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Local vs. Organic: Does consumer personality matter?

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Abstract

Recent studies analyzing consumer demand for locally grown products found out that consumers tend to value more local instead of organic food products and that socio-demographic and attitudinal factors can be sources of preference heterogeneity. More recently, Grebitus et al. (2013) demonstrated that personality traits affect consumers food choice behavior in both hypothetical (i.e., choice experiment) and non-hypothetical settings (i.e., real choice experiment and auctions). The present study investigates consumers' preferences and WTP for a novel product (apple sauce) displaying both local and organic labels, while assessing whether personality traits can be sources of heterogeneity in consumers' valuation. To the best of our knowledge, this is the first study to analyze the interaction between personality traits and consumers' preferences for both local and organic food products simultaneously. In addition, while past studies used commonly or largely consumed food products, this study focuses on a product considered novel in the study area of interest (i.e., Italy). We used a Real (non-hypothetical) Choice Experiment to elicit consumers' WTP for locally produced and organic apple sauce, while, to capture how personality affects consumer valuation we implemented the MIDI (The Midlife Development Inventory) Personality Scale. Our results suggest that consumers are willing to pay a price premium both for locally produced and for organic apple sauce. They however revealed a higher WTP for the organic production attribute. Our results also suggest that personality traits are a source of heterogeneity in consumers' preferences.

Keywords: local, organic, personality traits, Real Choice Experiment, consumer preferences.

Topic: Consumer behaviour: preference analysis**.**

Local vs. Organic: Does consumer personality matter?

Introduction

Due to market globalization and issues related to food safety, food security, and environmental safeguard, there has been increasing demand for attribute information concerning the origin and the methods of production of food products in recent years (Adams & Salois, 2010; Aprile *et al.* 2012; de-Magistris & Gracia, 2014; Grunert, *et al.*, 2014; Sirieix *et al.*, 2013). As a result, the food system of Northern American and European countries has been characterized by the emergence of a growing number of locally-based and alternative forms of food networks such as Farmers' Markets and Community Supported Agriculture (CSAs). The popularity of the so-called "local food movement" is evidenced by the increasing promotion from provincial, regional governments, and mainstream food retailers of claims indicating the local origin of food products (Adams & Salois, 2010; Bazzani & Canavari, 2013; Campbel *et al*., 2013). This growing appeal for "local foods" has led to an increasing number of empirical studies focused on the exploration of Alternative Agro-Food Networks (AAFNs) and on the analysis of consumers' preferences and WTP for locally grown food products (Darby *et al.*, 2008; de Magistris & Gracia, 2008; Goodman, 2003; Hu, *et al.*, 2009; Raffaelli *et al.*, 2009; Seyfang, 2006; Zepeda & Li, 2006)..

The food system is still lacking of a universal shared definition of "Local Food" (Adams & Salois, 2010; Bazzani & Canavari, 2013; Campbell *et al.*, 2013; Gracia, 2013). Indeed, in previous studies, different criteria have been used for the interpretation of local food products, ranging from food miles (Caputo *et al.* 2013; Caputo *et al.* 2013a; de-Magistris & Gracia, 2014) and political boundaries (regional or State borders) (Hu *et al.*, 2012; Scarpa, *et al.*, 2005) to food traditions (Akaichi *et al.*, 2012; Amilien *et al.*, 2007). Furthermore, the concept of local food has been often associated with organic production (Campbell *et al.*,

2014; Zepeda & Deal, 2009). However, while local food is still an abstract concept, the organic food system is more developed and characterized by certified labeling programs. Organic products are identified by the use of sustainable methods of production aimed at safeguarding the natural resources and reducing pollution caused by chemical fertilizers. In the last two decades, the conversions of farms to organic agricultural production methods and the sales of organic products have exponentially increased both in Europe and in North America (Adams & Salois, 2010; Campbell *et al.*, 2014; Rossi, 2013; Zepeda & Deal, 2009). However, in light of the growing global standardization and industrialization of organic food, several researches have argued that organic agriculture has lost some luster as an alternative to conventional agriculture, and that this has caused a shift in consumers' preferences from organic toward local food products (Adams & Salois, 2010; Adams, D. & Adams, A., 2011; Campbell *et al.*, 2014). Accordingly, local food has been defined as the "new organic" (Adams & Salois, 2010; Campbell *et al.*, 2014).

In light of this association, in recent years a growing number of studies have investigated consumers' preferences for local and organic foods, with results suggesting that consumers tend to value locally grown products more than organic food products (Aprile *et al.*, 2012; Campbell *et al.*, 2014, 2013; Costanigro *et al.*, 2014; de-Magistris & Gracia, 2014; Gracia *et al.*, 2014;Hu *et al.*, 2012; Meas *et al.*, 2014; Onozaka & Mcfadden, 2011;). However, Scarpa *et al.* (2005), exploring Italian consumers' evaluation for regionally grown and organic food products, observed that respondents' preferences for local and organic claims varied by the product in question. The local origin was more valued than the organic production in the case of olive oil, while, in the case of oranges, the organic claim was preferred to the domestic production. Scarpa *et al.* (2005) argued that this heterogeneity in consumers' evaluations can be explained by the generation of "home bias", and therefore a preference for the local claim, when food products with a strong connection with the territory are considered. Hence, the choice of the product in question might play an important role in consumers' valuation for local and organic claims. Past studies have focused on traditional or commonly consumed food products in the survey area (Aprile *et al.*, 2012; Costanigro *et al.*, 2012; de-Magistris & Gracia, 2014; James *et al.*, 2009; Moser & Raffaelli, 2012). To the best of our knowledge, no-known study has explored consumers' preferences for organic and local claims using an unfamiliar product to the subjects in question. Hence, it is not known yet how consumers value the local origin, especially in comparison to the organic certification, when

the product in question is still novel in the geographic area of interest and should be less likely that a "home-bias" effect is generated.

In addition, several studies reported that consumers' profile is a relevant aspect in the determination of consumers' evaluation for local and organic foods (Campbell *et al.*, 2014; Costanigro *et al.*, 2014; Gracia *et al.*, 2014). Evidence from the literature shows that factors such as individuals' socio-demographic characteristics, attitudes, and beliefs can be sources of heterogeneity in preferences for locally grown and organic food products. However, there might be other factors that could influence consumer preferences for local foods and organic foods. For instance, in psychology, personality traits have been identified as a relevant source of heterogeneity in individuals attitudes and behavior (Borghans, *et al.*, 2008; Ferguson *et al.*, 2011). According to Hofstee (1994), the definition of personality refers to individual differences in characteristic patterns of thinking, feeling and behaving. Its relevance in understanding individuals' decision making is given by the fact that personality traits are "thought to capture how people actually think, feel, and act and not what people say they are thinking, feeling, and behaving" (Grebitus, *et al.*, 2013; pp. 12). Hence, personality traits have been significantly used in psychology to explain different aspects of individuals' behavior, such as health issues, lifestyles and economical decisions (Almlund, *et al.*,, 2011; Borghans *et al.*, 2008; Goodwin & Friedman, 2006).

To our knowledge, only the study by Grebitus *et al.* (2013) investigated the effect of personality on consumers food choices. Their study focused on the use of personality traits to explain differences in respondents' behavior in Experimental Auctions (EAs) and Choice Experiments (CEs) but they did not consider the interaction effect between respondents' personality and the product features (e.g., different levels of food miles). Hence, no known study has explored the role of personality traits on consumers' valuation for food claims, such as origin and method of production. For instance, an individual whose personality is characterized by traits such as willingness to be cooperative, helpful and caring might care more about issues such as the support to the local economy or environmental protection and therefore would value more a food product that is locally and organically produced. Or a broadminded personality, open to new experiences might be more willing to choose a food product characterized by a claim such as "locally grown", rather than a global standard label, like the organic certification. On the other hand, an individual that tends to be apprehensive and worrying might be more comfortable in buying food that has been produced according to certified labeling programs, as in the case of organic certification.

In previous studies, personal aspects such as altruism/egoism and emotions have been investigated in relation to consumers food choice behavior (Aertsens *et al.*, 2009; van Doorn & Verhoef, 2011, Dean *et al.*, 2008). However, these aspects might be influenced by external factors, such as social desirability or quality of available information (Richards, *et al.*, 2011; Teyssier *et al.*, 2014; Dean *et al.*, 2008). On the other hand, according to Mischel (2009), personality traits are stable features which can influence individuals' behavior in different contexts. Therefore, the effect of personality traits might be of importance in explaining consumers' heterogeneity in food choices.

In this paper, we present results from the implementation of a Real (non-hypothetical) Choice Experiment (RCE), performed in the city of Bologna, Italy. The aim of the study is to estimate consumers' valuation for organic and locally produced apple sauce, while assessing whether personality traits can be sources of heterogeneity in consumers' valuation. The present study advances the literature in this area in two important ways. First we used a food product (apple sauce) that is still considered novel in the area of interest, i.e. Italy. While apple sauce is largely consumed in North America and Northern European countries, it is a product that is not part of Italian food traditions and it has only been recently introduced in the Italian market as a healthy snack product. The choice of this product was also motivated by the fact that, even though the processed apple sauce is not a common product in the survey area, Emilia Romagna region is the third largest producer of apples in Italy and it is the Italian region with the largest organic fresh fruit production. Second, we explored, for the first time, the role of personality in consumers' preferences for local and organic claims.

This paper is structured as follows: first we provide a background on the investigation of consumers' preferences for organic and local food products. Then, we give a description of personality traits measurement and of the methodological approach used to estimate respondents' WTP for locally produced and organic apple sauce. Finally, on the basis of our results, we propose our conclusions and suggestions for future studies.

Background on WTP for local and organic food

As aforementioned, a growing number of studies explored consumers' demand for locally grown and organic food products (Aprile *et al.*, 2012; Campbell *et al.*, 2014, 2013;

Costanigro *et al.*, 2014; de-Magistris & Gracia, 2014; Gracia *et al.*, 2014; Hu *et al.*, 2012; Lim & Hu, 2015; Meas *et al.*, 2014; Onozaka & Mcfadden, 2011; Scarpa *et al.*, 2005).

Findings from these studies show that consumers are willing to pay a premium both for organic and locally grown products, but the local origin attribute has been identified in most of the cases as the more valued attribute (Aprile *et al.*, 2012; Costanigro *et al.*, 2012; de-Magistris & Gracia, 2014; W. Hu *et al.*, 2012; Hu *et al.*, 2009; James *et al.*, 2009). Consumers' preferences for local food products have been confirmed when origin has been interpreted in terms of State and regional borders (Darby *et al.*, 2008; Hu *et al.*, 2012; James *et al.*, 2009), in terms of designation of origin and geographical indication labels (Aprile *et al.*, 2012), and in terms of "Food Miles" (Caputo *et al.*, 2013; Caputo *et al.* 2013; de-Magistris & Gracia, 2014).

An increasing number of papers have also focused on consumers' valuation for the combination of both local origin and organic attributes (Connolly & Klaiber, 2014; Gracia *et al.*, 2014; Meas *et al.*, 2014; Onozaka & Mcfadden, 2011; Yue *et al.*, 2009). Findings from choice experiments performed by Gracia *et al.* (2014) in Spain and by Onozaka & Mcfadden (2011) in USA showed that consumers generally prefer local over the organic food products, but their WTP for locally grown products increases with the combination of the organic label. On the other hand, Meas *et al.* (2014), Yue *et al.* (2009) and Connolly & Klaiber (2014), reported a negative interaction effect between State, regional claims, and the organic certification, although these two types of labels were positively valued when not combined. Even in the case of these three studies, higher WTPs were estimated for local than for the organic products, suggesting that local food producers and marketers should emphasize that their products are "local" in their marketing campaigns. However, results from the studies of Lim & Hu (2015) and Scarpa *et al.* (2005) did not confirm a general consumers' preference for locally grown products over organic products. Specifically, Lim & Hu (2015) investigated consumers' valuations for local beef in USA and in Canada, proposing different interpretations of local origin, such as (1) "local", (2) "local" with the specification of different levels of food miles, (3) provincial borders and (4) National borders. Their results suggest that consumers were willing to pay a higher price for local in comparison to organic beef, only when the local origin was specified in terms of provincial borders and when the origin of production was within a range of 320km. On the other hand, Scarpa *et al.*, (2005) observed that consumers' valuations for local and organic claims varied by product. Using a discrete choice framework, they investigated Italian consumers' preferences for organic and

regionally grown labels on olive oil, table grapes and oranges. They found that consumers' likelihood to purchase the olive oil was higher when it was regionally produced, and that organic production was the more valued claim in the case of oranges.

In addition, in order to determine the factors which can effect heterogeneity in consumers' preferences, several studies explored the interaction between socio-demographic characteristics and consumers' choices for locally grown and organic food products. Age, gender, education and income have been identified as the socio-demographic features which mostly affected individuals' WTP for both attributes (Aertsens *et al.*, 2009; Bazzani, Asioli, Gozzoli, & Canavari, 2013; Campbell *et al.*, 2014; Carpio & Isengildina-massa, 2009; Loureiro & Hine, 2002; Scarpa *et al.*, 2005; Zepeda & Li, 2006; Zepeda, 2009).

Further, the literature related to organic and local food consumption particularly investigated the effect of individuals' attitudes and beliefs on consumers' preferences showing that consumers who are more concerned about hedonic factors, such as health, freshness, taste, food safety and about issues related to environmental safeguard are willing to pay a price premium for organically produced food products (Aertsens *et al.*, 2009; Storstad & Bjørkhaug, 2002; Zanoli & Naspetti, 2002). On the other hand, consumers' motivations for buying locally grown food products have been found to include the environmental awareness and the appeal for "genuine" products, willingness to support the local economy, and to consume authentic, traditional foods (Costanigro *et al.*, 2012; Thilmany, *et al.*, 2008; Verbeke & Roosen, 2009; Zepeda & L., 2009).

Material and Methods

Real choice Experiment

Choice experiments (CE) are one of the most popular stated preference methods used in food marketing to elicit individuals WTPs for a certain good or service. Their popularity is due to its ability to estimate simultaneously the evaluation of different attributes and attribute levels. CEs are consistent with random utility theory (McFadden, 1974) and Lancaster theory (Lancaster, 1966), which assume that (1) individuals make choices to maximize their utility

under budget constraint, (2) the total utility of a good can be segregated in partial utilities given by the different attributes of the good, and that individuals make choices based on these attributes. In addition, the choice task in the CEs is very similar to real purchasing situations, where consumers are subject to make trade-offs between products, characterized by different attributes (Lusk & Schroeder, 2004). CEs are based on the provision of several hypothetical purchasing scenarios, where individuals are asked to make repeated choices between alternatives representing the products with different attributes and attributes' levels. The familiarity with the decision mechanism of CEs is the main advantage of this approach. However, the limit that has been observed in hypothetical CEs is the formation of hypothetical bias (Murphy, Allen, Stevens, & Weatherhead, 2005). The absence of an economic commitment in hypothetical methods can be a source of inconsistency (generally over-estimation) in individuals' WTP estimation in comparison to non-hypothetical approaches, such as Experimental Auctions (EAs) (Lusk & Shogren, 2007). Hypothetical bias have been defined as the difference between individuals' WTP in hypothetical and non-hypothetical evaluation methods (Carlsson & Martinsson, 2001; Carpenter & Harrison, 2004; Murphy *et al.*, 2005). Therefore, to mitigate hypothetical bias formation in CEs, several researches turned to the implementation of the so-called Real (non-hypothetical) Choice Experiments (RCEs) (Alfnes *et al.*, 2006; Chang, *et al.*, 2009; de-Magistris & Gracia, 2014; Gracia, 2013; Lusk & Schroeder, 2004; Yue *et al.*, 2009). In RCEs, economic incentives are given by paying respondents with a participation fee and by randomly choosing one of the choice tasks as binding. In addition, real products are used and participants have to buy for real the product that they chose in the randomly selected purchasing scenario. Different studies have proved that results from hypothetical CEs are different from the ones obtained using a RCE approach estimation (Chang *et al.*, 2009; Grebitus *et al.*, 2013; Johansson-stenman & Sveds, 2008; Loomis *et al.*, 2009; J. Lusk & Schroeder, 2004; Volinskiy, *et al.*,, 2009; Yue *et al.*, 2009). According to these findings, the incentive compatibility of RCEs allows the mitigation of hypothetical bias formation and therefore a better approximation of WTPs. RCEs also more closely represent individuals' choice making behavior in comparison to EAs because of the higher similarity to real purchasing processes (e.g. type of choice decisions making at the supermarkets) and the absence of peer pressure that can characterize EA mechanisms (Akaichi *et al.* 2013; Gracia *et al.*, 2011; Grebitus *et al.*, 2013).

Based on the aforementioned advantages of RCE, in the present research we decided to use this methodological approach to investigate respondents preferences for locally produced and organic apple sauce.

Experimental design

As a first step in the design of our RCE, we selected a specific product to be analyzed. We chose apple sauce product as our product of interest. This is due to a number of reasons. First, it would be considered a novel product in the Italian market. This aspect might, then, limit the generation of "home bias" issues discussed by Scarpa *et al.*, (2005). Second, it is a non-perishable product. As such, the effect of changes in its attributes from the organoleptic characteristics are isolated (Gracia, *et al.* 2011). Lastly, evidence from the literature shows that freshness of food products is often associated with the organic and locally grown claims. Hence, the use of a fresh food product might, implicitly induce a preference for product profiles characterized by the presence of organic and/or locally produced attributes.

As second step in the design of our RCE, we chose the attributes and attributes levels. As the objective of this study is to analyze consumers' preferences for locally produced and organic novel food products, origin and method of production were selected as the features characterizing the different apple sauce products. For the origin of production, we used two levels: produced in Emilia Romagna (the Italian region where the city of Bologna is located) and produced in Italy, but outside Emilia Romagna. We chose to define the regional borders as boundary between local and non-local because although the Italian system is still lacking of a shared definition of local food, regional borders have been mostly utilized when defining food products as "local" (Coldiretti, 2014). Indeed, most of Italian regions have established legislative decrees or have agreed on regulations focused on the promotion of the commercialization of regional products (Coldiretti, 2014). Regarding the method of production, we used two levels: organic and conventional (Hu *et al.*, 2009). Finally, four levels (0.95€, 1.45€, 1.95€, 2.45€), reflecting the price markets for two cups (100g each) of apple sauce were used for the price attribute. Table 1 reports the attribute and attributes levels used in this study.

Attributes	Levels
Price	- 2.45 €
	- 1.95 €
	- 1.45 €
	- 0.95 €
Origin	- Local (Produced in Emilia Romagna)
	- Non-local (Produced in Italy, but outside Emilia Romagna)
Organic Certification	- Organic
	- Conventional

Table 1: Attributes and Levels

Following Scarpa *et al.* (2007), the allocation of attribute and attribute levels to product alternatives was designed using a sequential Bayesian design to minimize the Db-error. It was performed in three different phases. In the first phase, the choice set design follows Street and Burgess (2005). Accordingly, the selected attributes and their levels were first used to come up with an orthogonal factorial design for the first alternative of our CE design, reducing the original 16 ($4x2^2$) combinations to just 8. Then, the generators described by Street & Burgess (2007) were used to obtain a practical set of 8 pairs, with a D-efficiency of 96.6%. This design was used for the pilot survey (second phase). In the last phase, we used the data from the pilot survey to estimate a MNL model whose coefficient estimates were then used as Bayesian priors.

Personality traits measurement

Individuals' personality can be interpreted as a dynamic and organized set of characteristics which differentiate individuals in patterns of thinking, feeling and behaving (Hofstee, 1994). In the definition of the different personality traits, the literature is divided into two main currents: the "lumbers" who believe that individuals' personality is characterized by a few broad traits and the ''splitters'' who, instead, believe that personality is characterized by more narrowly specified traits (Bouchard & Loehlin, 2001). However, an increasing consensus among personality theorists is that personality is structured as a set of global traits, which, in turn, are composed by more narrower traits (Gill & Hodgkinson, 2007, Eysenck ,1991; Bouchard & Loehlin, 2001). Indeed, the most popular structure in defining personality traits is the so-called "Big Five Model" (Bouchard & Loehlin, 2001; Goodwin & Friedman, 2006; Weiss, et al, 2008). The Big Five model, abbreviated as OCEAN, consists of

five broader factors: openness to experiences (O), conscientiousness (C), extraversion (E), agreeableness (A), and neuroticism (N). Each of these factors is defined by more specified personality traits.

The "Openness to experience" (*Open*) factor describes personality traits related to: intellectual creativity, openness or skepticism to novelty, inclination to be practical or imaginative, flexibility in emotions and ideas. On the other hand, the dimension "Conscientiousness" (*Consc*) refers to traits such as aptitude for being organized, active and hardworking. The factor "Extraversion" (*Extra*) describes the inclination to be sociable, lively, extroverts. "Agreeableness" (*Agr*), instead, is the sum of those traits which define whether an individual is cooperative, helpful, sympathetic, caring and trustworthy. Finally, the factor "Neuroticism" (*Neu*) implies all those traits related to emotional instability such as anxiety, inability in reacting to stressful situations, self-consciousness.

In order to measure the personality traits, we used the Midlife Development Inventory (MIDI) scale, where the five OCEAN traits are defined with a list of 25 items[1] (Keyes, *et al.*, 2002; Lachman & Weaver, 1997; Weiss *et al.*, 2008) (Table 2) . Each item is elicited by subjects, using a scale from 1 (not at all) to 4 (a lot) to indicate the degree to which each adjective on the scale describes them. The MIDI scale was constructed based on the MIDUS survey, where a broad number of personality items were tested. Items with the highest correlations and factor loadings were selected for its construction. The main advantages of the MIDI scale are its simplicity and conciseness, which suited with our necessity to interview the participants in a limited time-frame.

[1] The MIDI scale by Lachman & Weaver (1997) is composed of 30 items and 6 dimensions, but the literature usually focuses only on the Big Five (OCEAN) model, leaving the sixth factor (Agency) out.

OCEAN global factors	Specified traits
Openness to experience (O)	- Creative
	- Imaginative
	- Intelligent
	- Curious
	- Broadminded
	- Sophisticated
	- Adventurous
Conscientiousness (C)	- Organized
	- Responsible
	- Hardworking
	- (non) Careless
Extraversion (E)	- Outgoing
	- Friendly
	- Lively
	- Active
	- Talkative
Agreeableness (A)	- Helpful
	- Warm
	- Caring
	- Softhearted
	- Sympathetic
Neuroticism (N)	- Moody
	- Worrying
	- Nervous
	- (non) Calm

Table 2: Structure of the OCEAN model

For the analysis of the data, we calculated the mean value of the adjectives for each trait: first, we summed up the different adjectives to the traits they were part of and then we divided the obtained sums of each trait for the number of the respective adjectives. Finally, following Grebitus *et al.*, (2013), before including the personality information in the econometric model, we normalized each trait to have a mean of zero so that the constant terms in the regressions could be interpreted as the mean WTP (or utility) for the mean personality trait.

Data and Empirical Model

Data

We conducted a field RCE involving 80 subjects during fall 2014 in a hypermarket located in Bologna, a city in the Emilia Romagna region (Italy). Food shoppers were

randomly intercepted and recruited at the entrance of the retail store. They were informed about the opportunity to participate in a survey on consumers' valuations for apple sauce. Interviewers approached the randomly selected participants and asked them a set of screening questions, verifying whether they were the main household food shopper, that each participant was at least 18 years old, and whether they were available to taste different types of apple sauce (for instance, excluding consumers who disliked of were allergic or apples). If the responses to all of these questions were affirmative, the interviewer started the RCE. In the case of negative responses, the interviewer randomly selected another customer and asked the screening question until finding a participant who would be eligible to participate in the survey. Each participant was incentivized with a 5€ check-coupon.

Before answering the RCE questions, the participants were asked to taste all the four apple sauce products (local/organic, local/conventional, non-local/organic, non-local/conventional). After completing the blind test, participants had also the possibility to visually examine the apple sauce products (two cups of 100g of apple sauce each). Information regarding the RCE mechanism was also provided in detail to all participants. Specifically, they were first informed that they would face eight different choice tasks, each of them describing three choice options: two different apple sauce products and a "no purchase" option. Next, they were informed that after completing the CE questions, one of the choice tasks would be randomly selected as the binding choice task. That is, the participant will have to purchase the product they chose in the binding choice task if they picked one of the two product alternatives. If they chose the "no purchase" option, then they would not purchase any product and would not pay anything. Finally, the participants were clearly told that an actual payment would have to occur if they chose one of the two product options in the binding choice task and that every choice task would have the same probability to be picked as the binding choice task. After completing this informative phase, we started with the RCE.

Once participants completed the RCE, they were asked to fill out a brief questionnaire. We informed respondents that the questions concerned a description of their personality and we provided an explanation of the personality scale. We did not supervise participants in responding to the personality questions in order to avoid any social desirability or social pressure. The questionnaire concluded with questions related to socio-demographic information.

Empirical Models

Respondents' preferences and WTPs were analyzed using a discrete choice framework. Discrete choice models are consistent with random utility theory (McFadden, 1974) and Lancaster consumer Theory (Lancaster, 1966). According to random utility theory, the utility of an individual n of choosing alternative j in tth choice situation can be represented as:

$$U_{njt} = \beta'_n x_{njt} + \varepsilon_{njt} \quad (1)$$

where x_{njt} is a vector of observed variables relating to alternative j and individual n; β'_n is a vector of structural taste parameters which characterizes choices; ε_{njt} is the unobserved error term, which is assumed to be independent of the vectors β and x.

Different choice models can be derived depending on assumptions regarding the distribution of the unobserved error term and the functional form of the utility. The Multinomial Logit Model (MNL) is built on the assumption that the error terms are independently and identically distributed (IID) with a Gumbel distribution. This model implies independence within the alternatives and taste homogeneity across respondents. However, several studies have shown that consumer preferences for local food and organic products are generally heterogeneous (Gracia, 2013; James *et al.*, 2009b; Onozaka & Mcfadden, 2011; Scarpa *et al.*, 2005). When heterogeneity on consumers' preferences is expected, then discrete choice models such as the Random Parameter Logit (RPL) model should be specified. This is because the RPL model allows for random taste variation and account for the panel structure. Accordingly, in the present study, a general specification of the RPL model with panel data structure was considered, as each respondent answered eight different choices sets. Moreover, with the application of the RPL we are able to test whether personality traits can explain heterogeneity in consumers' preferences for organic and locally produced food products.

Different models were then specified. *Model 1* is a MNL model and it was used as benchmark model. *Model 2* is a RPL model and it allows examining whether heterogeneity across consumers' preferences is an issue to take into account when assessing consumer preferences for organic and local attribute information displayed in apple sauce products.

Model 3 adds to Model2 by incorporating personality traits as a possible source of additional heterogeneity.

As aforementioned, discrete choice models are consistent with the neoclassical Lancaster theory (Lancaster, 1966), based on the assumption that the total utility of a good can be segregated in partial utilities given by the different attributes of the product in question. Consumers will then choose the product that maximizes their utility derived by these product attributes under a budget constraint (Lancaster, 1966). Hence, the utility function of Models 2 and 3 can be specified by the attributes considered in the experimental design, such as price, origin, and method of production and by an alternative-specific constant (β_0) representing the no buy choice option.

The utility function is specified as follows:

$$U_{njt} = \beta_0 + \beta_1 Price_{jt} + \beta_2 Local_{jt} + \beta_3 Organic_{jt} + \varepsilon_{njt} \quad (2)$$

where n is the number of respondents, j pertains to three options available in the choice set (A, B and C) and t is the number of choice situations. The alternative-specific constant (β_0), coded as a dummy variable, takes the value 1 for the no-buy option and 0 otherwise. The alternative-specific constant is expected to be negative and significant, indicating that consumers obtain lower utility from the no-buy option than from the other two alternatives. The *Price* is a continuous variable represented by the four experimentally designed price levels. It is expected to have a negative impact on consumer utility and therefore a negative value. Finally, the non-price attributes such as *Local* (*Loc*) and *Organic* (*Org*) are dummy variables taking the value 1 if the product carries the corresponding labels, and 0 otherwise.
Model 3 is specified as follows:

$$U_{njt} = \beta_0 + \beta_1 Price_{jt} + \beta_2 Local_{jt} + \beta_3 Organic_{jt} + \beta_4 Local{*}Openness_{jt} + \beta_5 Local{*}Consciousness_{jt} + \beta_6 Local{*}Extraversion_{jt} + \beta_7 Local{*}Agreeableness_{jt} + \beta_8 Local{*}Neuroticism_{jt} + \beta_9 Organic{*}Openness_{jt} + \beta_{10} Organic{*}Consciousness_{jt} + \beta_{11} Organic{*}Extraversion_{jt} + \beta_{12} Organic{*}Agreeableness_{jt} + \beta_{13} Organic{*}Neuroticism_{jt} + \varepsilon_{njt} \quad (3)$$

where β_4, β_5, β_6, β_7, *and* β_8, are the coefficients of the interaction terms between the attribute *Local* and the personality traits, while β_9, β_{10}, β_{11}, β_{11} and β_{13} are the coefficients of the

interaction terms between the attribute *Organic* and the personality traits. As previously mentioned, we included in the model the standardized means of each personality trait. The rest of the other variables are specified as in Models 1 and 2. Table 3 summarizes the abbreviations that we will use to indicate the parameters representing the interactions between the personality traits and the local and organic attributes. This may facilitate the explanation and the understanding of our results.

Parameter	Abbreviation
Loc*Openness	LOCO
Loc*Consciousness	LOCC
Loc*Extraversion	LOCE
Loc*Agreeableness	LOCA
Loc*Neuroticism	LOCN
Org*Openness	ORGO
Org*Consciousness	ORGC
Org*Extraversion	ORGE
Org*Agreeableness	ORGA
Org*Neuroticism	ORGN

Table 3: Parameters describing the interaction effect between personality traits and local and organic attributes

As a last step, using the estimated coefficients from the RPL, we calculated the marginal WTPs as the ratio of the partial derivative of the utility function with respect to the attributes of interest, divided by the derivative of the utility function with respect to the price variable.

Results

Descriptive statistics

As we already mentioned, 80 food shoppers participated in the RCE. Summary statistics of the demographic characteristics of the sample are reported in Table 4 Consistent with the data of the latest Italian census (Istat, 2011), a slight majority of respondents were female (55%). The sample was mainly composed of individuals older than 65 years of age (40%). This proportion mirrors the data relevant to the population of the Bologna community,

which is characterized by a high presence of mature people. The household size was for nearly half of the sample (47.5%) was composed of two people. In accordance with the census data, the largest part of the sample held a college degree. With respect to the income level, the majority (65%) of the respondents had an annual income lower than 30.000 €.

Gender	Sample	Census data
Female	55%	52%
Male	45%	48%
Age		
18-39	27%	24%
40-64	33%	30%
Older than 65	40%	46%
Household size		
1	12%	N/A
2	47.5%	N/A
3	22.5%	N/A
4	14%	N/A
> 5	4%	N/A
Education		
Primary School	29%	N/A
Secondary School	31%	15
College degree	32.5%	31.2
College degree + Professional Degree (Masters, PhD)	7.5%	N/A
Average household income		
< 15.000€	23%	N/A
15.000€ - 29.999	42%	N/A
30.000-44.999€	23%	N/A
45.000-59.999€	5%	N/A
60.000 €	7%	N/A

Table 4: Socio-demographic information (%)

Table 5 shows the descriptive statistics of the personality traits. The various measures of the five personality traits were based on a MIDI 4 values scale (4 was the highest value and 1 the lowest). The majority of the means of the personality traits (except neuroticism) has a value around three, indicating that respondents identified themselves "some" with most of the traits. Neuroticism has clearly the lowest figures, suggesting that participants, on average, did not define themselves as very worrying, anxious people.

Trait	Mean	Variable	Mean	SD
Openness	2.98	Creative	2.8	0.81
		Imaginative	3	0.68
		Intelligent	3.22	0.63
		Curious	3.46	0.72
		Broadminded	3.3	0.67
		Sophisticated	2.48	0.80
		Adventurous	2.61	0.90
Conscientiousness	3.12	Organized	3.16	0.76
		Responsible	3.45	0.67
		Hardworking	3.33	0.68
		Careless	2.53	0.92
Extraversion	3.08	Outgoing	2.85	0.90
		Friendly	3.45	0.58
		Lively	3.15	0.76
		Active	3.35	0.67
		Talkative	2.96	0.82
Agreeableness	3.18	Helpful	3.51	0.61
		Warm	3.12	0.73
		Caring	3.26	0.67
		Softhearted	2.53	1.03
		Sympathetic	3.47	0.61
Neuroticism	2.35	Moody	2.05	0.87
		Worrying	2.7	1
		Nervous	2.42	0.94
		Calm	2.23	0.84

Table 5: Descriptive statistics of personality traits

Estimates from Empirical Models

As mentioned earlier, we estimated the RPL model (Model 2) because heterogeneity in preferences across consumers' choice were expected. We also estimated the RPL including personality traits as covariates (Model 3) to examine some sources of heterogeneity.

The last three columns of table 6 report the estimates of Model1 (MNL), Model2 (RPL), and Model3 (RPL + interaction).

		Model 1	Model 2	Model 3
Local	Mean	0.81***	0.96***	1.11***
		(6.25)[1]	(4.5)	(4.91)
	St. Dev.		1.47 ***	1.27***
			(6.83)	(6.35)
Organic	Mean	1.08 ***	1.33 ***	1.39***
		(9.02)	(5.98)	(6.12)
	St. Dev.		1.45 ***	1.38***
			(6.32)	(5.66)
Price		-1.29***	-1.75***	-1.75***
		(-9.46)	(-10.06)	(-10.07)
No_buy		-1.05 ***	-1.43***	-1.43***
		(-5.04)	(-5.84)	(-5.84)
Interaction terms with Personality traits				
LOCO				0.4**
				(2.03)
LOCC				0.25
				(1.18)
LOCE				-0.33
				(-1.59)
LOCA				0.58**
				(2.43)
LOCN				-0.38*
				(-1.69)
ORGO				-0.07
				(-0.36)
ORGC				0.01
				(0.06)
ORGE				-.41*
				(-1.93)
ORGA				0.08
				(0.33)
ORGN				0.06
				(0.24)
K (parameters)				
N		640	640	640
Log likelihood		-632.08157	-582. 59845	-571.15881
AIC		1278.2	1179.2	1176.3
AIC/N		1.997	1.821	1.838

***, **, * indicate significance at 1%, 5%, 10% level; 1= Number in parenthesis are |t-stats|

Table 6: Estimates from the MNL and the RPL models

Each model contains 640 observations, based on the responses of 80 individuals performing 8 choice sets each, for a total of 1,920 choices. A comparison across the models suggests that Model 3 is a better fitting model due to the increase in log-likelihood function (LL) and reduction in the AIC statistics. Hence, when assessing consumer preferences for local and organic foods, model performance can be further improved when accounting for

heterogeneity in consumer preferences and heterogeneity around the mean of some random parameters due to personality traits. The results obtained are robust across the models.

In Model 3, the constant β0 and the price coefficients are, as expected, negative and statistically significant at the 0.01 level; hence the utility that consumers derive from choosing none of the proposed alternative products (alternative C) is lower than the utility from buying one of them (alternative A or B). Also, increasing increments on the price variable decrease the associated utility level provided by the choice. On the other hand, for both local and organic attributes, the coefficients are positive and statistically different from zero at the 0.01 level. This indicates that the probability for consumers of choosing to buy the product increases when the apple sauce is locally produced or organic. In particular, respondents' utility increases when choosing the organic apple sauce, followed by apple sauce produced in Emilia Romagna.

Moreover, looking at the interaction terms, we can observe that 3 out of the 5 interaction terms are statistically significant when the local production claim is interacted with the "Openness to experience" trait (LOCE), "Agreeableness" (LOCA) and "Neuroticism" (LOCN). The positive value of LOCE coefficient indicates that the probability that an individual chooses the locally produced apple sauce is higher when his/her personality is characterized by the aptitude to experience new situations. Locally produced apple sauce might be perceived as a "new experience" for two reasons. First, the local production is still considered an unconventional claim in the food system (Adams & Salois, 2010; Bazzani & Canavari, 2013) and therefore still new for industrialized products. Second, apple sauce is uncommon in the area of interest; hence the local production might represent an extra source of curiosity for a novelty-seeker consumer. The "Agreeableness" trait has, as well, a statistically significant effect on respondents' valuation for the local attribute, indicating that caring, helpful individuals tend to prefer locally produced apple sauce more than the non-local counterpart. This might reflect the association of local food with the support to the local economy. The utility of a helpful individual might, then, increase when his/her purchase can be of benefit for the geographical area he/she belongs to. On the other hand, the interaction between the local claim and the "Neuroticism" trait has a negative effect, suggesting that the utility of a worrying, anxious individual decreases when the apple sauce is locally produced. The novelty of the locally produced apple sauce might be a source of uncertainty for these type of consumers. This aspect might generate some source of inconvenience to an individual

who is inclined to feel easily under stress, leading to a decrease of his/her utility in choosing a novel product.

Regarding the organic attribute, the interaction with the "Extraversion" (ORGE) trait is negative and statistically significant (at the 0.1 level of significance), suggesting that the organic product had less probability to be chosen when the subject in question was characterized by extravert personality. Extravert personality might be more inclined to try new aspects related to food products. Hence, he/she might, then, gain less utility in choosing the already popular and common organic label.

The hypothesis of preference heterogeneity for both organic and local cannot be rejected due to the fact that the derived standard deviation parameters for both claims are statistically different from zero. Hence, consistent with previous studies, heterogeneity in consumer preferences is an issue that needs to be considered when assessing consumer preferences for both organic and local attribute information.

Table 7 displays the Marginal WTPs for organic and local produced apple sauce, accounting for both main and interaction effects from the Model 3 estimation. We decided to use the estimates from Model 3 since it was a better fit for our data.

	Marginal WTPs from Model 3	
	Mean	Standard error
Local	0.63***	0.12
Local + LOCO	1.22***	0.28
Local + LOCC	-	-
Local + LOCE	-	-
Local + LOCA	1.03***	0.23
Local + LOCN	0.25	0.23
Organic	0.80***	0.13
Organic + ORGO	-	-
Organic + ORGC	-	-
Organic + ORGE	0.39*	0.29
Organic + ORGA	-	-
Organic + ORGN	-	-

***, **, * indicate significance at 1%, 5%, 10% level

Table 7: Marginal WTP estimates (€/two cups of apple sauce) by accounting for main and interaction effects from the Model 3 estimation.

Results indicate that all the WTP estimates for both organic and local claims are statistically different from zero at the 0.01 level, suggesting that respondents are willing to pay a premium for the both food claims. This outcome is consistent with previous research, which found that consumers are generally willing to pay a price premium for food products, when these are locally grown or organic (Aprile *et al.*, 2012; Campbell *et al.*, 2014, 2013; Costanigro *et al.*, 2014; de-Magistris & Gracia, 2014; Gracia *et al.*, 2014; Hu *et al.*, 2012; Lim & Hu, 2015; Meas *et al.*, 2014; Onozaka & Mcfadden, 2011; Scarpa *et al.*, 2005). Estimates also indicate that consumers are willing to pay the highest price for the organic apple sauce. This is not consistent with most of the literature investigating consumers' evaluation for local and organic food, where consumers were found to prefer locally grown products over organic food products (Aprile *et al.*, 2012; Costanigro *et al.*, 2012; de-Magistris & Gracia, 2014; W. Hu *et al.*, 2012; Wuyang Hu *et al.*, 2009; James *et al.*, 2009). On the other hand, our results are consistent with the studies of Lim and Hu (2015) and Scarpa *et al.*, (2005). Indeed, findings from the study of Lim and Hu (2015) show that consumers were willing to pay a higher premium for local beef in comparison to the organic one only when local origin was specified in provincial borders and when the origin of production was within a range of 320km. In addition, Scarpa *et al.* 2005 observed that consumers' preferences for local and organic claims varied depending on the product under consideration. Results from their study showed that in the case of olive oil, consumers were willing to pay a higher premium for the bottle labeled as locally produced than for the one labeled as organic. The preference for the origin of production was not confirmed when using a different type of product such as oranges.

Turning to the interaction effects, it can be noted that in the case of the local attributes, open to experience (LOCO + *Local*) and caring-helpful (LOCA + *Local*) personalities are willing to pay a higher price for the locally produced apple sauce (product from Emilia Romagna). The interaction effects also suggest that neuroticism and extraversion traits can decrease WTP for locally produced (LOCN + *Local*) and organic (ORGE + *Organic*) apple sauces.

Discussion and conclusion

In accordance with the growing popularity and interest for locally grown and organic food products, a significant number of studies investigated consumers' valuation for local and organic food claims. Findings from the majority of these studies show that consumers tend to value more the local origin of the product than the organic production (Aprile *et al.*, 2012; Campbell *et al.*, 2014b, 2013; Costanigro *et al.*, 2014; de-Magistris & Gracia, 2014; Gracia *et al.*, 2013). Although the preference for local over organic food has been observed on different kinds of consumers and in several countries, we noticed that in all these research, the products under study are traditional or largely consumed food products. This might be considered as an important issue since the association of the food product to aspects such as consumers' identity, belongingness and evocation to the geographic area of production might be source of "home bias" and therefore could induce an implicitly higher evaluation for the local product (Scarpa *et al.*, 2005). To the best of our knowledge, in the present study we assessed, for the first time, consumers' preferences and WTPs for local and organic claims using a novel food product in the area of interest. We used a non-hypothetical (RCE) approach to elicit consumers' preferences and WTPs for locally produced (in Emilia Romagna Region) organic apple sauce.

Our results suggest that consumers are willing to pay a price premium both for the local and organic attribute. However, estimates also indicate that consumers are willing to pay the highest price for the organic apple sauce. To our knowledge, this is a finding that is relatively unusual in the literature (only the studies of Scarpa *et al.* (2005) and Lim & Hu (2015) are partially consistent with our results). We then might consider different possible reasons for this outcome. One reason might be explained by the selection of the origin levels: Emilia Romagna as local and the rest of Italy as non-local. Italy is a country with a very strong food tradition and National origin can still be perceived as kind of local (Bazzani & Canavari, 2013; Lombardi *et al.*, 2013). However, we verified that the studies of Moser & Raffaelli (2012) and Scarpa *et al.* (2005), who also used regional and national borders to investigate Italian consumers' valuations for origin and organic claims, showed that respondents were more willing to buy apples (Moser & Raffaelli, 2012) and oil (Scarpa *et al.*, 2005) when these products were characterized by the regional origin. This suggests that the choice of the origin attribute levels might not be the determinant factor in explaining the peculiarity of our findings. In addition, since "local" is often perceived as an element of

freshness and vice versa (Darby *et al.*, 2008; Lim & Hu, 2015), the use of a processed food product might have induced a decrease in consumers' interest for the local attribute in comparison to the organic one. However, this suggestion is not consistent with findings from different researches which verified that consumers valued the local attribute more than the organic claim even in the case of processed products such as blackberry jam and pastries (Hu *et al.*, 2012; Hu *et al.*, 2009). Therefore, the most likely explanation to the inconsistency of our results with previous researches might be that the use of a novel food product, instead of a well-known one, may induce a weaker connection with territory and local community components and therefore, a decrease of "home bias". Therefore, our suggestion is that the consideration of "home bias" might be of relevant importance in assessing consumers' preferences for origin of production claims. However, this aspect has been scarcely investigated in the literature related to WTP for local food, which then makes it a good area for future research (Scarpa e al., 2005).

In contrast to past studies, we also considered the interaction effect between personality traits and consumers' valuations for local and organic apple sauce. In the literature concerning consumers' preference for sustainable food labels, different factors such as socio-demographic characteristics and food values have been analyzed to explain heterogeneity in consumers food choices. However, in psychology, personality has been identified as a relevant aspect in understanding individuals' choice behavior given that personality traits are stable features which can explain individuals' behavior in different contexts (Mischel, 2009). Personality traits have been generally described using the five big (OCEAN) factors: Openness to experience, Consciousness, Extraversion, Agreeableness, Neuroticism. In our experiment, we elicited respondents' personality traits using the MIDI personality scale (Keyes, *et al.*, 2002; Lachman & Weaver, 1997; Weiss *et al.*, 2008). Our results suggest that open-minded and caring personalities are more willing to pay for apple sauce when it is locally produced, in contrast to the worrying consumers. On the other hand, the effect of personality interaction with organic attribute was significant only in the case of extravert consumers who showed less inclination to choosing the apple sauce when it was organic.

On the basis of these results, we can conclude that the effect of the personality traits was more significant in the case of the locally produced attribute in comparison to the organic one. We can deduce that the effect of personality traits might be more significant in the case of an unconventional food claim, such as "local food". Indeed, the personality traits which were related to the inclination to experience new situations (openness to experience,

extraversion, neuroticism) appear to be the most influential ones in relation to respondents' preferences for local and organic apple sauce. However, what we cannot decipher is whether the originality of the locally produced apple sauce is given by the unconventionality of the local claim or by the peculiarity of the production in Emilia Romagna of the novel food product. In order to answer this question, future research might investigate consumers' preferences for local labels using food products which are largely consumed in the area of interest. Furthermore, in this study, we used organic and "locally produced" information which are both credence attributes. To the best of our knowledge, no known study has explored individuals' personality effects on consumers valuation for search or experience attributes and this might be of relevant interest for future researches. For instance, a caring or a worrying personality might give more importance to attributes related to health issues, while an organized, meticulous person might consider more valuable other factors, such as the visual aspects of a product (e.g., packaging). Finally, personality traits may also play an important role in the determination of consumers' attitudes and motivations in buying food products. A person characterized by a caring personality might pay more attention to issues related to the support of local economy or to environmental factors, while a worrying personality might value food safety aspects more than other personality types. Hence, the association between personality traits and food values could be an interesting area for future research.

In conclusion, we can affirm that respondents in our study were willing to pay a price premium for both the local and organic apple sauce. This result is of importance for marketing strategies since it suggests that the use of locally produced and especially organic food claims might be positively valued even in the case of novel food products. However, consumers' preferences for local and organic food can be heterogeneous and personality traits appear to partially explain this heterogeneity.

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