Human Values and Consumer Preferences for Extrinsic Credence Attributes in the Italian and German Markets for New Potatoes

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Abstract

We explore the relationship between observable socio-demographic consumer characteristics, consumers' unobservable human values as measured by Schwartz' Portrait Values Questionnaire, and consumers' preferences for extrinsic credence attributes on their purchases of new potatoes Italy and Germany. Parallel marketing studies were conducted in each of the two markets, with the intention of comparing the impact of human values on purchases of new potatoes with several attributes (price, country of origin, carbon footprint certification, ethical certification, method of production, and packaging). Motivation for the study comes from the declining market share of the domestic early potato due to international competition. Applied methods include Principal Component Analysis and Mixed Logit Analysis.

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1. Introduction

Consumer decision making is impacted by both the attributes of product choices, and consumer preferences. Firms frequently analyze consumer demographic characteristics as a proxy for consumer preferences to develop marketing strategies; nations seeking to promote an export market also look to consumer demographics in their market research. Product attributes have traditionally been framed as intrinsic or physical attributes, such as color, firmness, taste or texture, and extrinsic attributes such as price or brand; increasingly, new extrinsic credence attributes, such as regional origin, method of production, or perceived impact of production have been used by both producers and consumers to differentiate the value of products (Olson, 1972; Grunert, 1996; Verbeke & Ward, 2006;Zeithaml, 1988; Grunert, 2006; Ennekinga et al., 2007; Banović et. al, 2012).

In order for the economic value of these extrinsic attributes to be recognized, producers must provide reliable information regarding the products' extrinsic attributes, usually via labelling, and consumers must be inclined to prefer the extrinsic product attributes over those products with otherwise comparable attributes. Unfortunately, market research based solely on consumer demographics is a blunt instrument when used to identify consumer inclinations to purchase products with these extrinsic credence attributes. Information regarding gender, income, profession, family characteristics and so on can only go so far in identifying a potential consumer's perception of the additional value that extrinsic attributes contribute to a product. Instead, researchers have begun to explore how consumers' human values might provide insight into the economic valuation they place on extrinsic product attributes.

This paper seeks to compare how the human values of consumers in Italy impact a decision to purchase new potatoes that are differentiated by extrinsic credence attributes. The marketing study asked consumers about their human values, their preferences for new potatoes, and basic demographic information. Results from this paper can inform the marketing strategies of firms and governments seeking to promote the sales of new potatoes differentiated by their extrinsic credence attributes. Results will inform suppliers about what product characteristics would be most valuable to consumers and provide them with practical recommendations on how to better market their product. In addition, this study will inform the debate on the relationship between

consumers' human values and food choices, and will enrich the discussion among agribusiness specialists and agro-food marketing researchers.

The paper is organized as follows: Section 2 describes the data collection methodology; Section 3 reviews the literature on the relationship between human values and consumer decision-making; Section 4 describes the model applied to uncover the effect of human values on consumer decision making in the two new potato markets; Section 5 presents the results of our analysis, and Section 6 concludes.

2. Data

The survey instrument was designed by a team of Italian researchers, and administered in Italy and Germany by the research firm GfK Eurisko during the late summer of 2011. The survey period overlapped with the end of the new potato season, which allowed surveyors to identify both occasional and regular consumers of new potatoes.

The survey questionnaire briefly introduced characteristics of the new potato. Respondents were then offered a series of hypothetical new potato product labels with a combination of five different extrinsic attributes and price, and were asked to choose the product that they preferred from the series. Each extrinsic attribute was varied between two or three "levels" of attribute-specific options. For example, one of the five extrinsic attributes was "Country of Origin," and the product label specified one of the three following levels: 1) that the product was an "Italian product" or "German product" respective to the country in which the survey was administered; 2) that the product was not of Italian/ German origin, but was identified as being a product of another country; or 3) there was no information provided about the product's country of origin. The remaining four extrinsic credence attributes studied in this research are Production Method, Carbon Footprint Certification, Ethical Certification, and Packaging. The final attribute is price. Attributes and Levels included in the randomized questionnaire design are shown in Table 1.

Table 1. Attributes, Levels, and Variable Names included in the randomized questionnaire design

Attributes	Description†	Levels	Variable Name
Price (€/kg)		Base price: -25%; +25%; +75%	Price
Country of Origin	The country where early potato was produced, if it appears on the label	a) Italian product	Italian Origin
		b) The product is not Italian, but the origin appears on the label	COOL
		c) No info on the country of origin	No Origin
Production Method	*Organic* implies the substitution of chemicals (pesticides, weed killers) with natural methods, while *Env-friendly* implies a reduction in the use of chemicals. If no labeling info, then early potato is to be considered neither organic nor environmentally friendly	a) Organic product	Organic
		b) Product from environmentally friendly agriculture	Env-Friendly
		c) No information	No Production Method
Carbon Footprint	Product with known emissions of carbon dioxide	a) Carbon footprint logo	Carbon Logo
		b) No Carbon footprint logo	No Carbon Logo
Ethical Certification (EC)[1]	The EC logo on the label indicates that this early potato has been produced with safety in the workplace and fair reward of labor	a) EC logo	EC
		b) No EC logo	No EC
Packaging	The type of packaging, if any	a) Packed in plastic	Plastic Pack
		b) Biodegradable Packaging	Bio Pack
		c) Bulk	Bulk

†Description of each attribute as it was presented to respondents before starting the choice experiment.

The labels offered were a result of randomized choice-based conjoint (CBC) advanced design with complete enumeration (Sawtooth Software, Inc.). Randomized CBC designs ensure that each attribute is as equally likely to occur as another; complete enumeration ensures that labels or profiles offered to respondents are as orthogonal to one another as is possible, and that there is balance in the frequency of offered product attributes. Within the choice set offered to each respondent, product attributes overlapped as few times as possible. Each respondent was offered a set of five choices within each choice set: four different potato product labels, and the option to purchase none of the above. Respondents were offered such a choice set five times. As there were two versions of the survey, there were ten possible choice sets offered in total. The order of

choice sets offered was varied between respondents in order to avoid order bias. Examples of the Choice sets are shown in Figure 1 below.

Figure 1. Example of a choice set presented in the questionnaire

Level	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Price	**€/kg 1.40**	**€/kg 1.00**	**€/kg 0.60**	**€/kg 1.00**	None of these products
Country of Origin Label	Italian Origin	Non-Domestic product (origin known)		Italia Origin	
Production method		Environmentally friendly		Organic Product	
Carbon Footprint	Carbon Footprint Logo	Carbon Footprint Logo			
Ethical Certification					
Packaging					

The next set of survey questions use the 21-question Portrait Values Questionnaire (PVQ) developed by Schwartz to measure respondents' ten individual human values (Schwartz et al., 2001). As mentioned in the introduction, socio-demographic characteristic are inadequate as stand-alone predictors of consumers' preferences for the extrinsic credence product attributes measured in this study. Researchers have suggested that consumers' preferences for these attributes are linked to individual consumers' worldviews (Connors et.al., 2001; Brunso et al., 2004; Lusk and Briggeman, 2009; Cicia et al., 2012). Schwartz has developed a widely tested taxonomy of culturally-independent human values that characterize human worldviews, and a series of survey instruments that can be used to classify consumers within this taxonomy. This study employs a short version of the Schwartz survey – the PVQ. Section 3 will further address the relevance and application of this tool for the purposes of this study.

Each of the 21 questions in the PVQ address one of the following ten human values: self-direction; stimulation; hedonism; achievement; power; security; conformity; tradition; universalism; and benevolence. The survey provides respondents with statements that describe an unknown person's attitude, and asks respondents to rank the extent to which they identify with this person, using a Likert scale of one to seven, where one indicates a low level of identification and 7 ranks a high level of identification.

The final set of questions gathered socio-demographic information about the respondents and their households. Descriptive Statistics are shown in Table 2 below.

Table 2. Survey responders' Socio-demographic characteristics, variable name and type

	Var. Name	Var. Type	Germany	Italy
Gender (%)				
Male			46	13
Female			54	87
Age(years)**:** mean (st.dev)	*Age*	*Continuous*	42 (13.14)	52 (14.37)
Children<10 years old (%)	*Kids*	*Dichotomous*		
Yes			79	81
No			21	19
Household (HH) Income (%)				
<1500 Euro/month	*Low Income*	*Dichotomous*	38	26
1500-3050 Euro/month			39	37
>3050 Euro/month	*High Income*	*Dichotomous*	23	37
Education (%)				
<High School			12	37
High School			54	41
Univ. Incomplete			3	7
Univ. Graduated			31	15
Geographical Region (%)				
North	*North*	*Dichotomous*	49	50
Center			26	19
South	*South*	*Dichotomous*	25	31
HH early potato purchases in the current year (%)				
>Once/week			2	1
Once/week			12	8
2-3 times/month			16	15
Once/month			17	19
<Once/month			53	57
Sample Size			1009	1004

The sample contains 1004 respondents in Italy, and 1009 respondents in Germany

3. Human values and consumer choices

The analytical structure used by economists to study market segmentation and consumer studies has lately been criticized as inadequate to study consumer choices for extrinsic credence attributes (Carraciolo, et al., 2013; Cembalo, et al., 2011; Hustad and Pessemier, 1972). Market segmentation approaches use basic demographic profiles to identify consumer behavior, but for decades research has suggested that consumers within demographic classes have widely varying consumer preferences (Hustad and Pessemier, 1972). In addition, the marketplace has, in the last four decades, begun to reflect consumers' increasing willingness to pay for product attributes that do not strictly maximize direct consumer utility – as evidenced by the proliferation of products that claim to provide value to the consumer beyond the utility given by consumption of the product. Product attributes that reflect reduced environmental impact, ethical treatment of animals, equitable and safe working conditions for workers manufacturing the product, and a preference for supporting one's own regional or national economic production are examples of extrinsic credence attributes of products that garner purchasing preference (Olson, 1972; Grunert, 1996; Verbeke & Ward, 2006; Zeithaml, 1988; Grunert, 2006; Ennekinga et al., 2007; Banović et. al, 2012). Therefore, standard methods of product market research may fall short on two fronts: both in providing a clear picture of consumers' motivations, and in defining a set of product attributes relevant to consumers' increasingly sophisticated tastes.

Market research, then, needs to evolve. This paper, along with a number of other recent papers, suggests that market research must identify both the new dimensions of product information that address extrinsic credence attributes, and a more refined method of analyzing consumer purchase motivations with regards to these attributes. Consumers' food shopping is determined by the need to satisfy nutritional requirements, but food choices may be driven by health and environmental concerns. These concerns are related to current and future generations, and depend on consumers' lifestyles and values. Worsley and Lea (2008) suggest that personal values are stronger predictors of consumers' concerns about food and health than demographic characteristics. While much work has been conducted to predict consumers' choices based on food attributes and observable consumers' characteristics (discrete choice-models), less research is available on the influence of personal values on consumer's purchasing attitudes, though values and beliefs are likely pivotal predictors of food consumption (Cicia, et a., 2002; Rigby &

Burton 2003; Alfnes, 2004; Scarpa & Del Guidice, 2004; Hu et a., 2005; Ubilava & Foster, 2009; Ortega et al., 2011). Examples of how values and beliefs affect consumers' food choices include: vegetarian diets , consumers who purchase according to nutritional information or organics, environmental outcomes, country-of-origin labeling and preferences for domestic or local products (Allen and Baines, 2002; Worsley et al., 2010Gil, et al., 2001; Spash,et al., 2006; Umberger, 2003; Van Wezemael et al., 2013).

This study incorporates human values along with traditional consumer demographics to model consumer purchasing for extrinsic credence attributes for new potatoes.

This analysis explicitly considers consumers' human values and attitudes using taxonomy of Human Values proposed by Shalom H. Schwartz (1992). Schwartz proposed that humans across cultures share a core set of relatively stable "value orientations" (2007). Schwartz distinguishes these underlying values from their expression as attitudes, norms, opinions, and actions that are commonly measured in social sciences. The underlying values "guide the selection or evaluation of actions, policies, people and events" (2007, p. 297), and remain stable for an individual throughout their lives.

The ten values identified by Schwartz are: Self-Direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity, Tradition, Universalism and Benevolence. Descriptions of these values are provided in Table 3. Each value relates to the others either oppositionally or complementarily. For example, an individual whose values are positively correlated with Tradition would express values that were negatively correlated with Hedonism, but positively correlated with Conformity. As such, Schwartz organized the ten human values in circular spatial manner, as shown in Figure 2 (1992). Human values proximate to one another in this figure are positively related, while values across from one another are negatively related. The relationships between proximate values allow the creation of 4+1 higher order meta-values, which further simplify analysis.

Table 3 - Schwartz Values and defining goals

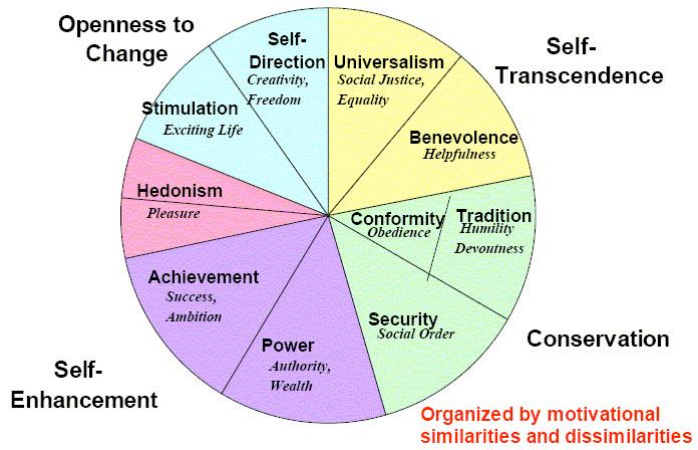
VALUES	DEFINING GOALS
SELF-DIRECTION	Independent thought and action-choosing, creating, exploring (creativity, freedom, independent, curious, choosing own goals, self-respect, intelligent, privacy)
STIMULATION	Excitement, novelty, and challenge in life (a varied life, an exciting life, daring)
HEDONISM	Pleasure and sensuous gratification for oneself (pleasure, enjoying life, self-indulgent)
ACHIEVEMENT	Personal success through demonstrating competence according to social standards (successful, capable, ambitious, influential, intelligent, self-respect, social recognition)
POWER	Social status and prestige, control or dominance over people and resources (social power, authority, wealth, preserving my public image, social recognition)
SECURITY	Safety, harmony and stability of society, of relationships, and of self (family security, national security, social order, clean, reciprocation of favors, healthy, moderate, sense of belonging)
CONFORMITY	Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms. (obedient, self-discipline, politeness, honoring parents and elders, loyal, responsible)
TRADITION	Respect, commitment, and acceptance of the customs and ideas that one's culture or religion provides (respect for tradition, humble, devout, accepting my portion in life, moderate, spiritual life)
BENEVOLENCE	Preserving and enhancing the welfare of those with whom one is in frequent personal contact [the 'in-group'] (helpful, honest, forgiving, responsible, loyal, true friendship, mature love, sense of belonging, meaning in life, a spiritual life)
UNIVERSALISM	Understanding, appreciation, tolerance and protection for the welfare of all people and for nature (broadminded, social justice, equality, world at peace, world of beauty, unity with nature, wisdom, protecting the environment, inner harmony, a spiritual life)

Caracciolo, et al., 2013, Adapted from Schwartz, 2012

As described in Caracciolo et al., these meta-values are:

1. **Self-Transcendence** (Benevolence and Universalism) – Concern for the wellbeing of others.
2. **Self-Enhancement** (Achievement and Power) – Pursuit of one's own interests, relative success, and dominance over others.
3. **Openness to Change** (Stimulation and Self-Direction) – Independence of thought, action, feelings and readiness for change.
4. **Conservation** (Security, Conformity, and Tradition) – Order, self-restriction, preservation of the past, and resistance to change.
5. **Hedonism** – Individual interest in pleasure.

Figure 2 - Schwartz Human values and meta-values



Source: Schwartz, 2006.

Several studies relate the expression of these values to food product choices. The Self-Transcendence human value of Universalism has been related to environmentally-friendly food products, and along with Benevolence, has been negatively related to GMOs (Thøgersen and Olander, 2003; Honkanen and Verplanken, 2004; Dreezens et al., 2005; Krystallis et al., 2008). Consumers whose values are strongly associated with Power, a Self-Enhancement meta-value, relate negatively to environmentally friendly products (Vermeir and Verbeke, 2008). Interest in trying new food products has been related positively to Stimulation and Self-Direction, both of which fall within the Openness to Change meta-value (Fotopoulos and Krystallis, 2002; Chinnici et al. 2002; Chryssohoidis and Krystallis 2005). Consumers expressing Conservation-oriented

human values of Security, Conformity and Tradition relate positively to foods considered safe and natural (Schifferstein and Oude Ophuis, 1998; Shepherd et al., 2005; Cicia et al, 2009; Botonaki and Mattas, 2010). Finally, consumers who express human values of Hedonism relate positively to food taste (Magnusson et al., 2001; Kihlberg and Risvik, 2007; de Boer et al., 2007).

How consumers identify themselves in relation to these values is unveiled through the 21 question Schwartz Portrait Value Questionnaire (PVQ), as mentioned above. Each of the 21 questions in the PVQ addresses one of the ten human values. The survey provides respondents with statements that describe an unknown person's attitude, and asks respondents to rank the extent to which they identify with this person, using a Likert scale of one to seven, where one indicates a low level of identification and 7 ranks a high level of identification. The values are converted to linearly uncorrelated principle components through a principle component analysis that align with the meta-values described above, which are then included as consumer attributes in a mixed logit model. This method allows converting usually unobservable consumer characteristics into observable consumer attributes.

This research compares differences in preferences and consumer values in Italy and Germany. Such comparisons are of paramount relevance to obtain effective product design, and to establish different pricing strategies for export. We use a unique set of cross-sectional data, collected in 2011, which comprise over one thousand observations from representative samples of the Italian and German populations.

We ask how human value characteristics and marketing claims relate to product purchases. This analysis is focused on a specific product, the early potato[2]. In Italy, early potato cultivation is concentrated mainly in the southern regions, especially in small areas of the South, which have become almost territorial districts that bind their agricultural economy to this crop. A crucial

[2] The UNECE defines "early potatoes" as potatoes harvested before they are completely mature, marketed immediately after harvest and whose skin can be easily removed without peeling. Early potatoes from the EU and non-EU Mediterranean area (Spain, Italy, Cyprus, Greece, Malta, Portugal, Morocco, Israel and Egypt) are harvested and then commercialized in the first half of the calendar year. Within this group of countries, Israel and Egypt are the main suppliers of early potatoes to the EU while, within Northern Europe, Germany is the main producer. The season of early potatoes obtained in the Continental and Northern part of Europe starts in late May-June and has its peak in July-August.

motivation for this study is that consumption of domestic early potatoes has lately decreased due to competition with similar products from Middle East and Northern African countries[3].

The opportunity for Italian and German early potato producers to regain important market shares in their respective markets depends on their ability to differentiate their product from early potatoes supplied by other countries. In this context, the quality and the commercial identity of the domestic product need to be well established. Improved characteristics of the product can be signaled to consumers through labeling. Product labeling influences product design, advertising, consumer confidence in food quality and consumer education on health and environmental protection.

4. Methodology and Model

Our methodology follows that of Brunso et al. (2004), Caracciolo et al.(2014), Cembalo et al. (2013), Hu, et al. (2004), McFadden and Train (2000), Revelt and Train (1998),Schwartz (1992) and Schwartz (2001). We first evaluate the reliability of the Schwartz Portrait Value results. Upon satisfactory reliability, we conduct a Principal Components Analysis (PCA) with varimax rotation to reduce the number of variables and identify human values principal component weights for respondents. We then use the principal component weights and extrinsic product attributes in Mixed Logit Model (ML) to determine the comparative effects of these aspects of consumer decision making on new potato products.

4.1 Reliability

Cronbach's alpha scores were computed for each of the 10 Schwartz Values to determine reliability. For nine out of the ten Schwartz Values, each Value's reliability was a function of responses to two of the PVQ questions; for the Schwartz Value "Universalism," the reliability was calculated as a function of the responses to three questions (Brunso et a., 2004; Schwatz, 2001).

4.2 Principal Component Analysis

[3] http://www.fao.org/publications/sofa/en/

To reduce the number of variables and obtain principal components weights to be used in our ML model, we conducted a PCA of the Schwartz Values, using varimax rotation. The orthogonality conditions of the varimax rotation are critical in this analysis because of the oppositional tension inherent in the Schwartz value design (Cembalo et al., 2013). Kaiser-Meyer-Olkin tests (KMO) were performed to verify the validity of the initial data applied to the model. Our analysis identified four components for the Italian data set (three meta-values plus unexplained), and five components for the German data set (four meta-values plus unexplained) a significant reduction from the original 21 questions. These components represent the relative weight of each observation on the composition of components.

4.3 Mixed Logit Analysis

The component weights for these three components were then included in our Mixed Logit model analysis as observable consumer attributes. The mixed logit model is used to estimate Italian and German consumers' willingness to pay (WTP) for different extrinsic credence attributes of the new potato. The mixed logit model is a discrete choice model that addresses two of the most critical concerns associated with the traditional logit model. The model accounts for additional unobserved consumer heterogeneity by allowing parameters to vary randomly according to a specified distribution (Revelt & Train, 1998). As a result, our model does not suffer from the inappropriate imposition of IIA. In addition, our survey instrument includes several choices by the same consumer, and the mixed logit model allows unobserved utility to be correlated over individuals (Train, 1997; Revelt and Train, 1998). . The mixed logit model is widely used for food and consumer choice research.

In the discrete choice model, consumers n = 1,…,N maximize utility

$$U_{njt} = \beta_n' \; x_{njt} + \epsilon_{njt} \qquad (1)$$

Where j = 1,…, J denotes the product alternatives, and *t = 1,…,T* denotes the choice sets. The vector of observed variables x_{ntj} includes all of the product attributes for the alternative offered to the consumer. The vector of unobserved "taste" coefficients β_n remains the same for each respondent, but varies between respondents. The parameters of β_n are random and follow the selected population distribution $f(\beta|\theta)$ where θ contains the mean and variance of the

distribution. The random component ϵ_{njt} is assumed to follow an *iid* extreme value distribution across individuals, product alternatives, and choice situations. The probability that each individual chooses a sequence of choices denoted by product alternatives $\boldsymbol{i} = i_1, \ldots, i_T$ depends on β and is denoted by the product of standard logit formulas:

$$\boldsymbol{L}_{ni}(\beta_n) = \prod_{t=1}^{T} \left[\frac{e^{\beta_n{}' x_{nit}}}{\sum_j e^{\beta_n{}' x_{njt}}} \right] \tag{2}$$

The unconditional probability that person n chooses sequence I is the integral of the conditional probability (2) over all possible values of β_n :

$$P_{ni}(\theta) = \int \boldsymbol{L}_{ni}(\beta_n) f(\beta_n|\theta) d\beta_n \tag{3}$$

The goal of estimation is to retrieve the population parameters of θ; the mean and covariance of β_n (Revelt and Train, 1998). Estimation of these population parameters allows estimation of the distribution of individual taste parameters, which vary across individuals. Because (3) does not exist in closed form, it is not possible to carry out this estimation using maximum likelihood; instead, the estimation is approximated through simulation using 1,000 Halton draws, following Train (2003).

5. Results

5.1 Reliability Results

Cronbach's alpha was calculated for each of the 10 Schwartz Values. Alpha scores are reported below in Table 3. According to the literature, alpha scores of above 0.500 are generally considered to indicate reliability for alpha values when using the Schwartz model. All of the Values except "tradition" meet this standard. The "tradition" value is generally found to have a low alpha score. We retain this value, however, as suggested by the literature. Further, retention of this variable had negligible impact on subsequent analyses.

Table 4. Reliability of the 2/3 item Portrait Values Questionnaire scores (Cronbach's alpha)

	German data	Italian Data
	α	α
Power	0.6428	0.6282
Achievement	0.7636	0.8133
Hedonism	0.6575	0.6143
Stimulation	0.5671	0.7074
Self-Direction	0.5587	0.5560
Universalism	0.5883	0.6804
Benevolence	0.7192	0.6215
Tradition	0.5000	0.3470
Conformity	0.5914	0.5402
Security	0.7195	0.5734

5.2 Principal Component Analysis Results

To include the Schwartz Human Values as regressors in the ML model below, a Principal Component Analysis (PCA) with varimax rotation was conducted for the data. According to the Schwartz Human Value literature, we would expect the ten human values to be reduced to five principal components (four meta-values plus Hedonism), corresponding to the meta-values described above. However, the analysis reduced the number of human values categories from ten to three for the Italian data, and from ten to four for the German data[4]. Consistent with the Schwartz Human Value framework, the resulting primary components align with the meta-value categories described above, although along slightly different boundaries due to the smaller number of components. The three categories resulting from the Italian PCA consist of the meta-value of "Openness to Change" overlaps with both the "Self-Enhancement" and the "Self-Transcendence" meta-values, and Hedonism falls within the Self-Enhancement / Openness to Change component. The three primary meta-values identified and included as regressors below are "Self-Transcendence / Openness to Change", "Self-Enhancement / Openness to Change" and "Conservation". The component analysis results for Italy are presented below in Table 5.

[4] The PCA was conducted both by imposing the number of principle components and not; subsequent analyses were conducted using the resulting two, three, four, five, and six component weights. Use of the imposed five component weights did not significantly affect results.

Table 5. Italian Principle Component Analysis results

Italian Schwartz Meta-Values				
	Self-Enhancement / Openness to Change	**Self-Transcendence/ Openness to Change**	**Conservation**	*Unexplained*
achievement	**0.5206**	-0.0775	0.0266	0.2347
hedonism	**0.4405**	0.0492	0.0516	0.3273
power	**0.5064**	-0.1481	0.1075	0.2726
stimulation	**0.4479**	0.1696	-0.115	0.2746
benevolence	-0.0892	**0.5499**	0.1126	0.2342
self-direction	0.2448	**0.4921**	-0.2281	0.302
universalism	-0.0848	**0.6065**	0.0479	0.1895
conformity	0.0522	-0.0057	**0.5944**	0.2961
security	-0.0103	0.1666	**0.4526**	0.3737
tradition	0.0069	-0.0267	**0.5887**	0.3807

Variance explained 71.5%

The four categories resulting from the German PCA consist of four meta-values, including "Self-Transcendence / Openness to Change", "Self-Enhancement", Conservation", and "Hedonism." The component analysis results are presented below in Table 6.

Table 6. German Principle Components Analysis results

German Schwartz Meta-Values					
	Conservation	**Self-Transcendence / Openness to Change**	**Self Enhancement**	**Hedonism**	*Unexplained*
conformity	**0.5308**	0.0534	0.2297	-0.1446	0.2923
security	**0.5317**	-0.1613	-0.1293	0.3954	0.1875
tradition	**0.5426**	0.0914	0.0563	-0.1436	0.3
benevolence	0.2355	**0.3234**	-0.2639	0.2294	0.2484
self-direction	-0.1489	**0.6039**	0.0692	0.0425	0.2961
stimulation	-0.186	**0.3288**	0.2048	0.3249	0.2819
universalism	0.1437	**0.6149**	-0.0927	-0.1675	0.2244
achievement	-0.026	0.0564	**0.595**	0.0714	0.2058
power	0.0843	-0.0562	**0.6688**	-0.0001	0.1706
hedonism	-0.0216	-0.0295	0.0326	**0.7804**	0.1464

Variation explained 76.47%

5.3 Mixed Logit Model Results

Given the results of the PCA, we expect that Italian and German consumers who express the meta-value of Self-Transcendence / Openness to Change will demonstrate an increased willingness to pay for Ethical Certification of new potatoes, as well as Organically produce new potatoes. We also expect that Italian and German consumers who express the meta-value of Conservation will demonstrate an increased willingness to pay for potatoes grown in Italy.

To identify the effects of consumers' human values on their valuation of extrinsic credence attributes of the new potato, the resulting PCA weights were included as consumer attributes in the ML regressions. Mean coefficient estimates and standard deviations for the ML model are reported in Tables 7 and 8. We will focus our analysis on the statistically significant parameters.

Price effects, which were modeled as fixed, are highly significant for both Italian and German consumers, as expected. In the ML model, the random coefficients are expected to vary across individuals; this variation is indicated by the estimated standard deviations of the coefficients. The significant random coefficients in the both Italian and German ML models include *COOL* (Country of Origin Labeling), *Italian/ German Origin, Organic, Carbon Logo,* and *EC* (Ethical Certification). The *Environmentally Friendly* attribute was also significant in the German model. Of these, all but the *Organic* attribute in the Italian model also varied significantly across individuals, as indicated by the significant standard deviations. In the German model, only *COOL* and *German Origin* varied significantly across individuals.

The meta-values discussed above were interacted with product attributes. Several of these interactions were statistically significant, and, additionally, conformed to the hypotheses regarding how human values affect consumer preferences for extrinsic credence attributes. For the Italian model, the interactions between *Self-Transcendence / Openness to Change* and both *Organic* and *EC* (Ethical Certification) are significant and positive. The interactions between *Conservation* and *Italian Origin* and *EC* (Ethical Certification) are also significant. The likelihood ratio for the model (686.330) indicates a good fit.

Table 7. Italy - Mixed Logit results

Variable	Mean (s.e.)	Std. Dev. (s.e.)
Price	**-0.586** (0.054)	
COOL	**0.752** (0.072)	**0.898** (0.127)
Italian Origin	**2.515** (0.082)	**1.376** (0.126)
Organic	**0.127** (0.046)	0.141 (0.272)
Carbon Logo	**0.383** (0.042)	**0.339** (0.119)
EC	**0.447** (0.046)	**0.473** (0.135)
Self-Transcendence / Openness to Change X		
Italian Origin	0.119 (0.068)	**0.569** (0.130)
Organic	**0.106** (0.040)	0.003 (0.085)
EC	**0.148** (0.042)	**0.202** (0.093)
Self-Enhancement / Openness to Change X		
Italian Origin	**-0.289** (0.049)	**0.291** (0.115)
Carbon Logo	-0.029 (0.025)	0.005 (0.101)
EC	**-0.081** (0.030)	**0.186** (0.080)
Conservation X		
Italian Origin	**0.238** (0.076)	**0.319** (0.154)
Organic	-0.042 (0.046)	**0.235** (0.106)
Carbon Logo	0.019 (0.042)	**0.269** (0.071)
EC	**-0.130** (0.047)	0.061 (0.157)
Likelihood ratio index	686.330	

Standard errors in parenthesis. Bold numbers are significant at 5% or better.

For the German model, the interactions between *Self-Transcendence / Openness to Change* and *Organic, Environmentally Friendly* and *EC* (Ethical Certification) are significant and positive. The interactions between *Conservation* and *German Origin* are also significant and positive. The likelihood ratio for the model (445.540) indicates a good fit.

Table 8. Germany - Mixed Logit results

Variable	Mean (s.e.)	Std. Dev. (s.e.)
Price	**-1.432** (0.060)	
COOL	**0.884** (0.058)	**0.635** (0.244)
German Origin	**2.022** (0.069)	**1.061** (0.110)
Environmentally Friendly	**0.535** (0.050)	-0.008 (0.291)
Organic	**0.692** (0.051)	0.233 (0.191)
Carbon Logo	**0.368** (0.040)	0.239 (0.158)
EC Logo	**0.735** (0.043)	0.197 (0.190)
Self-Transcendence / Openness to Change X		
Organic	**0.136** (0.040)	0.068 (0.215)
Environmentally Friendly	**0.105** (0.034)	-0.102 (0.097)
EC Logo	**0.115** (0.031)	0.068 (0.107)
Self-Enhancement X		
German Origin	**-0.153** (0.047)	0.251 (0.134)
EC Logo	**-0.134** (0.032)	**0.308** (0.063)
Conservation X		
German Origin	**0.157** (0.048)	0.206 (0.173)
Hedonism X		
German Origin	0.110 (0.071)	**0.499** (0.140)
Organic	-0.056 (0.045)	**0.218** (0.104)
Likelihood Ratio index	445.540	

Standard errors in parenthesis. Bold numbers are significant at 5% or better.

To provide an intuitive interpretation of these coefficients, we calculate Willingness to Pay (WTP) estimates, reported in Tables 9 and 10. In general, both Italian and German consumers' mean WTP for product attributes *COOL* (Country of Origin Labeling), *Italian/ German Origin*, *Organic*, *Carbon Logo*, *EC* (Ethical Certification), and *Environmentally Friendly* (German) are positive and significant (WTP estimates are statistically significant at 5% or better if the calculated confidence intervals do not fall over zero).

However, we can see that these increased WTP vary importantly depending upon the meta-values held by the individual consumers. As hypothesized, Italian consumers with meta-values of Self-Transcendence / Openness to Change have a positive and significant WTP for *Organic* (€/kg 0.181) and *EC* (€/kg 0..254) product attributes. Consumers with the meta-value of Conservation have a significant positive WTP for *Italian Origin* (€/kg 0.407), and a significant

negative WTP for *EC* (€/kg -0.223), as expected. Consumers with meta-values of Self-Enahcnement / Openness to change have significant and negative WTP for *Italian Origin* (€/kg -0.493) and *EC* (€/kg -0.139).

Table 9.Italy Willingness to Pay results

Attribute		WTP	Lower Bound	Upper Bound
COOL		1.285	0.99	1.58
Italian Origin		4.295	3.54	5.05
Organic		0.216	0.07	0.36
Carbon Logo		0.654	0.50	0.81
EC		0.764	0.58	0.95
Self-Transcendence / Openness to Change X				
	Italian Origin	0.204	-0.03	0.44
	Organic	0.181	0.04	0.32
	EC	0.254	0.11	0.40
Self-Enhancement / Openness to Change X				
	Italian Origin	-0.493	-0.68	-0.31
	Carbon Logo	-0.050	-0.13	0.04
	EC	-0.139	-0.24	-0.04
Conservation X				
	Italian Origin	0.407	0.14	0.67
	Organic	-0.073	-0.23	0.08
	Carbon Logo	0.032	-0.11	0.17
	EC	-0.223	-0.38	-0.06

Similarly, German consumers with meta-values of Self-Transcendence / Openness to Change have a positive and significant WTP for *Organic* (€/kg 0.095), *Environmentally Friendly* (€/kg 0.073) and *EC* (€/kg 0.080) product attributes. German consumers with the meta-value of Conservation have a significant positive WTP for *German Origin* (€/kg 0.110). Consumers with meta-values of Self-Enhancement have significant and negative WTP for *German Origin* (€/kg -0.107) and *EC* (€/kg -0.093).

Table 10. Germany - Willingness to Pay results

Attribute		WTP	Lower Bound	Upper Bound
COOL		0.617	0.533	0.701
German Origin		1.411	1.293	1.530
Environmentally Friendly		0.374	0.310	0.437
Organic		0.483	0.420	0.547
Carbon Logo		0.257	0.205	0.308
EC Logo		0.513	0.453	0.573
Self-Transcendence / Openness to Change X				
	Organic	0.095	0.040	0.150
	Environmentally Friendly	0.073	0.026	0.120
	EC Logo	0.080	0.038	0.123
Self-Enhancement X				
	German Origin	-0.107	-0.172	-0.042
	EC Logo	-0.093	-0.138	-0.049
Conservation X				
	German Origin	0.110	0.043	0.176
Hedonism X				
	German Origin	0.076	-0.021	0.174
	Organic	-0.039	-0.100	0.022

6. Discussion and Conclusion

According to our results, Human Values appear to play an important role in consumers' willingness to pay for extrinsic credence attributes. Italian and German consumers who express the meta-value of Self-Transcendence / Openness to Change have an increased WTP for product attributes such as Organic and Ethical Certification, demonstrating concern for the wellbeing of others. Consumers who express the meta-value of Conservation have an increased WTP for product attributes such as Italian/ German Origin, and a decreased WTP for new concepts like Ethical Certification, demonstrating order, self-restriction, preservation of the past, and resistance to change.

This study reinforces the important role that Human Values can play in improving the ability of market researchers to effectively and accurately assess consumers' valuation of extrinsic credence attributes.

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