the “adding” treatment all the significant mean WTP were negative, even for consumers more sensitive to environmental and/or health issues, in the subtracting treatment a positive significant WTP (corresponding to a premium price of 0.97 euros per 500 gr of pasta) is expressed by those already consuming wholemeal pasta and sensitive to the health issues; the premium increases to 1.09 euros in the same consumer subgroup if only wealthy people are considered. All these elements could be seen as consequences of the endowment effects whereby the consumer is more reluctant, in the second choice, to give up a certain product characteristic that feels as acquired after the first choice. This explanation however, looking at the other coefficients, seems not to be always valid. In particular signs of the endowment effect are observed for the healthy attribute while for the environmental one traces of the same effect could be found only in the environmental conscious consumers sub-sample.

Table 4. “Adding” and “subtracting” model results.

Model	Adding Treatment	Subtracting Treatment
BID	-2.50	-2.93
Environmentally friendly	-2.54	-2.90
Healthy	-2.25	-0.79
Healthy*whole-wheat	3.39	3.61
Environmentally friendly*whole-wheat	1.05	0.79
Environmentally friendly*environmental attitude	0.07	0.13
Healthy*environmental attitude	-0.01	0.00
Environmentally friendly*wealthy	0.91	0.83
Healthy*wealthy	0.10	0.27
Constant	1.18	-0.97
Ln σ_u^2	2.24	2.58
Rho	0.90	0.93
Log L	-641.2	-621.7
N	784	782

4. CONCLUSIONS

Our choice to work with pasta, a traditional food in Italy, was intended to measure the willingness of consumers to change a well-rooted dietary habit (along with the associated familiar taste) in order to obtain health or environmental benefits. These attributes are theoretically desirable as shown by the most responsive sub-samples of health or environmentally conscious, but the “average” household seems to be less likely to sustain a higher price. This is probably due also to the fact that the new product affects the consumer’s habits and taste, especially when the health-related attribute is present. In light of these results moving a wide share of consumers to a healthier and a more environmental friendly diet, at least when considering primary foods, will imply a great efforts in terms of marketing campaigns and consciousness arising mechanisms.

The observed presence of an endowment effect instead suggest that the evaluation of consumers’ WTP is dependent on the context, thus the decision of using an “adding” or a “subtracting” treatment as the “right” method for measuring it have to be taken in light of the framework in which we’re working. Furthermore this suggests that the value attached by the consumer to these attributes will increase if they become for him, through appropriate information or policy actions, the “reference point” from which his choice starts.

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REFERENCES

- Brècard, D., Hlaimi, B., Lucas, S., Perraudou, Y. and Salladarrè, F. (2009). Determinants of demand for green products: An application to eco-label demand for fish in Europe. *Ecological Economics* 69(1): 115-125.
- Ginon, E., Lohèac, Y., Martin, C., Combris, P. and Issanchou, S. (2009). Effect of fibre information on consumer willingness to pay for French baguettes. *Food Quality and Preference* 20 (5): 343-352.
- Grankvist, G. and Biel, A. (2001). The importance of beliefs and purchase criteria in the choice of eco-labeled food products. *Journal of Environmental Psychology* 21: 405–410.
- Grunert, K.G., Hieke, S. and Wills, J. (2014). Sustainability labels on food products: Consumer motivation, understanding and use. *Food Policy* 44: 177–189.
- Holmes, T.P. and Boyle, K.J. (2005). Dynamic learning and context-dependence in sequential, attribute-based, stated-preference valuation questions. *Land Economics* 81(1): 114-126.
- Honkanen, P. and Frewer, L. (2009). Russian consumers' motives for food choice. *Appetite* 52: 363-371.
- Hughner, R.S., McDonagh, P., Prothero, A., Shultz, C.J. II and Stanton, J. (2007). Who are organic food consumers? A complication and review of why people purchase organic food. *Journal of Consumer Behaviour* 6 (2-3): 94-110.
- Johnson, M.D., Herrmann, A. and Bauer, H.H. (1999). The Effects of price bundling on consumer evaluations of product offerings. *International Journal of Research in Marketing* 16: 129-42.
- Kahneman, D., Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk, *Econometrica* 47 (2): 263-292.
- Magnusson, M. K., Arvola, A., Koivisto Hursti, U. K., Åberg, L. and Sjoden, P.O. (2003). Choice of organic foods is related to perceived consequences for human health and to environmentally friendly behaviour. *Appetite* 40 (2): 109–117.
- Nasir, V.A. and Karakaya, F. (2014). Underlying motivations of organic food purchase intentions. *Agribusiness, an International Journal* 30(3): 290-308.
- Sabbe, S., Verbeke, W., Deliza, R., Matta, V. and Van Damme, P. (2009). Effect of a health claim and personal characteristics on consumer acceptance of fruit juices with different concentrations of açai (*Euterpe oleracea* Mart.), *Appetite* 53 (1): 84–92
- Williamson, A. R., Hunt, A. E., Pope, J. F. and Tolman, N. M. (2000). Recommendations of dietitians for overcoming barriers to dietary adherence in individuals with diabetes. *Diabetes Educator* 26: 272–278.
- Yue, C., Campbell, B., Hall, C., Behe, B., Dennis, J. and Khachatryan, H. (2016). Consumer preference for sustainable attributes in plants: evidence for experimental auctions. *Agribusiness, An International Journal* 32(2): 222-235.