

Article

How Does Consumers' Care for Origin Shape Their Behavioural Gap for Environmentally Friendly Products?

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Abstract: Climate change is threatening worldwide crop yields and varieties, and the desertification of Southern Europe and Mediterranean areas is endangering the cultivation of tomato, not only one of the most important cultivated crops, but also one of the main pillars of the global food industry. To minimize its environmental impact, current research efforts in Europe are selecting resilient tomato genotypes with reduced use of water and fertilizers. Still, its commercial acceptance depends on consumers' reaction in terms of interests, attitudes, and willingness to buy and pay for this hypothetical resilient tomato. In our setting, a behavioural gap exists whenever despite an interest for the product, and regardless of a positive attitude towards it, consumers are not willing to pay a premium price for this tomato. This paper focuses on Italians, among the largest tomato consumers across the world, and for whom origin emerges as a relevant consumption driver. We carried out a web-survey, totalling 932 responses. We ran three different ordinal regressions, one for each level of involvement in the purchasing process, identifying the factors affecting consumers' interest, attitude, and behaviour towards this hypothetical tomato. We prove the existence of a behavioural gap for Italian tomato consumers and observe that this gap widens as consumers' preferences for origin increase. Hence, policies developing environmentally sustainable products should not forget how consumer preferences for non-strictly environmental attributes might ultimately affect their propensity to buy and pay.

Keywords: environmental sustainability; consumer behavioural gap; tomato; food origin; Italy



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1. Introduction

Tomato is one of the most popular and cultivated vegetables all over the world. To meet a rising demand, its production has been steadily increasing over the last decades (+91% between 1994 and 2017, FAOSTAT). This popularity is not costless, as tomato cultivation requires significant amounts of water and fertilizer inputs, but both production factors are becoming less and less accessible. According to climate change forecast, precipitations are expected to decrease by 40% in Southern European countries, and a severe water scarcity is looming [1]. As for fertilizers, the cost of nitrogen and phosphorus has more than doubled since 2001 [2], and their use may threaten farmers' economic viability.

This work belongs to the H2020 "TomRes, A novel and integrated approach to increase multiple and combined stress tolerance in plants using tomato as a model", which is currently selecting resilient tomato varieties (non-GMO), with superior water and nutrient use efficiency. Within this research framework, the goal of this work is to understand how consumers would react to a more environmentally sustainable tomato. In particular, it is worth investigating if consumers' interests and their positive attitude towards environmental related issues actually result in a green behaviour and in a higher willingness to pay for a tomato with environmental sustainability characteristics. Any discrepancy between interest, attitude and behaviour would result in a behavioural gap. Whenever a gap exists,

interested consumers and consumers who have a positive attitude toward environmental sustainability do not undertake a green consumption behaviour.

The aim of our work is two-fold. First, we aim at proving the validity of the literature on consumer behavioural gaps towards an environmental consumption good, as this tomato would be. Then, with tomato being a flagship product, typical of the Italian culture and heritage, we disentangle the intricate net of subjective and objective elements that characterizes the preference for food origin in order to identify the main drivers of tomato consumption in Italy as well as their potential role in affecting the behavioural gap.

In examining the consumer behavioural gap, we also refer to food origin, which has been described by the literature as one of the main factors influencing purchasing behaviour [3–8].

Our analysis tries to investigate these two objectives within the same methodological framework. If, on one side, we explore the existence of a behavioural gap for Italian consumers with regards to a not yet existing environmentally sustainable tomato, we also examine to what extent the magnitude of their behavioural gap and spending propensity is affected by Italians' care for tomato origin, which emerges in the literature on consumer behaviour towards tomato [9–11] as a very relevant consumption driver. No study, to the best of our knowledge, investigates product origin as a factor influencing the consumer behavioural gap.

The paper is organized as follows: Section 2 focuses on the literature that deals with the behavioural gap and product origin. Section 3 presents the materials and methods utilised, Section 4 reports the results, and Section 5 draws the main conclusions.

2. Theoretical Framework

Several analyses and authors in recent years have tried to explain why the market for sustainable food products, despite a positive trend in market share, is still relatively underdeveloped [12–15].

This paradox is due to the fact that the intention to buy may not always lead to the actual decision to purchase. This divergence, also known as the attitude–behaviour gap, has been mainly examined over the last decades by social psychologists, who focused on the perceived behavioural control [16], on attitude strength [17], on exploring moderators of the attitude–behaviour link [18], and on methodological aspects [19,20].

The same idea has been then fruitfully used in the consumer behaviour research domain and more intensively in the analysis of sustainable purchase behaviour [21–24] and of ethical consumption [25,26]. These works investigate why and how this gap exists, explaining the technical and cognitive factors that impede consumption of one good despite consumers' positive attitude. The final, purchasing decision may be indeed inhibited by several factors. Aschemann-Witzel and Niebuhr Aagaard [27] find that the high price and availability are major reasons for this attitude–behaviour gap, especially among young consumers. Yamoah and Acquaye [15] use individual retail data and report that objective and technical inhibitors may be related to product availability, to specific characteristics of the product (in terms of price, quality, and taste). On the cognitive side, previous consumption habits (such as past purchases) may be responsible for the decision not to purchase. The existence of a behavioural gap in consumers is confirmed also by Kemp et al. [28], who compare the intentions to buy local using a revealed and a stated preference approach: according to scanner data, only few consumers actually buy local, despite the significantly larger share of consumers who state they would buy local to reduce distance travelled.

In our analysis, we introduce a broader definition of behavioural gap that is inspired by the literature related to consumer journey models [29,30]. These models were initially developed in marketing communications, and they are based on the assumption that consumers pass through cognitive (Learn), affective (Feel), and behavioural (Do) levels in their purchase process. The sequential order in which these phases are experienced depends on consumer involvement and on the learning type. When these elements are both high, consumers learn about a product before forming attitudes toward it and before

purchasing it: in this case, they follow the learn-feel-do sequence [31,32]. In the case of food consumption, this usually happens when the decision to purchase or not to purchase has consequences on human health or on the environment [33]. Empirical works in the food consumption behaviour literature have used this approach to investigate how these three levels of consumer reaction are related one another. Ghosh et al. [34] used customer involvement during organic food purchase to show that awareness drives attitude, and attitude drives purchase behaviour. They conclude that organic food is a high involvement product, in which thinking and economic considerations prevail prior to purchase. Always in the context of sustainable products, Mancuso et al. [35] stress how consumers, when offered farmed fish fed with insects, behave differently depending on their interests for environmental sustainability and on their attitude towards this specific product. In a similar vein, Angulo and Gil Roig [36] analyse Spanish consumers' acceptance of GM food products, and observe that in this case, too, the purchasing process evolves according to the learn-feel-do sequence, confirming the high level of consumer involvement for these products. Allegra et al. [37] focus on the main food packaging materials (glass, metal, plastics, etc.), with the aim of understanding the influence of packaging features on the consumer's choices and purchase preferences: they find that cognitive and rational levels precede the emotional one.

Following this research line, we decompose the purchasing process into three distinguished levels: interest, attitude, and behaviour, each accounting for a specific level of involvement, that is, cognitive, emotional, and behavioural. With respect to the original theoretical framework of the attitude-behavioural gap, we propose a modified version to fit the analysis of a hypothetical product that the consumer has never heard of. In the "learn" dimension, we consider consumer "interest", which accounts for consumers' concern for environmental and sustainability issues and interest towards the hypothetical sustainable tomato.

In our framework, the gap exists if despite an interest for the product, and regardless of a positive attitude towards it, consumers are not willing to pay a premium price for this tomato. The idea of including also consumer interest can be found in other works testing the existence of a behavioural gap for hypothetical products, just as tomato is in our setting [38,39].

The first hypothesis we thus want to verify in our analysis is the following:

Hypothesis 1 (H1). *There exists an interest-attitude-behavioural gap for Italian consumers towards a hypothetical, environmentally sustainable tomato.*

This analysis also wants to investigate how consumers' interest, attitude, and behaviour toward an environmentally sustainable tomato depend by consumers' preferences for food origin. In doing so, our analysis also contributes to the literature that examines food origin as a consumption driver.

In our analysis, we define origin according to the main concepts emerged from the systematic review proposed by Feldmann and Hamm [40] on consumers' perceptions of local food. In their review, the authors recognise the existence of multiple definitions of local food, and propose a classification into three different levels: one based on the distance travelled, one related to emotional and social aspects (homely grown or homemade food products), and one based on political boundaries (country). Concerning the first definition, they observe how the existing literature defining local food focuses on some contextual factors such as the place of residence, length of stay in a place, and type of products. The literature [41–43] reports, for Italian consumers, a strong relationship between the "type of product" (in our case, tomato) and political boundaries (Italy). Similarly, two focus groups conducted during the preliminary stages of our analysis further confirmed this robust link: indeed, for participants, the Italian origin of tomatoes is the most relevant attribute elicited. Hence, in our analysis, we define food origin according to political boundaries [40,44–46].

The past decade has witnessed the increase in popularity of origin of products and of local food. Consumers' propensity to go local is the result of different individual traits, such as demographic characteristics, attitudes, and knowledge, just to mention a few examples.

Within this melting pot of all the possible concurring explanations, there is a real chance that consumers buy local to support local farmers and communities and/or to reduce the environmental impact of the food purchased, mainly in terms of distance travelled. A local food consumer is thus concerned with social, economic, and environmental sustainability [9,46–48], and all the factors behind local food consumption can be grouped into a single "subset of general environmental concerns" [47].

The environmental interpretation of origin has been extensively addressed by the consumer behaviour literature. Recently, Annunziata et al. [49] reviewed the existing contributions to further characterize the environmental origin view: first, local food consumers wish to preserve biodiversity, natural resources and reduce energy consumption; then, they also seek to reduce food distance travelled. This second reason is also the driver of local food consumption observed in Britons in Brown et al. [50]; this link has also been examined with respect to the role of eco-labels and product origin in Lim et al. [51].

However, the significant weight attributed by consumers to food origin may not only be interpreted as an eco-friendly attitude. Consumers' revealed preferences towards local food may also stem from hedonistic drivers. As for this second explanation, only a few selected works discuss how the choice of purchasing local food is driven by personal well-being rather than social consciousness.

Among the several, hedonistic factors that may explain the purchase of local food, taste and quality seem to be two of the most important drivers [52–54]. In a similar vein, Brown et al. [50] observe that French consumers, though positively determined to help the ecosystem, report food quality as the main reason for purchasing local food.

Besides taste and other sensorial aspect, which are themselves the answer to self-satisfaction and other similar needs, hedonic consumers may prefer local food also because of health-related issues, such as health awareness and food safety. A health-consciousness local food consumer is depicted in [52,55]: this type of consumer searches for "safe and nutritious" food [56], is concerned with the intensive use of chemicals during the agricultural process [57,58], and wants to be healthy [58,59].

What really drives consumption of local food, and the preference for certain specific food origins, is thus a complicated set of reasons, which does not simply boil down to either environmentally sustainable or hedonistic motives. Indeed, consumers' preferences are driven by different underlying forces, that affect consumption decisions altogether and that may move in opposite directions. This is precisely the intuition of [25], who considers how different factors, more or less hedonistic, affect consumers' decision to buy local. In their setting, hedonistic explanations prevail over altruistic motivations.

In a similar vein, we want to investigate which of the two, possible interpretations of food origin prevail whenever consumers are faced with an environmentally sustainable tomato, and we want see how the importance of food origin influences the three stages of the purchasing process discussed earlier. Consumers' reported propensity to pay can be interpreted as the balance between two different forces, hedonistic and environmentally sustainable, interfering with consumer's willingness to pay for the sustainable tomato, and thus with its entire marketability.

Following [25], we expect hedonistic forces to prevail on environmentally sustainable motives, so that consumers for whom origin is an essential tomato attribute, though interested in environmental sustainability, may not be necessarily willing to bear the premium price of a resilient tomato. Hence, the second assumption that is going to be tested is the following:

Hypothesis 2 (H2). *The more important the origin, the wider the interest–attitude–behaviour gap will be.*

To examine the validity of our hypothesis H1 and H2, and to predict the behaviour of a sample of Italian consumers towards a hypothetical environmentally sustainable tomato, we constructed a survey, which is described in Section 3.

Our analysis also contributes to the understanding of consumer behaviour towards fresh tomato in general [10,11,60–63] and towards its environmental impact [9,60,64,65]. The former strand of research mainly focuses on tomato organoleptic and other nutritional features of fresh tomatoes; the latter set of contributions represent a rising research line that tries to understand how tomato consumers react when offered tomato with environmentally sustainable characteristics, in terms of carbon footprint or nutrient use efficiency. Despite the different possible ways of characterizing fresh tomatoes, their origin and price emerge as two very relevant features from the consumers' perspective.

3. Materials and Methods

In order to test the assumptions formulated above, we conducted a consumer survey regarding fresh tomato consumption and collected 932 responses. Then, we performed a Factor Analysis on the collected data to synthesize the information gathered from the survey into a smaller set of variables. We eventually performed three ordinal regressions on different stages of the purchasing process (interest, attitude, and behaviour) to estimate the existence of a behavioural gap and how these three stages are affected by the factors identified from the factor analysis.

3.1. The Survey

To build the survey we followed four steps: (a) set up of two focus groups, (b) development of the questionnaire and of a pilot test, (c) definition of the sample, and (d) distribution of questionnaire.

The two focus groups, each with seven participants selected according to their socio-demographic backgrounds [66], took place in December 2018 to identify the drivers of consumption and the most relevant attributes for a standard fresh tomato and for a sustainable fresh tomato. All participants were informed that the TomRes project is selecting a tomato with reduced amounts of water and fertilizers, and that this tomato does not yet exist. The evidence obtained from the focus groups helped us to develop the questionnaire.

To verify the existence of a behavioural gap for Italian tomato consumers, we interviewed a non-probability quota sample of consumers spread all over Italy, defining as control categories (quotas) gender and age. We adopted a country-based definition of local origin thus referring to a domestic (Italian) product. The questionnaire was built with Google Form platform and was initially tested with a pilot study. It was distributed online from December 2018 to March 2019 using social networks, blogs and press. Two Italian newspapers published an article on the research project posting the survey link. The final sample consists of 932 answers spread in most of Italian regions.

The resulting questionnaire was built considering components relevant to food consumer science [67] and includes eight sections: tomato-purchasing habits (PH), drivers of consumption (DC), origin (O), knowledge of sustainability issues (K), interest toward environmental issues (I), attitude (positive and negative) (A) and consumer behaviour (CB) toward the resilient tomato, and socio and economic characteristics (SE).

Direct questions were used to measure consumer interest, attitude, and behaviour. Willingness to pay, which is a proxy for consumer behaviour, has also been obtained by asking consumers direct questions about the percentage price increase that they would be willing to sustain for a tomato with certain sustainability characteristics.

The purchasing habits group collects information on the purchasing site and the type of tomato required. In the drivers of consumption set, we investigate several drivers that have been described in the literature as relevant tomato consumption drivers: for instance, price [9,10], sensorial aspects [11], seasonality, certifications [9,10], purchasing site [64], among others. As for origin, we ask consumers how important the cultivating site of fresh and processed tomato [9–11], as well as the Italian origin, are. In the Knowledge

section, we ask consumers to self-report their knowledge and awareness of environmental problems in general and in tomato production. These two questions are thus a measure of subjective knowledge, that is usually depicted as an important predictor of attitude and behaviour in food related choices [68–71]. Before introducing the sections aimed at revealing the existence of a consumer behavioural gap, the survey participants were told that a European research project is trying to select a sustainable tomato genotype with a reduced environmental impact. After this introduction, the survey resumed with the interest section, that focuses on consumers' interest in environmentally related issues, such as water footprint and use of fertilizer. In the attitude section, we include questions aimed at discovering consumers' positive (such as approving the idea, being favourable to its commercialization and trusting that it should be healthier) or negative feelings toward the hypothetical tomato. Following the focus group results, we explored these concerns: more expensive, more perishable, less tasty, less safe, and less natural. The consumer behaviour part was enriched with questions on the willingness to consume, willingness to pay, and other questions oriented to evaluate if consumers would actually search and ask for this tomato in the market. Willingness to pay was measured by means of an ordinal question that included four different possibilities. To make the question as user friendly as possible, and to help the consumer quantifying the actual price increase, the question reported both relative and absolute values, in euros, that referred to the average cost for 1 kg of tomatoes resulting from a price market analysis conducted in the main food stores of Italy. Consumers could pick one of the following options: nothing more; up to 10% more (5.5 €/kg); up to 20% more (6 €/kg); up to 30% more (6.5 €/kg).

The Socio-Economic section collects information such as age, gender, and income. The final version of the questionnaire contains 39 questions, mostly measured by means of Likert scales or rating scales. Following [72,73], these scales allow for different specifications depending on research needs. This is the reason why we introduced question-specific scales. Some questions throughout the survey, such as those in the section dedicated to the drivers of consumption, were modified rating scales consisting of an even number of available choices (i.e., 4). In this way, respondents were not allowed to select a middle option but were rather forced to take a position on one side or the other. This was done only for those questions with a lower emotional involvement from the consumer, who may opt for neutral positions or may run the risk of a "ceiling effect" (subjects tend to choose responses that cluster at either the top or bottom of any scale). Questions regarding knowledge and expected price had fewer scales (1–2 or 1–3), since too many scales on an unfamiliar question would have puzzled the respondent. Table 1 reports all the single items and the corresponding scales used.

Table 1. Items used in the questionnaire and their characteristics

	Variables	Type	Scale/Categories	Mean	Std. Deviation
PH	Type of purchasing site	Categorical	1–4	n.a.	n.a.
PH	Type of fresh tomato purchased	Categorical	1–3	n.a.	n.a.
DC	Importance of Taste	Ordinal	1–4	3.562	0.817
DC	Importance of Health	Ordinal	1–4	3.087	0.936
DC	Importance of Heritage	Ordinal	1–4	2.471	1.089
DC	Importance of Versatility	Ordinal	1–4	2.454	1.061
DC	Importance of Price	Ordinal	1–4	2.711	0.726
DC	Importance of Seasonality	Ordinal	1–4	3.487	0.782
DC	Importance of Nutritional aspects	Ordinal	1–4	3.095	0.870
DC	Importance of Certifications	Ordinal	1–4	3.017	0.934
DC	Importance of Sensorial aspects	Ordinal	1–4	3.653	0.653
DC	Importance of Purchasing site	Ordinal	1–4	2.862	0.899
O	Importance of Italian origin (of fresh and processed tomato)	Ordinal	1–4	3.591	0.758
O	Importance of Cultivating place of fresh tomatoes	Ordinal	1–4	3.437	0.808
O	Importance of Cultivating place of processed tomatoes	Ordinal	1–5	3.410	0.889
K	Knowledge of desertification problems of Mediterranean areas	Ordinal	1–3	2.456	0.661
K	Knowledge of environmental impact of tomato cultivation	Ordinal	1–2	1.384	0.487
I	Interest on Water footprint	Ordinal	1–5	3.893	0.985
I	Interest on Use of fertilizers	Ordinal	1–5	4.548	0.757
I	Interest on the European research framework	Ordinal	1–5	4.355	0.747
I	Interest: want more information	Ordinal	1–5	4.332	0.870
A	In agreement with: Approve the commercialization	Ordinal	1–5	4.431	0.732
A	Approve the idea	Ordinal	1–5	4.335	0.805
A	Lower environmental impact	Ordinal	1–5	4.180	0.941
A	Good for health	Ordinal	1–5	3.464	1.136
A	Less nourishing	Ordinal	1–5	2.266	1.146
A	Higher perishability	Ordinal	1–5	3.103	1.188
A	Less safe	Ordinal	1–5	2.072	1.121
A	Less tasty	Ordinal	1–5	2.619	1.165
A	Less natural	Ordinal	1–5	2.402	1.146
CB	Ask for hypothetical tomato at usual purchasing site	Ordinal	1–5	4.102	0.949
CB	Go purposefully in a shop selling hypothetical tomato	Ordinal	1–5	3.314	1.203
CB	Higher expected price for hypothetical tomato	Ordinal	1–3	2.607	0.608
CB	Willingness to consume hypothetical tomato	Ordinal	1–4	3.595	0.537
CB	Willingness to pay for hypothetical tomato	Ordinal	1–4	2.528	0.843
SE	Gender	Categorical	1–2	n.a.	n.a.
SE	Age	Ordinal	1–7	3.517	1.633
SE	Employment	Categorical	1–11	n.a.	n.a.
SE	Income	Ordinal	1–4	2.675	0.865

NOTE: Ordinal items in DC, O, I, A and CB follow ordinal scale from a minimum (not important or in disagree) to a maximum (very important/totally agree). Items in K section measure the level of knowledge from a minimum (no knowledge) to a maximum (good knowledge). n.a. stands for “not available”.

Description, scale, mean, and standard deviation of the 932 responses are reported in Table 1. The sample appears representative of the Italian population in terms of gender and age. In order to compare the age and gender distributions of our sample with the corresponding distributions of the Italian populations, we have compared the sample values with those of the Italian population obtained from ISTAT data. The chi-squared test with six degrees of freedom (there are 7 age categories and 2 gender categories) shows a substantial closeness to the distribution of the population.

3.2. Methods

In order to test H1 and H2 and to assess how the behavioural gap depends on the importance of tomato origin, we divided our analysis in two phases. First, we reduced the dimension of the data by means of a Factor Analysis also on those smaller subsets of questions, such as origin and knowledge. This decision was mainly driven by the empirical need of having regressors of the same type (i.e., all continuous) in the second step of our analysis, when the regressions on of the three stages of consumer involvement were performed. More specifically, we considered three different ordinal regressions, one for interest, one for attitude, and one for behaviour. The analysis was conducted using the Software SPSS version 25.

As discussed previously, each section of the survey collects information of a specific subject. Hence, within each group, a significant correlation between the variables was inevitable. In light of this, the factor analysis was considered the most suitable instrument to reduce the number of variables and to find the main factors expressing the most significant features of the survey.

Factor analysis is in fact a multivariate statistical tool that simplifies multidimensional variables by dimension reduction. This method models the covariation among a set of observed variables as a function of one or more latent constructs. By extracting a few and independent common factors, the common information and correlation of the original variables are well preserved.

We ran six factor analyses, one for each group of questions of the questionnaire and identified ten different factors thoroughly described in Section 4.2. We reduced the dimension of the data by means of a factor analysis also on those smaller subsets of questions, such as origin and knowledge. This decision was mainly driven by the empirical need of having regressors of the same type (i.e., all continuous) in the second step of our analysis, when the linear regressions on the three stages of consumer involvement were performed.

Purchasing habits (PH) and socio-economic (SE) variables, which contain some categorical information, were excluded from this analysis. The resulting factors were then used during the second phase of our analysis, when we considered one linear regression for each level of involvement of consumer during the purchasing process. Hence, we performed the three following linear regressions:

$$I = f(X_{DC}, X_O, X_K, X_A, X_{CB}, X_{SE}) \quad (1)$$

$$A = f(X_{DC}, X_O, X_K, X_I, X_{CB}, X_{SE}) \quad (2)$$

$$CB = f(X_{DC}, X_O, X_K, X_I, X_A, X_{SE}) \quad (3)$$

where I , A , and CB respectively denote the factors for interest, attitude and consumer behaviour when considered as dependent variables, whereas X_I , X_A , X_{CB} refer to the same factors when entered as explanatory factors. Moreover, X_{DC} , X_O , X_K express the factors related to the drivers of consumption, origin, and knowledge. Last, X_{SE} account for ordinal socio-economic variables, that is, age and income.

4. Results

4.1. Sample Characteristics

Socio-economic: The sample of 932 respondents is characterised by the following socio and economic characteristics. Males are 43% of sample and females account for 57% of the sample. As for age, more than half of respondents are aged 45 or older, and 35% are aged between 25 and 44. Generally speaking, 55% of respondents are satisfied with their income level, 38% have to keep a close eye on their spending, and for 7% of them, monthly income is insufficient to cover all needs.

Purchasing habits: As for purchasing habits, fresh tomatoes are usually bought at supermarkets (45%), at local markets (15%), at the grocery store (22%), and directly from the producer (farmers' market, farms, online) (18%).

Origin: The origin of tomatoes is a paramount attribute for Italian consumers, in a vein similar to Feldmann and Hamm [40]: 72% and 18% of respondents state that it is respectively very important or important, whereas for only the remaining 10% the Italian origin is less important or not important at all. In addition, the importance of the place of cultivation, meant as a specific area (a municipality, a region), further confirms this peculiarity: 60% consider the place very important, 27% important, and only 13% consider the place of cultivation a minor, or not relevant, attribute. We obtained similar results for processed tomatoes.

Interest: The analysis of the collected data shows that respondents are indeed interested in the environmental impact and in the use of fertilizers and water during production. In fact, 67% and 30% of respondents are respectively interested in the intensity of fertilizers and water consumption of tomato cultivation. It turns out also that almost all the respondents are interested and very interested in the European research framework on resilient tomato varieties (91%), and would like to have more information about it (89%).

Positive attitude: Based on the survey responses, positive attitude toward the hypothetical tomato seems quite high. Just over half of consumers declares to approve completely the idea of the hypothetical tomato as well as its commercialization, whereas only 20% are confident that this new product should be good for health. Moreover, Italian consumers show considerable confidence on the whole research framework: only 5.5% of them fear a really less tasty tomato, and 19% of respondents express some doubts. Respondents fear even less that the new tomato may lose nutritional characteristics: the fact that only 14% of the sample expressed this concern is very important for tomatoes, which are perceived as a functional food. Instead, Italian consumers fear that it may be less conservable (42%).

Consumer behaviour: The strong, positive attitude is further confirmed by the significant share (79%) of respondents that would purchase the hypothetical tomato if available on the market; half of them states that they would go to a store to buy it (Table 2). Interestingly enough, more than 60% of respondents are surely willing to consume the hypothetical tomato, although only 12% of them are willing to pay a consistent premium price (up to 30% more). Still, 67% of respondents expect that the new tomato will cost more.

Table 2. Consumer behaviour toward the hypothetical tomato.

	Scores					TOT
	1	2	3	4	5	
Ask for hypothetical tomato at usual purchasing site	2.4%	4.0%	14.4%	39.7%	39.6%	100.0%
Go purposefully in a shop selling hypothetical tomato	9.1%	17.3%	23.5%	33.3%	16.8%	100.0%
Willingness to consume hypothetical tomato	0.3%	1.4%	36.7%	61.6%		100.0%
Willingness to pay for hypothetical tomato	11.1%	37.1%	39.8%	12.0%		100.0%
Higher expected price for hypothetical tomato	6.5%	26.2%	67.3%			100.0%

NOTE: Based on our survey. "Ask for hypothetical tomato at usual purchasing site" and "Go purposefully in a shop selling hypothetical tomato" range from 1 (minimum value) to 5 (maximum value); "Willingness to consume hypothetical tomato" ranges from 1 (minimum value) to 4 (maximum value); "Willingness to pay for hypothetical tomato" ranges from 1 (Nothing more) to 4 (Up to 30% more); "Higher expected price for hypothetical tomato" ranges from 1 (minimum value) to 3 (maximum value).

4.2. Factor Analysis Results

We ran six different factor analyses, one for each of the six group of questions, and found interesting results in most of the cases (Table 3). The factor analysis was successfully implemented for the DC, O, I, A, and CB groups which scored a Kaiser–Meyer–Olkin

(KMO) measure greater than 0.6 and achieved a strong dimensional reduction. For the K group, the KMO result is borderline, although we must recall the peculiarity of this case, which includes two variables only, with an overall high level of explained variance. Clearly, rotation can be applied only to those sets of questions with more than one factor extracted.

Results of the factor analysis are reported in Table 4, which displays the component matrix values useful for the factor identification. For DC variables, the factor analysis returned three factors. The first factor, that we refer to as the “mindful drivers” factor, consists of those variables describing, or relevant, for contemporary customers. We labelled the second component “traditional drivers”, to identify a more conventional customer. The third resulting factor captures the “hedonistic” component of consumption: taste and health are positive drivers, whereas price has a negative coefficient. Single factors were extracted for origin, knowledge, and interest, so they can be easily identified. Factor analysis for attitude performed well, distinguishing between positive and negative factors. Finally, we found two different components of consumer behaviour, that are the shopping habits and the economic component of behaviour.

Table 3. Summary results of the six Factor Analyses.

	Set of Questions					
	DC	O	K	I	A	CB
N. of variables involved	10	3	2	4	9	5
N. Factor extracted	3	1	1	1	2	2
Test KMO	0.66	0.6	0.5	0.68	0.84	0.65
Bartlett’s test significance	***	***	***	***	***	***
Explained variance	53.1%	51.0%	65.5%	50.0%	56.0%	67.0%
Rotation	yes	no	no	no	yes	yes

Test KMO states for Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. *** indicates Bartlett’s test of sphericity significance minor of 0.001.

Single factors were extracted for origin, knowledge, and interest, so that they can be easily identified. Factor analysis for attitude performed well, distinguishing between positive and negative factors. Finally, we found two different components of consumer behaviour, that are the shopping habits and the economic component of behaviour.

All the factors identified by the factor analyses are eligible to explain the entire data information.

Table 4. Synthesis of Factor Analysis: Component Matrices.

		Drivers of Consumption (DC) *			Origin (O) **	Knowledge (K) **		Interest (I) **	Attitude (A) *		Consumer Behaviour (CB) *
Variables		Mindful Drivers	Traditional Drivers	Knowledge	Origin	Knowledge	Interest	Negative	Positive	Behaviour	Price Component
DC	Taste	−0.049	0.280	0.716							
	Health	0.208	0.164	0.777							
	Versatility	−0.031	0.763	0.219							
	Heritage	−0.050	0.720	0.200							
	Price	0.111	0.449	−0.442							
	Seasonality	0.744	−0.050	−0.007							
	Nutritional aspects	0.761	−0.031	0.121							
	Certifications	0.704	−0.237	0.145							
	Sensorial aspects	0.565	0.257	−0.122							
Purchasing site (importance of)		0.555	0.043	−0.014							
O	Italian origin (of fresh and processed tomato)				0.915						
	Cultivating place (of fresh tomatoes)				0.401						
	Cultivating place (of processed tomatoes)				0.723						
K	Knowledge of desertif. problems of Medit. areas					0.809					
	Knowledge of envir. impact of tomato cultivation					0.809					
I	Interest-Water footprint						0.780				
	Interest-Use of fertilizers						0.675				
	Interest for European research framework						0.794				
	Interest: want more information						0.552				

Table 4. Cont.

		Drivers of Consumption (DC) *			Origin (O) **	Knowledge (K) **		Interest (I) **	Attitude (A) *		Consumer Behaviour (CB) *
Variables		Mindful Drivers	Traditional Drivers	Knowledge	Origin	Knowledge	Interest	Negative	Positive	Behaviour	Price Component
A	Approve the commercialization							−0.258	0.686		
	Approve the idea							−0.007	0.677		
	Lower environmental impact							−0.277	0.777		
	Good for health							−0.072	0.763		
	Less nourishing							0.760	−0.206		
	Higher perishability							0.768	−0.196		
	Less safe							0.755	−0.222		
	Less tasty							0.466	0.030		
	Less natural							0.792	−0.165		
CB	Ask for hypothetical tomato at usual purchasing site									0.856	0.091
	Go purposefully in a shop selling hypothetical tomato									0.807	0.095
	Higher expected price for hypothetical tomato									−0.028	0.875
	Willingness to consume hypothetical tomato									0.695	0.096
	Willingness to pay for hypothetical tomato									0.259	0.786

* Rotated component matrix; ** component matrix. Values in bold are those greater than |0.4| and thus good to explain the factor.

4.3. Regression Results

The final estimated Equations (4)–(6) below are an updated version of Equations (1)–(3), once the factors for each group of variables have been included:

$$I_i = \alpha_I + \beta_{DC1}DC1_i + \beta_{DC2}DC2_i + \beta_{DC3}DC3_i + \beta_OO_i + \beta_KK_i + \beta_{A1}A1_i + \beta_{A2}A2_i + \beta_{CB1}CB1_i + \beta_{CB2}CB2_i + \beta_{SE}SE_i \quad (4)$$

$$A2_i = \alpha_{A2} + \beta_{DC1}DC1_i + \beta_{DC2}DC2_i + \beta_{DC3}DC3_i + \beta_OO_i + \beta_KK_i + \beta_{I}I_i + \beta_{CB1}CB1_i + \beta_{CB2}CB2_i + \beta_{SE}SE_i \quad (5)$$

$$CB1_i = \alpha_{CB1} + \beta_{DC1}DC1_i + \beta_{DC2}DC2_i + \beta_{DC3}DC3_i + \beta_OO_i + \beta_KK_i + \beta_{I}I_i + \beta_{A1}A1_i + \beta_{A2}A2_i + \beta_{SE}SE_i \quad (6)$$

where: $i = 1, \dots, 932$; $DC1, DC2, DC3$ are the three sub-factors obtained for the drivers of consumption (mindful, traditional, and hedonistic drivers), O is the factor for Italian origin, K stands for knowledge, $A1$ and $A2$ are the factors attitude (negative and positive attitude respectively), I is the factor for interest, $CB1$ and $CB2$ are the factors for consumer behaviour and the price component of behaviour, and SE is the socio-economic factor. In light of the formulated hypothesis (H1 and H2), in Equations (5) and (6) we use as dependent variables respectively the positive attitude and the price component of consumer behaviour.

Table 5 summarizes the results obtained in the three regressions, reporting for each variable the estimated coefficient and the corresponding statistical significance.

Table 5. Regression results.

		Interest		Positive Attitude		Consumer Behaviour (Price Component)	
		Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
	Constant	−0.148	0.138	0.290	0.001	−0.241	0.045
DC	Mindful drivers	0.120	0.000	−0.002	0.948	0.052	0.205
	Traditional drivers	0.006	0.815	0.049	0.030	−0.119	0.000
	Hedonistic drivers	0.127	0.000	0.028	0.235	0.069	0.031
O	Origin	0.154	0.000	−0.120	0.000	−0.076	0.080
K	Knowledge	0.166	0.000	−0.045	0.063	0.014	0.671
I	Interest	-	-	0.243	0.000	0.002	0.963
A	Negative attitude	−0.108	0.000	-	-	−0.205	0.000
	Positive attitude	0.333	0.000	-	-	0.195	0.000
CB	Behaviour	0.146	0.000	0.591	0.000	-	-
	Price component	0.024	0.380	0.169	0.000	-	-
SE	Age	0.038	0.022	−0.037	0.013	−0.095	0.000
	Income	0.005	0.875	−0.059	0.024	0.215	0.000
VIF *		1.055–2.132		1.055–1.798		1.020–1.813	
R ²		0.432		0.549		0.156	
Adjusted R ²		0.425		0.544		0.147	
S.E. of regression		0.758		0.675		0.923	
F-statistic		63.50		112.00		17.01	
Prob. (F statistic)		0.0000		0.0000		0.0000	

* VIF is the Variance Inflation Factor. The table reports the minimum and the maximum value of independent variables considered in each equation.

Most of the coefficients are significant for all the regressions, and low values of variance inflation factors indicate very low collinearity between the independent variables. The model goodness of fit measured with R^2 and adjusted- R^2 is not so high, though the main goal of this paper is to understand how the different variables are related one another. Hence, a low R^2 does not negate the importance of any significant variables [74].

Results show that there are some differences in consumers' involvement during the consumption process, as discussed below.

For the driver of consumption (*DC*), we observe different patterns. First, the factor "mindful drivers" is significant only for consumer interest: the higher the importance of certification, seasonality, and nutritional aspects, the more consumers are interested in environmental issues. Conversely, the "traditional drivers" factor does not affect interest, but improves consumers' attitude. Still, it worsens the price component of consumer behaviour. This means that, even if consumers are positively oriented to ideologically support the introduction of a more sustainable food product in the market, they are not completely prepared and willing to pay more. "Hedonistic drivers", that basically reflect the quality/price ratio, have a significant effect on interest and behaviour. It is likely that the two, positive elements describing the quality aspects of hedonistic drivers (taste and health, see Table 4) prevail at the very beginning of the purchasing process (i.e., interest), while the negative prices component may prevail in the final step. These aspects are outlined by the dimension of the estimated coefficients, that in the third regression are almost half of the first one.

Consumer awareness of environmental sustainability has been analysed by two specific questions investigating their overall knowledge of desertification problem and of the environmental impact of tomato cultivation. Such elements, summarised by the knowledge factor, are weakly and negatively related to consumer attitude and not significant for the consumer behaviour price component. This result, though contrasting with part of the literature [75–80], is justified from the fact that the analysis is centred around a hypothetical product that, as such, might be hard to reconcile with consumers' environmental knowledge. It is also worth stressing that the variables used to construct the knowledge factor concern environmental sustainability in general; also, because of the very hypothetical, it was not possible to measure consumer knowledge of the tomato examined. Nonetheless, other studies conclude that the mere knowledge of environmental sustainability is not a sufficient driver of sustainable food consumption [81,82]. In line with the information contained within this variable, our results indicate that interest, the most rational and cognitive aspect of the purchasing process, is instead positively influenced by knowledge.

We now look at how the three different levels of consumer involvement are related one another. First, we observe that interest positively affects attitude but not price-driven behaviour. This is an interesting result supporting the attitude–behaviour gap hypothesis.

Then, we also observe that the factor for negative attitude reduces interest and behaviour, while positive attitude increases them. It is worth stressing that, in this case, positive attitude has a stronger impact on interest than on willingness to pay, thus further supporting the hypothesis of the different involvement during the purchasing process.

Last but not least, the consumer behaviour factor is significant and positive for interest and attitude, although its price component is significant only for attitude. This result suggests how the price component is strongly related to the buying action sphere, without affecting the consumer's psychological sensibility versus the wide spectrum of environmental and sustainability issues.

All the sets of independent variables described so far have a different, overall impact on interest, attitude, and behaviour, both with respect to the sign and magnitude of the coefficients. Hence, we can conclude that interest in environment related research and in environmental sustainability in general is not a sufficient condition for completing the purchasing process, thus confirming the existence of a behavioural gap, and proving H1.

The origin factor is significant in all the three regressions, though its coefficient is positive only for interest. This means that consumers posing specific attention to the origin

of tomato are interested because they are confident with the overall positive environmental benefit originating by the cultivation of the hypothetical tomato. Moving along the purchasing process, origin and cultivation site differently shape consumer perceptions about the hypothetical tomato, revealing a gap when moving from interest to attitude, which is instead negatively affected by origin. Therefore, the more important is food origin, the less consumers are inclined to accept the hypothetical tomato. In other words, consumers looking for an Italian fresh tomato are not yet ready for this kind of tomatoes, neither conceptually nor physically. The same pattern is observed at the end of the purchasing process, when consumers are less prone to pay more for the hypothetical tomato at the expense of tomato origin. Our results thus shed some further light on the relationship between food origin and the consumer behavioural gap, as Kemp et al. [28] discussed, though from a different point of view. This result appears very interesting and supports H2.

As for socio-economics variables, regression results are quite remarkable. Age has a significant effect in all the three equations, but with different signs: positive for interest, and negative elsewhere. This leads us to conclude that older consumers, if compared to younger generations, are more interested in desertification issues but less comfortable in purchasing the hypothetical tomato. This is not surprising, as the literature shows that age has contradictory results in relation to sustainable behaviour [83–85]. In our case, we have to remind the novelty of this hypothetical tomato, and elder consumers may not be willing to pay an extra for unfamiliar products. Young generations are instead more prone to accept new or innovative ideas [86].

The coefficient for income is not statistically significant for interest, it is negative and significant for attitude and positive and significant for behaviour. In line with the literature [75,87–89], wealthy consumers are more likely to spend more for a sustainable product, but they are not necessarily well disposed to the idea of this product. This result supports once again the hypothesis of the attitude–behaviour gap.

5. Conclusions and Final Remarks

The purpose of this study is to investigate the existence of a consumer behavioural gap between consumer interest, consumer positive attitude, and consumer willingness to pay a premium price for a hypothetical sustainable tomato. Moreover, this work examines how consumers' preferences for tomato origin, which is a very relevant driver of consumption, influence the behavioural gap. To this purpose, we have formulated two specific assumptions. First, that there exists an interest–attitude–behavioural gap for Italian consumers towards a hypothetical, environmentally sustainable tomato (H1). Then, that the more important the preference for origin, the wider the interest–attitude–behaviour gap will be (H2).

As for the first hypothesis, the results of this analysis show that consumers' interest positively influences attitude but not the price-driven behaviour. It follows that a consumer interested in environmental sustainability does not automatically make green consumption choices, a fact which supports the existence of a behavioural gap. Furthermore, positive attitude has a stronger impact on interest than on willingness to pay: this fact highlights how the causal relation between attitude and behaviour is rather weak.

With regards to the second hypothesis, and in line with the literature on the origin of food products, we also investigate which possible interpretation prevails whenever consumers face a hypothetical and environmentally sustainable tomato. Since the preliminary evidence emerged during two focus groups revealed that origin is the most important attribute for Italian tomato consumers, which goes beyond any environmental sustainability concern, we envisaged this second hypothesis, according to which hedonistic forces should prevail over "altruistic/environmental" forces with regards to the consumption of a hypothetical product. The regression results prove the validity of this second assumption, that is "The more important the origin, the wider the interest–attitude–behaviour gap will be". Indeed, the coefficient for origin is positive and significant only for interest, whereas it is negative and significant for attitude and willingness to pay. It follows that

those consumers that care more about product origin are also less inclined to accept and to pay for the hypothetical tomato. Hence, we conclude that, in our study, the origin attribute can be depicted as a hedonistic trait.

Moreover, this work offers some interesting insights on the analysis of traditional products consumption. Overall, the sets of independent variables have a different impact on consumers' involvement during the consumption process. Specifically, drivers of consumption affect interest, attitude and consumer behaviour in different ways. Traditional drivers (convenience, tradition and price) are not significant for interest, but they do increase consumer attitude toward the hypothetical tomato, and reduce consumer behaviour, in terms of their willingness to consume and pay. These different directions lead us to conclude that a traditional/conventional consumer is not completely prepared and willing to pay more for a sustainable food product. Knowledge of desertification issues and of the environmental impact of tomato cultivation are not sufficient to make consumers prone to the hypothetical tomato, and not significant for the price factor.

Considering that the European research framework is not limited to tomatoes, but it is being extended to other resilient crops, it is necessary to accompany and support such initiatives with a substantial information campaign addressed to consumers. The huge efforts that international and national institutions are pursuing to counteract the negative effects of climate change cannot be achieved without the appropriate involvement of end users, as anticipated by [90], both from a cultural point of view, according to the principles of a healthy and sustainable diet, and from an economic point of view, in order to ensure sustainable products at affordable and/or unchanged market prices.

Moreover, in the medium and long-run, the European Union should conceive climate change adaptation actions targeting the use of Common Agricultural Policy 2021–2027 resources supporting the agricultural production of more green and resilient varieties, sponsoring also the adoption of a specific label. In this way, even though the yield of crop production is reduced, farmers would be oriented to the green varieties. The policy's direct support to the farmers would indirectly benefit consumers, too.

Despite the promising and interesting conclusions, our analysis is not flawless. First, it omits questions on the frequency of consumption, that may explain and influence consumer behavioural gap. Then, the understanding of consumer behaviour toward hypothetical consumption goods could be improved with more advanced statistical techniques for willingness to pay, such as stated preference approaches. Nonetheless, we are confident enough that, despite this methodological limitation, our analysis reveals a first insight on the relation between food origin and the behavioural gap, a relation that is worth investigating further.

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