Attribute non-attendance or attribute-level non-attendance? A choice experiment application on extra virgin olive oil

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ABSTRACT

The fact that survey respondents do not attend to all the attributes presented in choice experiment surveys is fast becoming a key issue in CE studies. This study proposes a new method aimed at eliciting consumers' stated attribute non-attendance (ANA) behavior at the levels of each attribute, and compares it with the commonly used stated ANA approach, where non-attendance behavior is captured at the attribute level (i.e., not levels of the attributes). Results generally indicate that respondents do indeed ignore some of the levels of an attribute, suggesting that capturing non-attendance behavior at the attribute level would be insufficient at accurately and totally capturing stated ANA behavior. This finding implies that future choice experiment studies should take ANA into account not only at the attribute level but also at the levels of an attribute, both when asking respondents their stated ANA behavior during the survey and also in CE model specifications.

Key words: stated attribute level non-attendance, serial attribute non-attendance, serial attribute level non-attendance, choice experiments

The fact that survey respondents do not attend to all the attributes presented in choice experiments (CE) surveys is fast becoming a key issue in CE studies. This issue is referred to in the choice modeling literature as attribute non-attendance (ANA). A considerable amount of CE studies have acknowledged that ANA behavior matters in applied choice analysis and have documented that ignoring ANA behavior leads to biased willingness to pay (WTP) and welfare measures (Hensher 2006; Carlsson, Kataria, and Lampi 2010; Hensher and Rose 2009; Scarpa et al.2009; Balcombe, Burton and Rigby 2011). Despite this, questions related to how respondents attend to information represented in CE surveys and the best methods to capture such behavior are still relatively unanswered. To dig deeper into these questions, this paper proposes a new method aimed at eliciting consumers' stated non-attendance behavior at the levels of each attribute, and compares it with the commonly used stated ANA approach, where non-attendance behavior is captured at the attribute level (i.e., not levels of the attributes). We pose this broader methodological contribution within a food CE context.

To date, the choice modeling literature proposes two different methods to accommodate ANA behavior: the stated ANA (Hensher 2006; Carlsson, Kataria, and Lampi 2010; Hensher and Rose 2009), and inferred ANA (Scarpa et al. 2009; Balcombe, Burton and Rigby 2011). The inferred ANA method refers to methods that account for ANA through the estimation of analytical models (Scarpa et al., 2009; Caputo et al., 2013; Hensher and Greene 2010; Campbell et al., 2011; Hensher et al., 2012). The stated ANA, on the other hand, refers to methods accounting for ANA by asking respondents supplementary information about whether or not they ignored an attribute when making a decision (e.g., Hensher et al., 2005; Hensher and Rose, 2009; Scarpa et al., 2009; Scarpa et al. 2010; Puckett and Hensher 2008, 2009; Scarpa et al., 2010). Hence, in this latter approach, the researcher will have self-reports of which attributes were considered and ignored by the respondents. Two stated ANA approaches are commonly used in the literature: serial and choice-task stated ANA. In the serial stated ANA, respondents are usually asked about the attributes they systematically ignored at the end of the entire sequence of choice tasks (i.e., choice questions); while in the choice task stated ANA approach, the ANA questions are asked at the end of each choice task.

Previous stated ANA studies have commonly assumed that respondents ignore a specific attribute (e.g., price), irrespective of its levels (e.g., different prices used in the CE design). Nevertheless, it is possible that respondents only ignore attributes when they are expressed at some specific levels (Erdem, Campbell, and Hole 2014). For instance, people may follow certain attribute processing strategies which are triggered by the attribute level present in the choice task, especially when they embed various quality features of the good in question. Erdem, Campbell, and Hole (2014), point out that failure to account for attribute level non-attendance behavior might lead to bias estimate and policy recommendations. Therefore, understanding the extent to which non-attendance behavior is linked at the attribute level or the levels of an attribute is of paramount importance especially given the fact that outcomes from discrete choice models are typically used not just for marketing purposes but also for policy and welfare analysis. No other known study, however, has examined the stated non-attendance behavior at both the levels of the attribute and at the attribute level.

To fill this void in the literature and due to the importance of this methodological issue in terms of survey design, we attempt to explore the ANA issue in choice experiment not just at the attribute level but also at the levels of an attribute using serial method. We did so by asking respondents supplementary questions on levels of ANA. We named this novel method "Serial Attribute Level Non-Attendance" (Serial-ALNA). We then compared the Serial-ALNA approach with the commonly used stated serial attribute non-attendance (Serial-ANA), where the non-attendance questions were asked at the attribute level at the end of the entire sequence of choice tasks.

This study contributes to the choice modeling literature in a number of ways. First, it introduces a new method to elicit serial stated non-attendance behavior at the levels of the attribute. To the best of our knowledge, while previous studies have examined only stated ANA behavior at the attribute level, no other CE study has examined ANA behavior at the levels of an attribute. Only Erdem, Campbell, and Hole (2014) investigated both attribute level and levels of attribute non-attendance behavior in the context of health economics. However, instead of using stated ANA, they inferred non-attendance behavior through the estimation of a latent class model. Hence, they did not account for attribute level non-attendance behavior by asking supplementary questions about non-attendance behavior during the survey, as we did in this study. Most importantly, the authors conclude that: (1) not accounting for levels of attribute non-attendance behavior could lead to biased estimates, and (2) it is necessary to investigate levels of attribute non-attendance behavior when the levels of an attribute imply different quality aspects.

In this regard, our study also provides insights into how consumers attend food attributes. In food CE studies, food attributes are usually described by different levels, which commonly embed a variety of quality features. To illustrate, consider an example. Country of origin attribute, which is commonly used in food CEs, is usually described by different levels indicating different countries where a food product comes from. So, why should a consumer attend a certain country of origin and ignore the others? Some consumers might attend only to a country of origin label indicating their own country due to ethnocentric behavior, while ignoring all the others. Other consumers might generally ignore the country of origin labels, except the countries vaunting a good reputation for the production of the product in questions. This example might suggest that accounting for ANA at levels of an attribute is more appropriate in food CE studies, especially in those employing experimental design characterized by highly differentiated levels to describe food attributes.

As a practical application, we evaluate stated serial non-attendance behavior at the levels of the attribute and at the attribute level (i.e., Serial ALNA and Serial ANA) using a CE on extra virgin olive oil selection. The choice data are analyzed using a Random Parameter Logit models with Error Component model (EC) (Scarpa, Ferrini, and Willis 2005). For each treatment, two RPL-EC are estimated: EC Full-Attendance, in which the attributes (or attribute levels) and attribute levels are assumed to be attended to by the respondents; and the (2) EC Full-Non-Attendance, in which we specified an indirect utility function that separately estimates two coefficients for each of the attributes (or attribute levels), depending on whether the respondent identified the attribute (or level) as attended or ignored. Results generally indicate that respondents tend to ignore some of the levels describing an attribute. This is confirmed by both descriptive statistics from the self-reported non-attendance behavior as well as by the model estimates.

The rest of the article is organized as follows. Section two describes the experimental procedures. Section three reports the econometric models estimated in this study. Section four reports the results, while the last section includes discussion of the main results and conclusion.

Experimental Procedures

Choice Experiment Design

This study uses an online CE on extra-virgin olive oil. We choose extra-virgin olive oil as the product of interest in our CE study for a number of reasons. First of all, it is a traditional component of the Mediterranean diet, widely adopted throughout our area of study; i.e., Italy, and quite essential to the sustainability of the rural economy of southern Italy (Scarpa and Del Giudice, 2004; Aprile, Caputo, and Nayga. 2010). In addition, its production is mostly concentrated in the Mediterranean countries, with Italy, Greece, and Spain accounting for more than 70% of the total olive oil production (Menapace et al. 2011).

In addition to the price, a set of labels and health claims regulated by the European Union (EU) are included in the experimental design as attributes: organic label, geographical indications (e.g. GIs), country of origin (e.g. COOL), and health claims. Each of these attributes was described by different levels. For the organic label, two levels were selected: the recently established EU organic logo (European Community Regulations 834/2007), and no organic logo. The levels for the GI labels included those currently regulated in the EU (European Union Regulations No.1151/2012): Protected Designations of Origin – PDO – and the Protected Geographical Indications – PGI. We also added a third level representing the absence of such labels. As for the COOL, the EU regulation (European Union Regulations No. 29/2012) requires that the country of origin of the olives and the country of oil extraction are among the components to be labelled on an extra-virgin olive oil bottle. As for the blends oils, labels such as "Blend of Community" or "Blend of Non-Community" olive oils should be used. Accordingly, in this study the COOL was described by three levels: 100% Italian oil; blend of European Union oils, and blend of extra European Union oils. Until recently, given the general consensus that extra virgin olive oil is a healthy product, no health claims has been regulated by the EU (Finardi, Mastromauro, and Orlandi 2011). However, adding health claims to products that have a relatively high health image among consumers might increase the perceived healthfulness of these products. This could be a very important development within the European market, especially given the different labelling programs or initiatives developed by the EU on nutritional and health claims on extra virgin olive oil (European Union No. 32/2012). Consequently, three levels were selected for the health claim attribute: extra olive oil polyphenols contribute to the protection of blood lipids from oxidative stress, extra-virgin olive oil containing saturated fats contribute to the maintenance of normal blood LDL-cholesterol concentrations, and no health claim. Table 1 summarizes the selected attributes and attributes levels.

<<Insert Table 1>>

The allocation of the attribute levels was designed using a sequential experimental design with a Bayesian information structure geared to the minimization of the expected D_b-error (Sandor and Wedel 2001; Scarpa Campbell, and Hutchinson 2007), which is the expectation of the determinant of the asymptotic variance covariance matrix of the estimated parameters. Such expectation is computed by simulation on the basis of some prior (i.e., prior to the knowledge of the survey results) distributional assumptions. Following Scarpa et al. (2013), our design is developed in three sequential steps, each of which was designed to enrich the prior knowledge of such distributions. In the first step, we performed a fractional orthogonal factorial design, which was used for the pilot testing of the design. This design involved 48 choice tasks orthogonally arranged into 4 blocks of 12 choice tasks each. In the second step, the data from the pilot were used to estimate a multinomial logit model (MNL). In the third step, we used the parameter values from the MNL to generate the final D_b-optimal choice design.

Choice Experiment Treatments

Using a between-subject approach, an online serial stated CE study was conducted. Two treatments were implemented: Serial-ANA and Serial-ALNA. In each treatment, (1) respondents were asked to select among three alternatives: two quality-differentiated extra virgin olive oil products and one "no buy" option; (2) the identification of stated non-attendance behavior was obtained from supplementary non-attendance behavior questions that respondents were asked to respond to during the survey; and (3) the non-attendance behavior at the attribute level was elicited by asking respondents supplementary non-attendance questions at the end of the entire sequence of choice tasks; hence after they responded to the 12 choice tasks or CE questions. However, these treatments differ depending on how the non-attendance behavior was elicited. In particular, in the Serial-ANA treatment, respondents were asked if and what attributes they systematically ignored when responding to the CE questions. Hence, in this treatment we assumed that respondents ignore a specific attribute or attributes, irrespective of the levels of the attributes. In the Serial-ALNA treatment, on the other hand, respondents were asked if and what attribute levels they systematically ignored when responding to the CE questions.

Data

Subjects were recruited through an online survey sent to a random sample of Italian consumers. Respondents were invited to participate in the survey via email, and informed about the questionnaire length and type. To complete the survey, participants should be older than 18 years old and should have bought extra virgin olive oil in the past three months. To monitor the quality of the data and to control for respondents who were just rushing through to get their payment for completing the survey, two quality checks were also included in the final survey: a time cutoff, which was fixed at 10 minutes to exclude all of the respondents that did not take enough, or took too much time to complete the survey; and two trap questions, which were posed right before and after the CE questions.

Overall, a total of 363 participants completed the CE surveys and they were randomly assigned to either the Serial ANA treatment CE (n=180) or the Serial ALNA CE treatment (n=183). Table 2 reports summary statistics of basic demographics for the two treatments. For each of the demographics, we used a chi-squared test of independence to test for differences in frequencies across treatments. Results indicate that the two treatments are equivalent in terms of demographics.

<<Insert Table 2>>

Table 3 shows the percentages of the attributes and attribute levels that were self-reported to being ignored by the respondents in Serial ANA and Serial ALNA treatments.

<<Insert Table 3>>

Results indicate that 34.44% and 29.51% of the respondents have ignored at least one attribute or attribute levels in the Serial and Serial ALNA treatments, respectively. One result is readily apparent: non-attendance behavior for an attribute varies across its levels. Most notably, 14.44% of the respondents stated to have ignored the country of origin attribute in the Serial ANA treatment. However, when looking at the percentages of the different levels of the country of origin in the Serial ALNA treatment, it can be noted that only 2.19% of the respondents stated to have ignored “ITA” (100% Italian product), while 10.93% and 14.21% stated to have ignored “EU” (Blend of EU olive oils) and “NOEU” (Blend of non-EU olive oils) respectively. This result suggests that collecting information on attribute processing behavior at the attribute level only may be insufficient to fully take ANA into account since non-attendance could also be at the levels of an attribute.

Econometric Analysis

The data were analyzed using a random parameter logit model with an additional variance-enhancing error component shared by the two hypothetical product alternatives. This is absent in the utility of the no-buy alternative (Scarpa et al. 2005; Scarpa, Campbell and Hutchinson 2007). Such econometric model is known in the choice modeling literature as Error Component (EC) logit model. Consider a sequence of observed choices **i** by individual *n*, one for each choice task in the assigned sequence of *T* choice tasks, **i = (**$i_1,..., i_T$), in an EC model, unconditional on **β** the probability that individual *i* makes this sequence of choices, is represented by the following joint probability:

(1) $$P\{j\ is\ chosen\} = \int \prod_{t=1}^{12} \left[\frac{e^{V_{njt}+e_{nj}}}{\sum_{k=1}^{J} e^{V_{nkt}+e_{nj}}} \right] f(\beta_n) d\beta_n$$

where $V_{njt}$is the observed portion of the utility depending on the parameter β_n; $f(\beta_n)$ is the density is function of the coefficient β_n; $e_{nj}$is a zero-mean normally distributed respondent-specific idiosyncratic error component. Due to the presence of e_{nj} and β_{nj} equation (1) lacks a closed form solution. Hence, the parameters of the model are estimated by simulated maximum likelihood estimation techniques following Train (2003).

To date, two different approaches have been employed in modeling self-reported ANA non-attendance behavior into discrete choice models (Campbell and Lorimer 2009; Balcombe, Burton, and Rigby 2011; Scarpa et al. 2013). The first one pertains to the estimation of discrete choice models in which the parameters for the ignored attributes are restricted to zero, while the second one refers to model specifications in which two coefficients are estimated for each of the attribute, depending on whether the attribute was stated as being either considered (AA) or ignored (ANA). A few studies have compared these two approaches by statistically testing if the utility from the ignored attributes is equal to zero (Campbell and Lorimer 2009; Balcombe, Burton, and Rigby 2011), while others estimated ANA models by specifying two coefficients for each attribute (AA and ANA) to validate the self-reported ANA statements (see Scarpa et al. 2013). Results from using the second method have demonstrated that non-attenders tend to have smaller absolute marginal utilities than attenders, but not zero (Campbell and Lorimer 2009; Hess and Hensher 2010). Therefore, in this study we used the latter approach.

In both treatments (i.e., Serial ANA and Serial-ALNA), we specified two EC models: 1) EC Full-Attendance, in which a full attendance behavior was assumed; and 2) EC Full-Non-Attendance, in which the self-reported attribute and attribute levels non-attendance statements at the serial level were used to build specific indirect utility functions incorporating two coefficients for each of the attributes or attribute levels, depending on whether the attribute was or the levels of the attribute were stated as being either considered or ignored (Campbell and Lorimer 2009; Hess and Hensher 2010; Alemu et al. 2013; Scarpa et al. 2013).

In the EC Full-Attendance model (Model 1), the utility function that individual *i* obtains from choice alternative *j* in choice situation *t* is as follows:

(2)

$$U_{ijt} = \alpha + \beta_1 * PRICE_{ijt} + \beta_2 PDO_{ijt} + \beta_3 PGI_{ijt} + \beta_4 ORG_{ijt} + \beta_5 ITA_{ijt} + \beta_6 NOEU_{ijt} +$$

$$+ \beta_7 POLI_{ijt} + \beta_8 FAT2_{ijt} + 1_j(\eta_{it}) + \varepsilon_{ijt}$$

where α is the alternative specific constant of the no-buy option; Price, which is the price of 1 liter of extra-virgin olive oil, enters in the model as a continuous variable. PDO (Protected Designation of Origin), PGI (Protected Geographical Indication), ORG (Organic European logo), ITA (100% Italian product), NOEU (Blend of non-EU olive oils), POLI (Olive oil polyphenols contribute to the protection of blood lipids from oxidative stress), and FAT (Extra-virgin olive oil containing saturated fats contribute to the maintenance of normal blood LDL-cholesterol concentrations) are the attribute levels described in table 1. They all enter in the model as effect coding variables; $1_j(.)$ is an indicator function that takes the value of 1 for both the experimentally designed olive oils and 0 otherwise; η_{it} is a zero-mean normally distributed respondent-specific idiosyncratic error component; and ε_{njt} is the unobserved error term.

In the EC Full-Non-Attendance model (Model 2), the utility function that individual *i* obtains from choice alternative *j* in choice situation *t* is as follows:

(3)

$$U_{ijt} = \alpha + (1_{ik} + 1_{il})(I = 1)[\beta_1^1 * PRICE_{ijt} + \beta_2^1 PDO_{ijt} + \beta_3^1 PGI_{ijt} + \beta_4^1 ORG_{ijt} + \beta_5^1 ITA_{ijt} +$$

$$+ \beta_6^1 NOEU_{ijt} + \beta_7^1 POLI_{ijt} + \beta_8^1 FAT_{ijt}] + (1_{ik} + 1_{il})(I = 0)[\beta_1^0 * PRICE_{ijt} + \beta_2^0 PDO_{ijt} +$$

$$\beta_3^0 PGI_{ijt} + \beta_4^0 ORG_{ijt} + \beta_5^0 ITA_{ijt} + \beta_6^0 NOEU_{ijt} + \beta_7^0 POLI_{ijt} + \beta_8^0 FAT_{ijt}] + 1_j(\eta_{it}) + \varepsilon_{ijt}$$

where $1_{ik}(.)$ is an indicator of self-reported ANA behavior at serial level (Serial ANA) for individual i and attribute k (k=1,2,…,5); $1_{il}(\cdot)$ is an indicator of self-reported ALNA behavior at serial level (serial ALNA) for individual i and attribute level *l*(l=1,2,...,13) and A=0 otherwise. Therefore, the utility coefficients $\beta^1_{k/l}$ refer to the coefficients estimated for attended attributes or attribute levels, while the utility coefficients $\beta^0_{k/l}$ refer to those for the self-reported ignored attributes or attribute levels.

Results from the econometric analysis

The EC estimations are based on 2160 and 2196 observations in the Serial ANA and Serial ALNA treatments, respectively (180 and 181 individuals performing 12 choice tasks each). In all the models (Model 1 and Model 2) estimated for the two treatments (Serial ANA and Serial ALNA), the price is assumed as fixed, while the other variables are considered as random variables following a normal distribution. Table 3 presents the estimation results for Model 1 (EC Full-Attendance), which implies full attendance behavior, and Model 2, which implies both attendance and non-attendance behavior (at the attribute and at the attribute level), depending on whether the attribute or attribute levels were stated as being either considered or ignored. Results are reported in Table 4.

<<Insert Table 4>>

The first two columns of results in table 4 pertain to Model 1 and Model 2 from the Serial ANA data. In both models, the coefficient of the no-buy option is negative and statistically significant, meaning that consumers increase their utility when choosing one of the experimentally designed extra virgin olive oil products compared to the no-buy option. The standard deviation of the error component (ERC) for the purchase alternatives is statistically significant across all models, suggesting that the hypothesis of correlation across utilities is verified. As expected, the coefficient of price is negative and statistically significant at the 0.01 level indicating that consumer’s utility decreases with increasing price. In Model 2, the coefficient estimates for the attributes reported as being ignored are statistically different from zero for the “100% Italian Product” (ITA) and the “Blend of non-EU olive oils” (NOEU) country of origin labels, as well as for one of the health claims (Extra-virgin olive oil containing saturated fats contribute to the maintenance of normal blood LDL-cholesterol concentrations” - FAT). This implies that in this CE study, respondents who stated to have ignored the country of origin might not have ignored all the three levels of this attribute, but rather only some of them. This suggests that capturing non-attendance behavior at the attribute level is insufficient at totally capturing stated ANA behavior and may result in measurement errors.

The last two columns of results in table 4 pertain to Model 1 and Model 2 from the Serial ALNA data. As in the Serial ANA treatment, in both models (1) the coefficient of the no-buy option and the price are both negative and statistically significant, and (2) the standard deviation of the error component (ERC) for the purchase alternatives is statistically significant. In Model 1, coefficient estimates for the “100% Italian Product” label, “Protected Geographical Indication” (PGI), Protected Designation of Origin (PDO), “Olive oil polyphenols contribute to the protection of blood lipids from oxidative stress” (POLI), “Organic European logo” (ORG), and “Extra-virgin olive oil containing saturated fats contribute to the maintenance of normal blood LDL-cholesterol concentrations” (FAT) labels and their standard deviations coefficients are all statistically significant. The strongest utility increase is caused by the presence of the “100% Italian Product” (ITA), while the presence of the “Blend of non-EU olive oils” (NOEU) label results in a utility decrease. In Model 2, coefficient estimates for attribute levels reported as being attended to are significantly different from zero. Respondents who attended the attribute levels prefer extra virgin olive oils with the “100% Italian Product” label, followed respectively by “Protected Geographical Indication” (PGI), Protected Designation of Origin (PDO), “Olive oil polyphenols contribute to the protection of blood lipids from oxidative stress” (POLI), “Organic European logo” (ORG), and “Extra-virgin olive oil containing saturated fats contribute to the maintenance of normal blood LDL-cholesterol concentrations” (FAT) labels. Only one of the seven coefficient estimates (FAT) for attribute levels reported as being not attended to is statistically significant. These results suggest that ALNA self-reporting is quite consistent with the choice behavior that was actually adopted.

The last rows of table 4 also display the summary statistics of the model. As reflected by the decrease in likelihood (LL) function and the increase in the AIC and BIC statistics, accounting for ALNA results in increase of model fit. On the other hand, accounting for ANA results in a decrease in model fit.

Conclusion

The ANA issue is arguably one of the hottest methodological topics being currently pursued by CE researchers. In this study, we attempt to dig deeper into this issue by examining whether ANA behavior should be taken into account only at the attribute level or at the levels of an attribute. This is an important issue, methodologically, in CE research since the answer to this question has significant ramifications for design of CE studies and econometric analysis of CE models. Our findings imply that respondents do indeed state to ignore some levels of an attribute, suggesting that to fully account for non-attendance behavior in CE studies, one should take into consideration non-attendance behavior not only at the attribute level but also at the levels of an attribute. Not doing so could produce biased in choice outcomes. Hence, when CE researchers wish to take stated non-attendance into account, they should ask stated ANA questions in the survey at the levels of an attribute and also take this into account in model specifications to get a more detailed picture of ANA behavior, and consequently, likely get more reliable choice outcomes.

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Tables

Table1. Attributes and Attributes levels (variable names)

Attributes	Attribute Levels
Price	○ 3.99 Euro, 6.99 Euro, 9.99 Euro, 12.99 Euro, 15.99 Euro (PRICE)
GIs	○ Protected Designation of Origin (PDO) ○ Protected Geographical Indication (PGI) ○ Absent (baseline)
Country of Origin	○ 100% Italian product (ITA) ○ Blend of EU olive oils (baseline) ○ Blend of non-EU olive oils (NOEU)
Organic	○ Organic European logo (ORG) ○ Absent (baseline)
Health claim	○ Olive oil polyphenols contribute to the protection of blood lipids from oxidative stress (POLI) ○ Extra-virgin olive oil containing saturated fats contribute to the maintenance of normal blood LDL-cholesterol concentrations (FAT) ○ Absent (baseline)

Table 2: Demographics

	p-values	Serial ANA	Serial ALNA
Gender	0.572		
Female		53.33%	56.28%
Male		46.67%	43.72%
Age	0.134		
18-29		18.33%	20.22%
30-44		38.89%	32.79%
45-64		36.11%	33.33%
65-74		6.67%	12.02%
>74		-	1.64%
Education	0.901		
Low		10%	12.57%
Medium		52.78%	50.82%
High		37.22%	36.61%
Income	0.746		
Low		53.33%	52.46%
Medium		37.22%	39.34%
High		9.44%	8.20%

[1] **Chi-squared test**

Table 3: Attributes and attribute levels ignored by the respondents in Serial ANA and Serial ALNA treatments

Attributes and Levels	SERIAL *% Respondents*	
	Serial ANA	**Serial ALNA**
AA[a]	65.56	70.49
ANA[b]/ ALNA[c]	34.44	29.51
Price (in Euro)	12.22	
3.99		3.83
6.99		-
9.99		1.09
12.99		1.09
15.99		10.39
Country of origin labels	14.44	
ITA		2.19
EU		10.93
NOEU		14.21
Geographical Indications labels	16.67	
PDO		7.65
PGI		9.29
Health Claims	17.78	
POLI		12.02
FAT		13.11
Organic Label		
ORG	17.78	8.74

Note: [a] Indicates full-attendance behavior; [b] Indicates attribute non-attendance behavior, where at least one attribute has been ignored; [c] Indicates level of the attribute non-attendance behavior, where at least one level of an attribute has been ignored.

Table 4. Estimates from the EC models across Serial ANA and Serial ALNA treatments (|t-test|)

	Serial				**Serial Level**			
	Model1 *AA*		*Model2* *ANA*		*Model1* *AA*		*Model2* *ALNA*	
Variables	β	σ	β	σ	β	σ	β	σ
No-buy	-2.62		-2.05		-1.26		-1.72	
	(8.47)		(5.59)		(3.81)		(5.75)	
ERC		5.16		3.89	3.94			5.23
		(16.62)		(8.4)	(16.74)			(23.03)
Considered								
Price	-0.31		-0.27		-0.28		-0.26	
	(16.16)		(15.87)		(16.07)		(16.62)	
ITA	3.09	2.52	2.81	2.37	3.82	2.48	4.34	2.70
	(11.17)	(9.14)	(11.41)	(7.32)	(13.21)	(8.04)	(11.66)	(8.74)
NOEU	-3.10	2.06	-2.56	2.04	-0.76	1.27	-1.05	1.17
	(9.28)	(6.71)	(9.43)	(6.88)	(4.51)	(6.62)	(5.84)	(7.61)
PDO	0.31	0.72	0.36	0.19	0.24	0.67	0.24	0.62
	(2.97)	(5.97)	(4.24)	(1.54)	(2.55)	(4.88)	(2.59)	(5.32)
PGI	0.21	0.64	0.15	0.63	0.28	0.39	0.33	0.07
	(2.47)	(4.93)	(1.62)	(5.97)	(3.50)	(3.60)	(4.37)	(0.82)
POLI	0.14	0.44	0.12	0.31	0.22	0.37	0.22	0.32
	(1.87)	(4.74)	(1.56)	(2.02)	(3.17)	(3.24)	(3.08)	(2.56)
FAT	0.41	0.41	0.71	0.71	0.27	0.83	0.83	0.96
	(4.25)	(7.87)	(4.93)	(4.93)	(3.10)	(6.36)	(1.90)	(7.66)
ORG	0.23	0.59	0.26	0.50	0.20	0.72	0.21	0.67
	(3.54)	(7.26)	(4.20)	(6.45)	(3.15)	(7.61)	(3.02)	(7.24)
Ignored								
ITA			2.46				0.71	
			(9.91)				(1.13)	
NOEU			-2.54				-0.32	
			(8.77)				(1.53)	
PDO			0.00				0.11	
			(0.2)				(0.47)	
PGI			0.22				0.07	
			(1.44)				(0.33)	
POLI			-0.02				-0.07	
			(0.15)				(0.40)	
FAT			0.41				0.05	
			(3.06)				(2.68)	
ORG			-0.06				0.17	
			(0.69)				(1.25)	
Summary Statistics								
N		2160		2160		2196		2196

LL	-1540	-1576	-1621	-1608
AIC/N	1.468	1.507	1.517	1.512
AIC3/N	1.489	1.531	1.538	1.531