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Effect of environmental and altruistic attitudes on willingness-to-pay for organic and fair trade coffee in Flanders

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Abstract

Sustainability labels on food products provide information to consumers that the product has been produced in an ethical way. We explore the knowledge and purchasing behaviour of the organic label and fair trade label. Secondly, we investigate the willingness-to-pay (WTP) for food products bearing organic and fair trade labels. Thirdly, we evaluate the correlation in WTP for organic and fair trade. Lastly, we examine the effect of environmental and altruistic attitudes on WTP for both sustainability labels. We draw our conclusions by analyzing a stated choice experiment on consumers coffee buying behaviour in Flanders, Belgium. Our results suggest that knowledge for the fair trade label is higher than that of the organic label. The importance of the organic and fair trade labels on coffee purchase decisions and their WTP estimates were similar. We found a high correlation in WTP for both labels. Our results indicate significant effects of environmental and altruistic attitudes in WTP for both organic and fair trade labels.

Keywords: Coffee, Organic, Fair trade, Willingness-to-pay, Attitudes

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1. Introduction

Ethical consumers continuously rely on sustainability labels found on products to choose food products that have been produced and processed in an ethical way (Verbeke, 2005; Grunert, 2005; Bublitz et al., 2010). These labels are especially important on a product's attributes which can neither be observed pre-purchasing, nor be experienced post-purchase. For such attributes, only the presence of a matching label denotes that the product satisfies the sustainability claim. A considerable number of sustainable labels have been developed in the recent past. This increase signifies an ever-increasing interest in sustainability consumption. However, the unbounded increase has fanned consumer confusion on what respective labels aim to address. Further, it has increased the information burden on food products that consumers have to process before deciding which product to purchase. As a result, consumers often limit their reliance on these labels (Verbeke, 2008; Grunert, 2011) in making their choices.

Although many studies have investigated the role of sustainable labels in ethical food consumption, few have concurrently studied multiple labels in one study. To our knowledge, none of the studies that investigated more than one sustainability label factored in correlation in willingness-to-pay among the labels. Additionally, only a few have assessed effects of environmental and altruistic attitudes on the WTP for these labels on food products. This study seeks to narrow this research gap by investigating the effects of environmental and altruistic attitudes on WTP for fair trade and organic labelled coffee. First, we explore consumers' recognition for fair trade and organic labels. Then, we investigate the WTP for fair trade and organic coffee. Thirdly, we assess the influence of demographic, environmental and altruistic factors on WTP for these labels. Lastly, we provide a description of consumers' association of WTP for the labels by estimating their revealed correlation.

In the study, we present results from a stated choice experiment (Train, 2009) on coffee preference in Flanders aimed at investigating willingness-to-pay for fair trade and organic labels. Investigating coffee is interesting since it is a classic fair trade product. It is largely produced by poor southern hemisphere countries and heavily consumed in the more developed countries (Pay, 2009). Secondly, it is considered as a pioneer product for sustainability consumption (Reinecke et al., 2012). Coffee is also a well-known ethical food product consumed in Belgium, as well as in many European countries (De Pelsmacker et al., 2005; Pay, 2009). As a result, we expected negligible biased choices resulting from a hypothetical setting in a stated choice experiment (List & Gallet, 2001; Loomis, 2014). Investigating fair trade labels (whose primary objective is to help less-fortunate people in far-off places) and organic labels (which capture peoples' sensitivity to their own health and the environment) presents a fascinating scenario in revealing their concurrent roles on coffee choices. Further-

more, it can help to identify factors that determine preferences and understand consumers' ability to differentiate objectives and information provided by these labels in one study.

This study aspires to benefit market actors in several ways. For marketers and policy makers, the study provides insights on consumers' WTP for fair trade or organic labels. It also provides an intrinsic consumer perception of the roles, objectives and overlaps for these labels by assessing revealed correlation in their WTP. We provide insights for products marketers by determining important factors affecting the WTP for either labels. In studying multiple sustainability labels and determining their importance in consumer choices, WTP and correlation in their WTP, we implicitly question the need to study multiple labels - especially those like fair trade and organic - with a fine line between their objectives.

The study is divided into six parts. In section 2, we provide an overview of the available literature on fair trade and organic labels. Section 3 discusses the data and methods used. Results are provided in the fourth section. Discussion of results and conclusions are provided in section five while study limitations and suggestions for future research are given in the last section.

2. Literature review

2.1. Fair trade and organic labels

Fair trade and organic labels are among the more prominent sustainability labels available on the market (Coff et al., 2008; Zander & Hamm, 2010; Andorfer & Liebe, 2012). Others include the Animal Welfare, Rainforest Alliance, Biodynamic, Natural, Shade Grown and Carbon Footprint labels. Some of these sustainability claims are certified while others are not. Fair trade was initiated in 1988 by the Dutch development organization Solidaridad (Solidaridad, 2018) to promote sustained and democratic development in southern countries. The aim was to achieve progressive growth by guaranteeing market access to producers from these countries. Coffee was introduced as the first fair trade certified product under the Max Havelaar brand (Pay, 2009). Since then, both products and objectives associated with fair trade have expanded in scope and reach. Currently, fair trade not only aims at easing access to developed markets by farmers from less developed Latin American, African and Asian countries. It also cushions these farmers against frequent market upheavals, guarantees minimum prices that are less exploitative for their products, encourages better working conditions and environmental protection, promotes social development at points of product origin and encourages long-term, less restrictive contact between producers and consumers of products (Becchetti & Huybrechts, 2008; Ruben et al., 2009).

Organic labels on the other hand, provide assurance to consumers that products have been grown in conditions that promote healthy living, animal welfare, sustainable resource use and environmental protection (Lampkin, 2003). Since its introduction in 2010 by the European Commission (Regulation (EC) No 271/2010), all food products with an organic claim are obliged to carry the European organic logo. This is meant to increase recognizability and ensure organic products are produced through strict and structured methods that are certified by a recognized control body.

In the recent past, interest in fair trade and organic labelled food products has shown a rapid growth. The growth has been accompanied by massive research spanning major markets in Europe (Rousseau, 2015; Gallenti et al., 2016), America (Loureiro & Lotade, 2005; Van Loo et al., 2015), China (Yang et al., 2012) and Japan (Aoki et al., 2017). Some studies have examined consumers' awareness and perception (Rousseau, 2015; Tebbe & von Blanckenburg, 2017). Others have either focussed on willingness-to-pay (Didier & Lucie, 2008; Van Loo et al., 2015) or assessed factors contributing to varying preference levels across markets for these labels (Bray et al., 2011; Annunziata et al., 2011; Moser et al., 2011). However, there does not appear to exist clear-cut conclusions by researchers and other market players over these research items. In the following subsections, we provide literature reviews on some of these thematic areas.

2.2. Willingness to pay for fair trade and organic labels

Investigation into willingness to pay for fair trade and organic labels has been massive, and cuts across products and consumer markets. Some studies have exclusively investigated either of the labels solely. For instance, De Pelsmacker et al. (2005) and Rotaris & Danielis (2011) investigated fair trade in the Belgian and Italian coffee markets respectively. De Pelsmacker et al. (2005) showed that Belgian consumers were willing to pay an additional 0.19€ (10% of the 1.87€ price for the reference coffee profile) of the market price for a 250g package of coffee. Elsewhere, Rotaris & Danielis (2011) found that Italian consumers were willing to pay a premium of 2.2€ (110% of the 2€ price for the *status quo* alternative) for a 250g of coffee. Poelmans & Rousseau (2017) and Krystallis & Chryssohoidis (2005) on their parts focussed on organic labels on beer and a set of food products in Belgium and Greece. The Belgian beer market was shown to be indifferent to presence of an organic label. However, Krystallis & Chryssohoidis (2005) showed that their sample's WTP was largely sensitive to presence of an organic label on a food product. These studies showed varying levels of WTP for both labels. The variation in WTP depended on factors such as where the study was conducted, products and product attributes included and, data collection and analysis methods used (Rotaris & Danielis, 2011).

Some other studies have studied fair trade and organic labels simultaneously (Van Loo et al., 2015; Rousseau, 2015; Loureiro & Lotade, 2005; Didier & Lucie, 2008; Poelman et al., 2008; Annunziata et al., 2011; Garcia-Yi, 2015; Gallenti et al., 2016; Meyerding, 2016). These studies have been motivated by several factors. First, they appreciate consumer preferences on number of sustainability labels an ethical product should have (Zander & Hamm, 2010; Tebbe & von Blanckenburg, 2017; Sirieix et al., 2013). Second, they acknowledge the frequent overlaps in labels' objectives (Reinecke et al., 2012). Lastly, they recognize that an increasing number of food products in the recent past have sought to satisfy more than one ethical requirement (Giovannucci et al., 2010). Results of studying fair trade and organic labels together vary depending on similar factors as when studying either labels alone. Moreover, there is no conclusion on whether WTP for fair trade is lower (or higher) than that of organic label. More specifically, while Rousseau (2015) and Loureiro & Lotade (2005) reported higher premiums for fair trade, organic label was reported to have higher premiums by both Van Loo et al. (2015) and Garcia-Yi (2015), and yet still Didier & Lucie (2008) obtained similar premiums for the two labels. The increasing demand for food products with multiple labels, inconclusive WTP results and the often indistinguishable labels' objectives suggest a need to investigate more than one sustainability label in an ethical food consumption study.

2.3. Determinants of willingness to pay for fair trade and organic labels

Several studies have concentrated on factors contributing to observed preferences for labels and the impacts of these labels on consumer behaviour. Socio-demographic factors are especially well-researched items. The effects of demographic factors are however not conclusive. Older age, higher income, being feminine and higher education status have been found in some studies to have important impacts on ethical purchasing behaviour (Littrell et al., 1999; Carrigan & Attalla, 2001; Laroche et al., 2001). Whereas more recently, De Pelsmacker et al. (2005) and Langen (2013) found demographic factors to be unrelated to consumers' ethical purchasing behaviour.

Studies investigating effects of environmental and altruistic factors often find important influences on WTP for environmentally and socially conscious products. Husted et al. (2014), using a modified New Environmental Paradigm (NEP) scale (Webb et al., 2000; Dunlap et al., 2000), found that Mexican consumers with pro-environmental attitudes were willing to pay more for environmental certification of their dining rooms. Lusk et al. (2007) showed that individuals with altruistic attitudes (measured by psychometric scales) were willing to pay more for pork products with environmentally friendly processing practises, animal well being and antibiotic usage. Similarly, Littrell et al. (1999) reports fair trade consumers to

be more likely enthusiastic about equality, altruism, peace and environmental friendliness. These studies found that consumers of environmentally and socially responsible products attached more weight on pro-environmental conservation and were pro-social. Although the link between sustainable products and environmental and altruistic attitudes appears to be a direct one, only a few studies have specifically included these factors in their sustainable food consumption researches.

3. Data and methods

3.1. Choice experiment

A discrete choice experiment (DCE) (Train, 2009) was used to elicit consumer preferences for fair trade and organic labels. A DCE is a stated preference technique (Louviere & Hensher, 1982; Louviere & Woodworth, 1983) that has a well grounded theoretical basis in random utility theory (Hanley et al., 1998), and is more general and consistent with economic demand theory than other choice elicitation approaches (Louviere et al., 2010).

In a stated choice experiment, a product is hypothesised using unique combinations of attributes and respective attribute levels. Often, an opt-out option is made available for respondents who do not prefer any of the hypothesised alternatives. Choosing a product alternative intrinsically implies that the consumer perceives it to have a higher utility compared to its competitors. Inevitably, due to lack of tangible choice consequences and the nonexistent nature of the proposed product, interpretation and application of results from these experiments are often not without caution (List & Gallet, 2001). However, for attributes like ethical labels, and cases of marketing a prospective non-existing product, this approach is often the sole and reliable option.

In this unlabelled choice experiment, a choice set comprised of five alternatives: coffee options A, B, C and D and an opt-out option.

3.2. Attributes and attribute levels selection

In line with existing literature (De Pelsmacker et al., 2005; Catturani et al., 2008; Didier & Lucie, 2008; Rotaris & Danielis, 2011; Rousseau, 2015; Van Loo et al., 2015; Gallenti et al., 2016), we described a 250g package of grounded coffee using the following attributes: taste, presence of fair trade and/or organic label, country of origin, country of production and price. Taste attribute levels dessert, mild and mocha were selected because they were the most popular flavors available in most brands. Price levels were determined on the basis of online webshops from Carrefour and Bioplanet supermarkets in Belgium. The

lowest (highest) priced grounded coffee on these websites was 2.35€ (4.65€). A maximal price of 5.99€ (plus levels of 3.35€ and 4.35€) were included to provide more trade-offs, reliable parameter estimates and substantial ability to detect non-linearities in marginal utilities. The choice of Ethiopia, Brazil and Indonesia as countries of origin was motivated by representation for an African, Latin American and Asian leading large scale producer of conventional coffee (Van Dingenen et al., 2010; ICO, 2017). Belgium, the Netherlands and Italian-produced coffee were the most represented producing countries available in the Belgian market. The different attributes and their levels are shown in Table 1.

Table 1: Attributes and attribute levels

Attribute	Attribute levels
Taste	Mild (reference)
	Mocha
	Dessert
Production country	Belgium (reference)
	Italy
	Netherlands
Fair trade label	No (reference)
	Yes
Organic label	No (reference)
	Yes
Origin country	Ethiopia (reference)
	Brazil
	Indonesia
Price	2.35 euro
	3.35 euro
	4.35 euro
	5.99 euro

3.3. Design construction

From Table 1, 3^2x2^2x3x4=432 different coffee products combinations were possible in a full factorial design. To avoid presenting respondents with the large number of choice tasks from a full factorial design, we constructed a fractional orthogonal factorial design using SAS (SAS Institute Inc, 2014). The design generation algorithm ensures that alternatives are chosen in such a way that the included factors are balanced and orthogonal (Street et al., 2005; Kuhfeld, 2010). The resulting design comprised of 12 distinct choice sets. To

limit time spent when making choices, the choice sets were subdivided into two blocks each containing 6 tasks. A respondent was then randomly assigned to one of the blocks at the start of the survey. An example of a choice set is shown in Table 2.

Table 2: Choice set example

Coffee	None	A	B	C	D
Taste		Dessert	Mocha	Mild	Dessert
Production country		Netherlands	Italy	Belgium	Italy
Fair trade label		No	Yes	No	Yes
Organic label		Yes	No	No	Yes
Origin country		Ethiopia	Brazil	Indonesia	Indonesia
Price		2.35 euro	4.35 euro	5.99 euro	3.35 euro

3.4. Survey and questionnaire

Every study participant received a questionnaire divided into three sections. The first section comprised of questions relating to knowledge of the labels, purchasing frequency and consumption behaviour for fair trade and organic coffee. The second section consisted of the choice experiment described in sections 3.1 - 3.3. The final section comprised of socio-economic questions including age, gender, income, education level and employment status. A short survey was also included in this section on respondent's environmental and altruistic concerns. Attitude towards helping others (AHO) (Webb et al., 2000) and altruistic social behaviour (ASB) (Carlo & Randall, 2002; Niezink, 2008) scales were used to assess prosocial behaviour. The NEP scale (Webb et al., 2000; Dunlap et al., 2000) was used to reveal consumers' environmental concerns.

3.5. Attitudinal scales

Participants' pro-social and environmental attitudes were taken as part of the last section to avoid influencing their responses to label definitions and choice tasks. The NEP scale consisted of fifteen items with the exact wording provided by Dunlap et al. (2000). The seven even-numbered items were inverted to indicate pro-NEP responses as were the eight odd-numbered items. Higher pro-NEP values were expected to be associated with higher WTP for both fair trade and organic labels due to congruence in their objectives. Similarly, AHO had four items (Webb et al., 2000). A positive AHO effect on fair trade was expected since all the AHO items typify the fair trade objective of concern for other people. The

ASB scale had five items presented as items 4, 10, 16, 20 and 23 in Carlo & Randall (2002). All the ASB items promote self-enhancement values (De Dominicis et al., 2017). They also include the egoistic concern for environmental problems (Schultz, 2000; Wesley Schultz, 2001). These self-enhancement items were reversed to comply with the ASB motive of collective interest over individual benefit in the succeeding analyses. As such, high ASB values were more likely to be associated with pro-environmental concerns that form the basis for organic and fair trade food products (Schultz, 2000; Wesley Schultz, 2001).

Respective items on all scales were translated into Dutch and randomly ordered for the survey. Participants were asked to indicate on a five-point likert scale whether they strongly disagreed (value equal to 1) or strongly agreed (value 5) with the scales' statements. Respondents' internal consistency for the attitudes was tested using Cronbach's Alpha (Tavakol & Dennick, 2011). Internal consistencies for NEP, AHO and ASB scales were 0.75, 0.87 and 0.72 respectively. The internal consistencies suggest using a single value for each scale. To optimize information from the multidimensional scales (Taye et al., 2018), we carried out a principal components analysis and retained the first principal component.

3.6. Data collection and sample characteristics

Participants were recruited using an online survey tool known as Qualtrics (Qualtrics, 2018). Respondents were invited to participate using emails, social media, oral questions and by snowballing from acquaintances of present participants. Using an online survey for data collection is desirable as it has been associated with minimizing socially desirable responses (Kreuter et al., 2008). Further, to limit the chances of hypothetical bias that often characterize stated preference experiments, we included a cheap talk script (Cummings & Taylor, 1999; Van Loo et al., 2011) before each block of choice sets. In this script, respondents were asked to imagine they were in a local supermarket planning to buy a coffee product. The coffee was to be served to many visitors. The respondent was to behave as if a chosen product would actually be paid for. Data collection was carried out as part of a master thesis project (Surmont & Meulders, 2017).

This survey was limited to Belgian residents in Flanders who were at least 18 years of age. In total, 326 respondents participated in the study. 262 participants completed the survey and were used for the analysis. Table 3 shows their demographic characteristics. Slightly over half of the sample were female (55%) and 50% were aged below thirty years. The majority (80%) had at least a post-secondary school diploma. Given the relatively high education in the sample, it followed quite naturally that most of them were either students (27.5%) or employed (56%) and had a decent income (over 70% earning more than 1500€).

Table 3: Socio-economic characteristics and purchasing behaviour of labelled products

Characteristic	%	Characteristic	%	
Female	55.3	Social status		
		Unemployed	1.5	
Age groups		Independent	9.9	
19-24	29.5	Housewife/husband	2.7	
25-29	20.7	Retired	2.7	
30-44	24.5	Student	27.5	
45-92	25.3	Employed	55.7	
Education level		Purchasing behaviour		
Primary	0.4		%	
Secondary	19.8	Frequency	Organic	Fair trade
Higher non-university	33.2	At least every week	24.0	5.7
University	46.6	At least every month	18.3	17.9
		Not every month	35.9	42.4
Family income (€)		Never	21.8	34.0
< 1500	8.4			
1500-2000	23.3			
2000-3000	14.1			
>3000	34.4			
No answer	19.8			

3.7. Data analysis

3.7.1. Knowledge of labels and purchasing behaviour

To test knowledge for fair trade and organic labels, logos were shown to respondents followed by a short description. Then they were asked to indicate whether they already knew the logo and whether their knowledge matched the description of the logo. Descriptive statistics of tabulated percentages were then used to report knowledge of definitions provided for each label, their associated logos and consumers purchasing behaviour.

3.7.2. Modelling willingness-to-pay for fair trade and organic labels

Multinomial logit models (MNL) are among the most prominent analysis methods for choice data. These models are based on random utility theory (McFadden, 1974; Hanley et al., 1998). MNL models assume that the utility for an alternative can be additively decomposed into a deterministic and a random component. The relationship between the utility and the non-random component is assumed to be linear, while random components are assumed to be identically and independently distributed (iid) following a type-I extreme value distribution (Train, 2009). A general representation of utility (U_{ijs}) derived from alternative j of choice set s for respondent i is shown in equation 1.

$$U_{ijs} = V_{ijs} + \epsilon_{ijs} \tag{1}$$

where $\mathrm{V}_{ijs} = \boldsymbol{\beta}'\mathbf{x}_{ijs}$ is the deterministic component, $\boldsymbol{\beta}$ is a vector of attribute preferences, $\mathbf{x}_{ijs}$ is a vector containing observed attribute values related to alternative j in choice set s. ϵ_{ijs} is the corresponding type-I extreme value distributed random component.

A respondent chooses an alternative in a choice set if the utility from the chosen alternative exceeds the utility that would be gained from the other alternatives. Thus, the probability of choosing alternative j is p_{ijs}=Prob($V_{ijs} + \epsilon_{ijs} > V_{iks} + \epsilon_{iks}$, $\forall$ k $\in$ A_i & k$\neq$j) where A_i is the choice set faced by respondent i. By assuming ϵ_{ijs} to be iid type-I extreme value variates, McFadden (1974) shows that p_{ijs} has a closed form solution (equation 2) that results in the standard MNL probabilities.

$$p_{ijs} = \frac{e^{V_{ijs}}}{\sum\limits_{k \in A} e^{V_{iks}}} \tag{2}$$

With five dummy coded categorical attributes (Table 1), the expanded utility function for this study is as shown in equation 3.

$$\begin{aligned} U_{ijs} = {} & \beta_0 ASC_{ijs} + \beta_1 \mathrm{Dessert}_{ijs} + \beta_2 \mathrm{Mocha}_{ijs} + \beta_3 \mathrm{Netherlands}_{ijs} + \beta_4 \mathrm{Italy}_{ijs} + \\ & \beta_5 \mathrm{Organic}_{ijs} + \beta_6 \mathrm{Fairtrade}_{ijs} + \beta_7 \mathrm{Brazil}_{ijs} + \beta_8 \mathrm{Indonesia}_{ijs} + \beta_9 \mathrm{Price}_{ijs} + \epsilon_{ijs} \end{aligned} \tag{3}$$

where ASC is equal to 1 when the opt-out is chosen and 0 if one of the available coffee options is chosen. Dessert and Mocha are taste dummy coded variables with Mild taste as a reference. The Netherlands and Italy are production country dummy variables with Belgium as a reference. Brazil and Indonesia are indicator variables for country of origin whose reference category is Ethiopia. Organic and Fairtrade are organic and fair trade labels dummy variables, where 1 indicates presence of the respective label on the product and 0 the absence of the label. Price was treated as a quantitative attribute.

To quantify the marginal rate of substitution between non-price and price attributes, we estimated the WTP (ω) for each attribute level by calculating a ratio between the negative of a non-price ($\beta_{non-price}$) and price (β_{price}) coefficients:

$$\omega_{non-price} = \frac{-\beta_{non-price}}{\beta_{price}} \tag{4}$$

3.7.3. Heterogeneity in WTP and correlation for sustainability labels

While choice experiments are often modelled using MNL models, their implied assumptions of homogeneity in preferences across respondents and Independence from Irrelevant Alternatives (IIA) (Train, 2009) are in most cases unrealistic. The homogeneity assumption in MNL models can be markedly relaxed by including interactions of socio-economic variables with attributes and alternative specific alternatives or analysis by subsets (Rousseau, 2015). Preferences heterogeneity can also be modelled using mixed multinomial logit models (MMNL) (McFadden & Train, 2000; Train, 2009). The MMNL models consumer preferences and choice behaviour by assuming random coefficients (for all or some of the attributes) over decision makers in a population defined by some density f(β). In this paper, consumer preference heterogeneity will be modelled using an MMNL model.

Two MMNL models were estimated. The first MMNL model, denoted as M1, included random coefficients for price and taste, fair trade and organic dummy variables. We allowed two independent instances of correlation among these random coefficients. First, between the two taste dummy variables. This correlation was included as a result of improved model fit when correlation between tastes was factored in, keeping all other variables fixed. The second correlation was between fair trade and organic labels. The inspiration for including this correlation was to investigate the association between WTP for the labels when presented simultaneously on a product. Tastes, fair trade and organic labels coefficients were assumed to be normally distributed, while the price coefficient was assumed to be log-normally distributed. Coefficients for country of origin and country of production were kept fixed since there was no improvement in model fits when entered as random coefficients.

WTP as shown in equation 4 is straightforward when applied in MNL since all attributes including price are assumed to be fixed. However, for an MMNL with random non-price and price coefficients, taking ratios may not result in well-behaved distributions (Train & Weeks, 2005; Sonnier et al., 2007; Daly et al., 2012). Thus, to derive appropriate WTP estimates for attributes, we pre-multiplied all non-price parameters by the price coefficient (Hess & Rose, 2012). Then, we specified normal heterogeneity distributions for WTP

coefficients and lognormal distribution for the price coefficient (Sonnier et al., 2007; Hess & Rose, 2012). Equation 5 shows a representation of model M1 in WTP space.

$$U_{ijs} = \beta_{9i}(\omega_0 ASC_{ijs} + \omega_{1i}\text{Dessert}_{ijs} + \omega_{2i}\text{Mocha}_{ijs} + \omega_3\text{Netherlands}_{ijs} + \omega_4\text{Italy}_{ijs} + \omega_{5i}\text{Organic}_{ijs} + \omega_{6i}\text{Fairtrade}_{ijs} + \omega_7\text{Brazil}_{ijs} + \omega_8\text{Indonesia}_{ijs} + \text{Price}_{ijs}) + \epsilon_{ijs} \quad (5)$$

with:
Taste WTP coefficients ω_{1i} and ω_{2i} assumed to come from a multivariate normal distribution (MVN). ω_{Des} and ω_{Moc} are the mean WTP components for Dessert and Mocha respectively. σ^2_{Des}, σ^2_{Moc} are variances for Dessert and Mocha while $\sigma_{Des,Moc}$ is the covariance between Dessert and Mocha coefficients.

$$\begin{bmatrix}\omega_{1i}\\ \omega_{2i}\end{bmatrix} \sim MVN\left\{\begin{bmatrix}\omega_{Des}\\ \omega_{Moc}\end{bmatrix}, \begin{bmatrix}\sigma^2_{Des} & \sigma_{Des,Moc}\\ & \sigma^2_{Moc}\end{bmatrix}\right\} \quad (6)$$

A similar idea was applied for organic (ω_{5i}) and fair trade (ω_{6i}) coefficients. ORG and FT subscripts annotate organic and fair trade respectively:

$$\begin{bmatrix}\omega_{5i}\\ \omega_{6i}\end{bmatrix} \sim MVN\left\{\begin{bmatrix}\omega_{ORG}\\ \omega_{FT}\end{bmatrix}, \begin{bmatrix}\sigma^2_{ORG} & \sigma_{ORG,FT}\\ & \sigma^2_{FT}\end{bmatrix}\right\} \quad (7)$$

The correlation between fair trade and organic labels was then calculated as the ratio of $\sigma_{ORG,FT}$ and the product of σ_{ORG} and σ_{FT}. The lognormal specification for the price coefficient (β_{9i}) is shown in equation 8:

$$log(\beta_{9i}) \sim N(\beta_{Pr}, \sigma^2_{Pr}) \quad (8)$$

3.7.4. Environmental and altruistic effects on WTP for sustainability labels

The second MMNL model (M2) extends M1 by including demographic and attitudinal variables in the mean coefficients of fair trade and organic labels. The aim was to use these variables to explain part of the observed heterogeneity in both labels. Further, M2 was used to assess the effects of environmental and altruistic attitudes on preferences for fair trade and organic coffee. The updated mean functions for both labels from equation 7 are shown in equations 9 and 10.

$$\omega_{ORG} = E(\omega_{5i}) = \gamma_{organic} + \gamma_1\text{female}_i + \gamma_2\text{age}_i + \gamma_3\text{HE.non\_uni}_i + \gamma_4\text{HE.uni}_i + \gamma_5\text{NEP}_i + \gamma_6\text{ASB}_i + \gamma_7\text{AHO}_i \quad (9)$$

$$\omega_{FT} = E(\omega_{6i}) = \gamma_{ftrade} + \gamma_8 \text{female}_i + \gamma_9 \text{age}_i + \gamma_{10} \text{HE.non\_uni}_i + \gamma_{11} \text{HE.uni}_i + \gamma_{12} \text{NEP}_i + \gamma_{13} \text{ASB}_i + \gamma_{14} \text{AHO}_i \quad (10)$$

In these equations, female equals 1 for females and 0 for males. Age is treated as a continuous variable. Education is a 4-level categorical variable. Primary and secondary school levels were combined into a reference category while higher non-university education (HE.non_uni) and higher university education (HE.uni) were the other education categories. NEP, ASB and AHO denote principal component scores for environmental, altruistic social behaviour and attitudes towards helping others. To ensure γ_{ftrade} and $\gamma_{organic}$ represented the overall mean WTP for fair trade and organic labels, we standardized the age attribute and effect coded the education attribute. Thus, HE.non_uni is 1 for higher non-university education, 0 for higher university education and -1 for either primary or secondary education. Similarly, HE.uni is 1 for higher university, 0 for higher non-university and -1 for either primary or secondary education.

3.7.5. Estimation and software

The model was estimated using bayesian methods implemented in the *R2jags* package (Su & Yajima, 2015) available in R (R Core Team, 2018). The package provides high-level interface utilities for MCMC models via the JAGS sampler (Plummer, 2013). It allows for useful processes like parallel processing for multiple chains, automated convergence control and evaluation of model performance. We ran 3 chains of 100,000 iterations. The first (last) 50,000 iterations were used as burn-in (sample draws). For random parameters, we assumed non-informative priors by using low precisions (10^{-6}) on the normal (lognormal in the case of price) distributions for mean parameters. Similarly, miniscule shape and scale parameters for the gamma (or wishart in multivariate cases) distributions were used as priors for precision parameters. For the fixed coefficients, we assumed flat priors (N(0,10^{-6})). Convergence for the paramaters was assessed using the Rhat statistic (Gelman & Rubin, 1992). An Rhat value less than 1.05 signified convergence.

4. Results

4.1. Fair trade and organic labels knowledge

238 (90.8%) of the respondents positively identified with the description provided for and 144 (55%) already knew the organic label. For fair trade, 254 (96.9%) agreed with the description provided and 203 (77.5%) already knew its logo. On the consumption patterns, 46.6% indicated that they drunk coffee every day, 18.7% between 2 to 6 days per week,

2.3% once per week, 9.9% less than once per week, while 22.5% never drunk coffee. These results indicate that coffee is a well-known and frequently consumed product in the sample. Furthermore, the fair trade logo was more often recognized than the organic label.

Table 3 shows that when considering frequency of buying labelled coffee, a higher percentage bought organic (24%) compared to fair trade (5.7%) coffee at least every week. Both labels were bought by 18% of respondents at least every month, while 34% do not buy fair trade coffee at all compared to 22% for organic coffee.

4.2. WTP for Fair trade and Organic labels: MNL

Table 4 shows the results for estimating an MNL model to determine the choice probability for a 250g coffee alternative. ASC has, as expected, a negative significant coefficient indicating that consumers benefit more from choosing a coffee alternative compared to an opt-out. The respondents preferred dessert and mocha to mild flavoured coffee, Brazilian to Ethiopian and Ethiopian to Indonesian for country of origin, Belgian-processed over coffee processed in the Netherlands, ceteris paribus. Cheaper coffee was preferred to more expensive coffee. The WTP for coffee with an organic label was on average 2.2 euros higher than coffee without an organic label. The WTP for fair trade coffee was on average 2.1 euros higher than coffee without a fair trade label.

Table 4: MNL results in preference and WTP spaces

Attribute	Coefficient	Preference space β(SD)	WTP space ω(SD)
ASC		-1.381(0.152)*	-4.184(0.398)*
Taste	Dessert	0.314(0.071)*	0.960(0.238)*
	Mocha	0.316(0.072)*	0.963(0.231)*
Origin	Brazil	0.154(0.072)*	0.469(0.221)*
	Indonesia	-0.148(0.070)*	-0.446(0.209)*
Production	Netherlands	-0.318(0.075)*	-0.968(0.232)*
	Italy	-0.111(0.071)*	-0.337(0.217)
Price		-0.330(0.024)*	
Organic	Yes	0.713(0.059)*	2.163(0.206)*
Fair trade	Yes	0.680(0.060)*	2.064(0.221)*
DIC		4437.2	4437.2

* The 95% credible interval does not include zero ($|\text{Est/SD}| > 1.96$).

To explore which product attributes were most important when purchasing a coffee alternative, we calculated relative importance statistics (Vermunt & Magidson, 2013) from the MNL model. Relative importance is the ratio between the maximum effect of an attribute and the sum of maximum effects of all attributes under consideration. Price had the highest score at 0.48, followed by organic (0.17) and fair trade (0.16) labels. Taste and production country each had scores of 0.08 while country of origin had an importance score of 0.04. Respondents considered price as the most important attribute, followed by sustainability labels. Fair trade and organic labels were indistinguishable in importance and their WTP estimates were basically equal.

4.3. Heterogeneity in WTP for sustainability labels

Table 5 shows consumer preferences for organic and fair trade labels in the two MMNL models. M1 fits an MMNL WTP model without including demographic and attitudinal variables. The opt-out and price coefficients were, as expected, negative and significant. Respondents preferred dessert to mild flavoured coffee. Brazilian coffee was not significantly preferred to Ethiopian coffee, while Belgian-made coffee was preferred to coffee processed in either Italy or the Netherlands.

Consumers were prepared to pay on average an extra of 1.67 euros for a 250g package of fair trade and organic labelled coffee. The high similarity in estimated WTP means for both labels carries over to their standard deviations. Standard deviation estimates were close to 1.8 and were highly significant. The significance of standard deviations indicates the presence of observed heterogeneity in WTP preferences amongst respondents. We attempted to explain part of these WTP heterogeneities by factoring in consumer-specific characteristics in model M2.

4.4. Environmental and altruistic effects on WTP for labels

Table 5 (column M2) shows the results from including attitudinal variables to explain the observed variation in WTP for organic and fair trade labels. M2 had a better fit compared to M1 as seen by its lower DIC value. For the organic label, the NEP and ASB coefficients were positive and significant. AHO was not significant. An increase by one standard deviation in NEP (ASB) resulted in an increase of 0.5 (0.4) euros in marginal WTP for organic coffee. All of the environmental and altruistic attitudes scores were significantly associated with WTP for the fair trade label. A unit increase in standard deviation for the NEP (ASB, AHO) scales was associated with an increase of 0.5 (0.4, 0.4) euros in willingness-to-pay for fair trade coffee.

Table 5: MMNL results in WTP space

		M1	M2
Attribute	Coefficient	Est(SD)	Est(SD)
ASC		-4.065 (0.337)*	-4.011 (0.333)*
Taste	Dessert_{ω}	0.744 (0.230)*	0.766 (0.243)*
	Dessert_{σ}	2.005 (0.258)*	2.104 (0.268)*
	Mocha_{ω}	-0.168 (0.383)	-0.149 (0.387)
	Mocha_{σ}	4.909 (0.501)*	4.984 (0.525)*
	$\sigma_{Des,Moc}$	0.150 (0.155)	0.170 (0.155)
Origin	Brazil_{ω}	-0.069 (0.148)	-0.061 (0.149)
	$\text{Indonesia}_{\omega}$	-0.363 (0.141)*	-0.363 (0.141)*
Production	$\text{Netherlands}_{\omega}$	-0.675 (0.162)*	-0.692 (0.165)*
	Italy_{ω}	-0.365 (0.142)*	-0.374 (0.146)*
Price	β	-0.317 (0.091)*	-0.325 (0.092)*
	σ	1.355 (0.293)*	1.344 (0.290)*
Organic	Yes_{ω}	1.666 (0.182)*	1.685 (0.181)*
	Yes_{σ}	1.760 (0.205)*	1.717 (0.207)*
	$:\text{NEP}_{\gamma}$		0.492 (0.199)*
	$:\text{ASB}_{\gamma}$		0.406 (0.182)*
	$:\text{AHO}_{\gamma}$		-0.010 (0.180)
Fairtrade	Yes_{ω}	1.668 (0.186)*	1.684 (0.186)*
	Yes_{σ}	1.869 (0.207)*	1.748 (0.205)*
	$:\text{NEP}_{\gamma}$		0.470 (0.197)*
	$:\text{ASB}_{\gamma}$		0.374 (0.182)*
	$:\text{AHO}_{\gamma}$		0.426 (0.180)*
	$\sigma_{ORG,\ FT}$	0.907 (0.049)*	0.901 (0.054)*
DIC		4011.1	3993.3

* The 95% credible interval does not include zero ($|\text{Est/SD}| > 1.96$).

Adding demographic variables to M2 led to a poorer DIC value (4042). Except for higher university education in the case of WTP for the organic label, none of the socio-demographic variables were significant. Respondents with a higher university education were willing to pay an extra of 0.5 euros for an organic labelled coffee compared to those with either primary or secondary school education. Variations of the mean preferences for both labels remained significant suggesting that including these variables did not completely explain the observed heterogeneity.

4.5. Correlation between WTP for fair trade and organic labels

The foregoing results show important concordance between fair trade and organic labels, even though ideally, we expected them to be unalike. Fair trade consumers were expected to care mostly about people in far-off places (i.e. others). Conversely, organic coffee enthusiasts were expected to care mostly about themselves. This scenario was well-captured by significance of AHO scale on fair trade and its non-significance on organic label. To describe the high resemblance in results, we calculated the correlation between WTP for organic and fair trade labels. Table 5 shows that the correlation was high and positive. In both models, the correlation was 0.9. This result implies that consumers who were willing to pay a premium for fair trade coffee were also willing to pay a largely similar premium for organic coffee and vice versa.

5. Discussion and conclusion

Results on label knowledge appear to positively update on what was reported by Rousseau (2015). In that study which also assessed recognition of fair trade and organic labels in Flanders, 60% of the respondents correctly identified fair trade compared to the 78% we found. Our 55% knowledge of organic label, however, appears to show a sharp improvement compared to 6% reported by Rousseau (2015). We find fair trade knowledge results within an expectable range, as is comparable to 71% reported by Gallenti et al. (2016) in Italy. We also posit that additional time for organic label in the Belgian market could be responsible for the increase in its identifiability. This is especially in light of results reported by Van Loo et al. (2014) whose Flanders sample showed a higher preference for a national Belgian organic logo, certified by a private organization, to the then newly-introduced EU-organic label. The superior fair trade knowledge is certainly attributable to the longer time it has been on the market compared to the EU-organic label that was introduced in 2010.

The approximate price premiums for a 250g of fair trade coffee and organic coffee were highly similar throughout our analysis. The presence of a fair trade label was associated with a WTP estimate of 2.1€ in the MNL model. This represented a 34 (88)% of the most (least) expensive coffee hypothesised. Similarly for the organic label, the WTP estimate was 2.2€ representing 36 (92)% of the most (least) expensive coffee. The mean WTP estimates for both labels in M1 and M2 was 1.7 euro (28% and 72% of most expensive and cheapest coffee respectively). The high similarity in WTP for organic and fair trade has been reported before by Didier & Lucie (2008) for French chocolate consumers. Didier & Lucie (2008) found that the WTP for an organic and a fair trade chocolate bar of 100g was 1.25€ (179% of the average WTP for a standard chocolate) and 1.31€ (187%)

respectively. The absolute estimates were also similar to separate estimates for a 250g packet of coffee from two studies in Italy (Rotaris & Danielis, 2011; Gallenti et al., 2016). Rotaris & Danielis (2011) reported an average extra premium of 2.2€ (110 [34, 146]% of the *status quo* [most, least expensive] alternative) for fair trade coffee. The WTP for organic coffee reported by (Gallenti et al., 2016) was 2.8€ (31 [93]% of the most [least] expensive alternatives). However, our fair trade WTP estimates differ substantially. In their study, Gallenti et al. (2016) found a WTP of -4.3€ for fair trade. The difference could be attributed to differences in samples and modelling assumptions.

These WTP results contradict other results in past studies that have shown unequal, non-unidirectional conclusions on fair trade and organic labels. Rousseau (2015) found WTP for a 100g chocolate bar to be 2.03€ (41 [203]% of the most expensive [cheapest] alternative) for fair trade. Their WTP estimate for the organic label was negative and close to zero. Loureiro & Lotade (2005), using a different WTP elicitation approach and a Weibull model, also found that fair trade coffee carried a higher premium than organic labelled coffee. Van Loo et al. (2015) found WTP for organic coffee to be $1.16 (11 [27]% of most [least] expensive options) while fair trade had $0.68 (7 [15]%) for a package of 12 oz. Similarly for Meyerding (2016), the organic label had a higher part-worth utility compared to the fair trade label. These results, highlighting a few studies that have compared willingness-to-pay for organic and fair trade products, underline the fact that clarity on which of these two labels is superior is non-existent. Perhaps, this is the reason we observed equivalent relative importances and a high correlation in WTP. It could point to consumer inability to tease-out differences in aims advocated by ethical labels. The results also show that the estimates are highly dependent on study location, products considered and methods used.

Our findings support results reported elsewhere (Lusk et al., 2007; Umberger et al., 2009; Ajzen et al., 2011) showing that environmental and altruistic attitudes have important roles in driving consumer decisions and willingness to pay for ethical products.

WTP for organic coffee was positively and significantly affected by being pro-environmental and altruism. The positivity shown by pro-environmental respondents naturally stems from the underlying pro-environmental objectives advocated by organic labels. This relationship is unequivocal as has been shown in cases of ecologically-themed conservation studies (Husted et al., 2014; Taye et al., 2018; Hwang & Lee, 2018). The positive effect of altruistic social behaviour shows that individuals with a collective environmental concern are more likely to purchase pro-environmental food products like organic coffee.

Environmental pro-activeness and altruism were significantly associated with WTP for fair trade coffee. The positive NEP and AHO effects were intuitively expected given the compat-

ibility between objectives of fair trade and underlying reasons for being pro-environmental and pro-help-others. The positive ASB effect mirrors the congruence between the fair trade objective of helping other people over oneself and the motivations to minimize personal benefit in the reversed self-enhancement ASB items used in the study.

Our lack of demographic effects on WTP for either labels is, however, not unique. Equally, past literature does not present unambiguous results in this respect (Laroche et al., 2001; De Pelsmacker et al., 2005; Krystallis & Chryssohoidis, 2005; Langen, 2013).

A high correlation was observed between WTP for fair trade and organic labels. This was also manifested through identical relative attribute importances, equivalent WTP estimates and similar effects of attitudinal variables on both labels. The high correlation between WTP for fair trade and organic labels could imply lack of clarity on the part of consumers about their objectives, or it could be a tacit reasoning that a product satisfying either label will automatically accommodate the other label.

6. Limitations and future research

Controlling for some limitations in the sample structure, these findings are to some degree representative of the Belgian coffee market. However, their transferability to other countries within the region, and/or other food products may be limited. This is because WTP has been shown to differ greatly depending on location of the study, methodology used and, product and product attributes investigated. The closeness in relative importance and WTP estimates, and the high correlation in WTP for fair trade and organic labels calls for further research. A follow-up study to investigate the part-worth utilities and their correlation for more food labels in a revealed and repeated multi-site experiment may be interesting.

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