

1 Article

## 2 Consumer perception of the quality of lamb and 3 lamb confit

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10 **Abstract:** The patterns of food consumption in general and those of meat, in particular, are  
11 constantly changing. These changes are due not only to socio-economic and cultural trends that  
12 affect the whole society but also to the specific lifestyles of consumer groups. Due to the importance  
13 of consumer lifestyle, the objectives of this study were i) to identify the profiles of lamb meat  
14 consumers according to their orientation toward convenience, as defined by their eating and  
15 cooking habits; ii) to characterize these profiles according to their socio-economic characteristics and  
16 their preferences regarding the intrinsic and extrinsic quality signals of lamb meat; and iii) to  
17 analyze the willingness to pay for lamb confit. In this study, four types of consumers have been  
18 differentiated according to their lifestyles related to lamb consumption. These groups, due to their  
19 characteristics, could be called "Gourmet", "Disinterested", "Conservative" and "Basic". The Gourmet  
20 group has characteristics that make it especially interesting to market a product such as lamb confit;  
21 however, this group is unaware of this product. Therefore, a possible strategy to expand the  
22 commercialization of light lamb and the confit product would be guided marketing to this niche  
23 market.

24 **Keywords:** cluster; intrinsic; extrinsic; oil; meat confit; lamb  
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### 26 1. Introduction

27 The patterns of food consumption, in general, and those of meat, in particular, are constantly  
28 changing. These changes are due not only to socio-economic and cultural trends that affect the whole  
29 society but also to the specific lifestyles of consumer groups, which are increasingly diversified.  
30 Lifestyle defines the activities of people in terms of how they spend their time, their interests, their  
31 opinions and their views of themselves and the world around them [1], and this makes the consumer  
32 respond differently to everyday stimuli such as consumption. In the field of food marketing research,  
33 Brunsø and Grunert [2] established as a methodological framework the food related lifestyle (FRL)  
34 as a mediator between consumer values and their behavior. In this framework, a FRL is composed of  
35 five elements or interrelated aspects: how to make purchases, quality aspects for the evaluation of  
36 food products, cooking methods, consumption situations and the reasons for purchase [3]. Bernués,  
37 *et al.* [4] used the methodology of FRL to perform a consumer segmentation regarding fresh lamb  
38 meat as convenience food. These convenience foods are increasingly demanded due to the greater  
39 incorporation of women into the labor market, the proliferation of small, single-parent or single-  
40 person families, individualistic and impulsive consumer behavior, and lack of interest or skill in the  
41 kitchen [5]. The four groups of consumers detected were those with a traditional profile, middle-aged  
42 people who like traditional foods and exhibit great concern for the intrinsic quality attributes of lamb;  
43 people little involved with food but who are aware of its importance and its relationship with health  
44 and who are concerned that lamb is easy to cook; the adventurers, with a very open attitude regarding  
45 innovation in their diet and a lot of interest in both intrinsic and extrinsic quality of lamb; and finally,

46 the carefree, who are not interested in anything related to food and who are not interested in any  
47 particular characteristic of lamb [5]. However, these authors did not conduct any study regarding  
48 lamb products with a clear orientation toward convenience purchases, as is the case of light lamb  
49 confit and meat that is ready to be consumed after brief and minimal handling. Traditionally, the  
50 process of confit is applied to fruits and other products that are cooked in a syrup at low temperature  
51 over long cooking times. In recent years, the concept of confit has been extended to cooking in oil at  
52 low temperature for long periods, unlike frying, which involves cooking at high oil temperatures for  
53 a very short time. An internationally known example is duck confit, in which duck meat confits in its  
54 own fat. Light lamb confit is prepared in olive oil at low temperature and is presented as canned in  
55 oil. With the production of light lamb confit, which is currently not on the market, the breeders of  
56 light lamb would diversify the production and overcome seasonality in the sale of lamb. The  
57 diversification of lamb products are interesting due to the constant decrease of fresh lamb in Spain,  
58 especially in Aragón [6]. Aragón is an utmost region in the light lamb production and that decrease  
59 of meat from light lam consumption is quite harmful. In addition, Ojinegra de Teruel breed is one of  
60 the important breeds raised in Aragón. This breed had an early deposition of fat [7] which difficult  
61 the commercialization as fresh meat

62 Light lamb confit has a flavor somewhat different from lamb cooked by other means and is a  
63 product that must simply be heated before serving. As the characteristic flavor of lamb and the  
64 difficulty of cooking it are two of the factors that have caused the consumption of lamb to decrease  
65 in Spain [8], it is possible that this presentation of light lamb confit, canned with oil, will increase  
66 consumption. Currently, the convenience of cooking and consumption is increasingly perceived as a  
67 key factor in the marketing of any meat product and, especially for light lamb meat, is closely linked  
68 to the manners in which it is cooked and consumed. Therefore, it can be deduced that the future  
69 consumption of light lamb meat, or its subsequent replacement by other meats, will depend to a great  
70 extent on these two elements: the manners in which it is cooked and consumed. Therefore, the present  
71 study has focused on these two aspects to establish consumer orientation toward convenience. This  
72 approach is consistent with the "supply, perception and demand for quality" model of food  
73 established by [3,4] for the segmentation of consumers.

74 The objectives of this study were i) to identify the profiles of light lamb meat consumers  
75 according to their orientation toward convenience, as defined by their eating and cooking habits; ii)  
76 to characterize these profiles according to their socio-economic characteristics and their preferences  
77 regarding the intrinsic and extrinsic quality cues of light lamb meat; and iii) to analyze the willingness  
78 to pay for light lamb confit.

## 79 2. Materials and Methods

80 An online survey was conducted using forms from Google, Inc. (California, USA) during the  
81 months of May and June 2014. The geographical scope of the survey was restricted to Spain, ruling  
82 out the responses of consumers from other countries. This study was conducted according to the  
83 Declaration of Helsinki for studies on human subjects.

84 The survey consisted of four blocks (Table 1): A) socio-demographic variables (sex, age, level of  
85 income per capita, level of schooling, etc.); B) variables related to lifestyle, specifically regarding  
86 habits related to eating and cooking; C) the importance of extrinsic quality attributes of lamb meat;  
87 and D) the importance of the intrinsic quality attributes of lamb meat at the time of purchase, scored  
88 according to a 4-point Likert-type scale (1: not at all important; 2: not very important; 3: fairly  
89 important; 4: very important). For the statements in B) and C), the respondent had to express his/her  
90 degree of agreement or disagreement on a 4-point Likert-type scale (1: strongly disagree; 2: disagree;  
91 3: agree; 4: strongly agree).

92

93  
94**Table 1.** Questionnaire about consumer habits when cooking and eating and the importance of extrinsic and intrinsic attributes of lamb meat.

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**B) Habits of the consumer at the time of cooking and eating<sup>1</sup>**

I like to cook

I like foreign food

At home, we prefer informal dinners

I like going to restaurants with friends and family

At home, everyone cooks

I spend a lot of time cooking

I like to eat

I like changes in food

Planning food is important for family nutrition

Traditional recipes are best

**C) Importance of extrinsic quality attributes of lamb<sup>1</sup>**

Lamb meat with a mark of quality is better

Lamb is easy to cook

The best lamb is grass-fed

The Ojinegra de Teruel breed is better than others

The price of lamb is very important

The lamb from Aragon is better than others

Organic lamb is better than others

The best lamb is fed cereals

**D) Importance of the intrinsic quality attributes of lamb meat at the time of purchase<sup>2</sup>**

Appearance of freshness

Lamb category

Light lamb category

Light colored meat

Age

Breed

Low fat

**E) Other issues related to lifestyles**Are you vegetarian? <sup>3</sup>Do you have any food restrictions for your religion? <sup>3</sup>Would you like to lose weight? <sup>3</sup>Is your cholesterol level high? <sup>3</sup>Do you live in a city? <sup>3</sup>Have you heard about the Ojinegra de Teruel breed? <sup>3</sup>Have you heard about lamb confit? <sup>3</sup>Have you ever eaten lamb confit? <sup>3</sup>If you have eaten lamb confit, where did you eat it? <sup>4</sup>How much would you be willing to pay for a can for four people of lamb confit preserved in ... <sup>5</sup>- Extra virgin olive oil

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- Olive oil

- Sunflower oil

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95 <sup>1</sup> 4-point Likert scale, Strongly disagree, Disagree, Agree and Strongly agree.

96 <sup>2</sup> 4-point Likert-type scale, Not important, A little important, Quite important, Very important.

97 <sup>3</sup> Yes/No

98 <sup>4</sup> I cooked it myself, In a restaurant, I bought it made, Other answer

99 <sup>5</sup> Less than 10 euros, Between 10 and 15 euros, More than 15 euros

100

101 In addition to the questions related to the place of residence and health (“Would you like to lose  
102 weight?” and “Is your cholesterol level high?”), respondents were asked about the price they would  
103 be willing to pay for a can of light lamb confit for four people that was preserved in three different  
104 types of oil (extra virgin olive, virgin olive or sunflower oil). The options were as follows: less than  
105 10 euros, between 10 and 15 euros and more than 15 euros. In the absence of such a product on the  
106 market, these proposed prices are based on confit meats of other types of lamb and other meats in  
107 general. Due to not having a closed interval as a price reference, the lower and upper ends were left  
108 open.

109 Except for the variable Age, which was continuous, all the questions in the survey were closed  
110 and of an ordinal type (blocks B, C and D) or nominal.

111 Once the survey was available online, the access link was disseminated via email to both  
112 individuals and institutions and groups (housewives, consumers, cultural associations, etc.). Social  
113 networks such as Facebook, Twitter and personal blogs were also used. At the end of the two-month  
114 duration of the survey period, 659 surveys had been collected, of which 200 surveys were complete  
115 and corresponded to Spanish consumers.

116 The study of the consumer sample was performed by means of relative frequencies. The analysis  
117 of the variables was performed using the  $\chi^2$  test, taking a probability less than 0.10 as significant.  
118 When one of the cells had a frequency less than five, which makes the use of the  $\chi^2$  statistic  
119 unadvisable, the likelihood ratio statistic was used at the same probability level. To interpret the  
120 pattern of association between the variables studied, the corrected standardized residual between the  
121 observed and expected cases within each cell greater than  $|1.96|$  was considered. The corresponding  
122 percentage associated with these residuals is specified in bold in the tables.

123 To group consumers into homogeneous groups (clusters or conglomerates), hierarchical cluster  
124 analysis was performed using the Ward method. In this analysis, the variables of the B blocks were  
125 included, following the theoretical framework of FRL proposed by Brunsø and Grunert [2] and  
126 developed by Grunert [9]. The number of clusters or groups of consumers by affinity of their chosen  
127 responses was a compromise solution using Ward's distance from the dendrogram that would  
128 maximize the distance between one division of the dendrogram and the next, so as to not obtain a  
129 number of clusters too great to be discussed. Subsequently, the relationships between the different  
130 groups were analyzed using the test  $\chi^2$  test or the likelihood ratio under the conditions discussed  
131 above.

### 132 3. Results

#### 133 3.1. Characterization of the sample

134 The data for the general sample are presented in Tables 2 through 6. The sample (Table 2) had  
135 5% more women, and there was a bias in the level of studies because 50% of the respondents had  
136 university studies. Regarding the level of income per capita, less than 25% earned less than  
137 €1,000/month, and the rest of the sample had income distributed similarly among the three upper  
138 strata. Although the survey was initially disseminated throughout Spain and responses were even  
139 received from other countries, by not requesting the region of origin of the applicant, we cannot  
140 confirm a geographical bias within Spain.

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**Table 2.** Socio-demographic characteristics of the general sample and by consumer group.

	CL1	CL2	CL3	CL4	Total	$\chi^2$	P
Respondents/Percentage of respondents	82/41%	4/2%	66/33%	48/24%	200		
Sex						6.19	t
Man	41.8	<b>0.0</b>	49.2	<b>59.1</b>	47.6		
Woman	58.2	<b>100.0</b>	50.8	<b>40.9</b>	52.4		
Level of schooling						50.87	***
None	0.0	<b>33.0</b>	1.6	0.0	1.1		
Primary	0.0	0.0	0.0	2.3	0.5		
Secondary	1.3	<b>33.3</b>	3.3	4.5	3.2		
High School	19.0	0.0	21.3	20.5	19.8		
Vocational training	19.0	0.0	26.2	34.1	24.6		
University students	<b>60.8</b>	33.3	47.5	38.6	50.8		
Is vegetarian	0.0	<b>33.3</b>	1.6	0.0	1.1	31.03	***
Income per capita						17.14	ns
<600 €/month	15.6	<b>33.3</b>	5.4	12.2	11.9		
600-1000 €/month	9.1	<b>33.3</b>	12.5	22.0	13.6		
1000-1500 €/month	27.3	<b>33.3</b>	23.2	12.2	22.6		
1500-2000 €/month	24.7	<b>0.0</b>	23.2	31.7	25.4		
> 2000 €/month	23.4	<b>0.0</b>	35.7	22.6	26.6		
Religious food restrictions	2.5	<b>33.3</b>	1.6	2.3	2.7	11.12	*

143 ns, P>0.10; t, P<0.10; \*, P<0.05; \*\*, P<0.01; \*\*\*, P<0.001.

144 Cells in bold had the corrected standardized residual between the observed and expected cases within each cell greater than  
145 |1.96|.

146 We found that 1.1% of respondents defined themselves as vegetarians (Table 3) and 2.7% held  
147 religious beliefs with certain types of food restrictions. Approximately one-third of the sample knew  
148 of the Ojinegra de Teruel breed and lamb confit. A large percentage (70.9%) did not know whether  
149 they had ever eaten confit, and 12.5% had never tasted it. Only 16.6% answered that they knew of it,  
150 of which 72.7% knew it because they had eaten it in a restaurant (Table 3).

151

**Table 3.** Other questions related to lifestyle.

	CL1	CL2	CL3	CL4	Total	$\chi^2$	P
Respondents/Percentage of respondents	82/41%	4/2%	66/33%	48/24%	200		
Are you Vegetarian? <sup>1</sup>	0.0	<b>33.3</b>	1.6	0.0	1.1	8.11	*
Do you have any food restrictions for your religion? <sup>1</sup>	2.5	33.3	1.6	2.3	2.7	3.86	ns
Would you like to lose weight? <sup>1</sup>	67.1	66.7	76.7	65.9	69.8	2.00	ns
Is your cholesterol level high? <sup>1</sup>	21.5	66.7	26.2	22.7	24.1	2.91	ns
Do you live in a city? <sup>1</sup>	81.0	100.0	82.0	77.3	79.4	1.67	ns
Have you heard of the Ojinegra de Teruel breed?	41.8	66.7	21.7	31.8	34.2	7.83	t
Have you heard of lamb confit? <sup>1</sup>	27.8	33.3	24.6	31.8	29.1	0.71	ns
Have you ever eaten lamb confit? <sup>1,2</sup>	54.5	100.0	46.7	71.4	16.6	3.06	ns
Where did you eat it? <sup>3</sup>							

I cooked it myself	30.0	0.0	0.0	0.0	16.0	10.14	ns
In a restaurant	66.7	100.0	85.7	90.0	72.7		
I bought it made	0.0	0.0	14.3	10.0	6.1		
Other answers	13.3	0.0	0.0	0.0	15.2		

152 <sup>1</sup> Percentage of affirmative responses

153 <sup>2</sup> The percentage of Do not know/No answer was 70.9%

154 <sup>3</sup> Percentage of respondents who claimed to have eaten lamb confit

155 Cells in bold had the corrected standardized residual between the observed and expected cases within each cell greater than  
156 |1.96|.

157

158 Table 4 presents the degree of agreement with statements that define consumer lifestyle. Most  
159 respondents like to eat (96.8%), eat foreign food (72.8%), and prefer informal dinners (70.5%) and  
160 variety in food (74.4%), showing great interest in food and an open attitude to different foods and  
161 variety. There is a great agreement (greater than 93%) in terms of both the preference to eat at  
162 restaurants with friends and family and the importance of dietary planning for family nutrition.

163 **Table 4.** Habits of the consumer at the time of cooking and eating for the general sample and by  
164 groups of consumers.

	CL1	CL2	CL3	CL4	Total	$\chi^2$	P
Respondents/Percentage of respondents	82/41%	4/2%	66/33%	48/24%	200		
I like to cook						118.81	ns
Strongly disagree	0.0	66.7	14.8	2.3	6.4		
Disagree	1.3	33.3	47.5	0.0	16.6		
Agree	49.4	0.0	37.7	61.4	47.6		
Strongly agree	49.4	0.0	0.0	36.4	29.4		
I like foreign food						43.95	***
Strongly disagree	0.0	<b>33.3</b>	6.6	6.8	4.0		
Disagree	<b>5.1</b>	66.7	<b>37.7</b>	31.8	23.0		
Agree	<b>65.8</b>	0.0	<b>42.6</b>	50.0	53.5		
Strongly agree	<b>29.1</b>	0.0	13.1	11.4	19.3		
At home, we prefer informal dinners						49.45	***
Strongly disagree	8.9	<b>100.0</b>	<b>1.6</b>	9.1	8.0		
Disagree	20.3	0.0	13.1	<b>36.4</b>	21.4		
Agree	54.4	0.0	62.3	47.7	54.5		
Strongly agree	1.0	0.0	23.0	6.8	16.0		
I like going to restaurants with friends and family						132.77	***
Strongly disagree	0.0	<b>66.7</b>	0.0	0.0	1.1		
Disagree	3.8	<b>33.3</b>	4.9	6.8	5.3		
Agree	48.1	0.0	57.4	43.2	49.2		
Strongly agree	48.1	0.0	37.7	50.0	44.4		
At home, everyone cooks						48.36	***
Strongly disagree	<b>8.9</b>	<b>33.3</b>	32.8	<b>6.8</b>	16.6		
Disagree	<b>20.3</b>	<b>66.7</b>	42.6	43.2	33.7		

Agree	43.0	<b>0.0</b>	<b>19.7</b>	45.5	35.3	
Strongly agree	27.8	<b>0.0</b>	<b>4.9</b>	<b>4.5</b>	14.4	
I spend a lot of time cooking						72.17 ***
Strongly disagree	<b>2.5</b>	0.0	<b>29.5</b>	1.7	11.8	
Disagree	<b>20.3</b>	0.0	<b>59.0</b>	38.6	36.9	
Agree	<b>55.7</b>	66.7	<b>8.2</b>	47.7	38.5	
Strongly agree	<b>21.5</b>	33.3	<b>3.3</b>	9.1	12.8	
I like to eat						143.40 ***
Strongly disagree	1.3	<b>100.0</b>	0.0	2.3	2.7	
Disagree	0.0	0.0	1.6	0.0	0.5	
Agree	<b>26.6</b>	0.0	<b>72.1</b>	47.7	46.0	
Strongly agree	<b>72.2</b>	0.0	<b>26.2</b>	50.0	50.8	
I like changes in food						73.34 ***
Strongly disagree	<b>0.0</b>	0.0	6.6	<b>11.4</b>	4.8	
Disagree	<b>3.8</b>	0.0	19.7	<b>54.5</b>	20.9	
Agree	43.0	33.3	54.1	31.8	43.9	
Strongly agree	<b>53.2</b>	66.7	19.7	<b>2.3</b>	30.5	
Planning meals is important for family nutrition						62.06 ***
Strongly disagree	2.5	<b>66.7</b>	1.6	0.0	2.7	
Disagree	1.3	<b>33.3</b>	3.3	2.3	2.7	
Agree	39.2	0.0	39.3	34.1	37.4	
Strongly agree	57.0	0.0	55.7	63.6	57.2	
Traditional recipes are best						77.19 ***
Strongly disagree	6.3	<b>66.7</b>	9.8	<b>0.0</b>	7.0	
Disagree	<b>51.9</b>	33.3	<b>54.1</b>	<b>11.4</b>	42.8	
Agree	41.8	0.0	<b>27.9</b>	47.7	38.0	
Strongly agree	<b>0.0</b>	0.0	8.2	<b>40.9</b>	12.3	

165 ns, P>0.10; t, P<0.10; \*, P<0.05; \*\*, P<0.01; \*\*\*, P<0.001.

166 Cells in bold had the corrected standardized residual between the observed and expected cases within each cell greater than  
167 |1.96|.

168

169 Regarding extrinsic quality attributes (Table 5), the respondents agreed or strongly agreed that  
170 lamb meat with some mark of quality is better (78.4%). More than half thought that the lamb of  
171 Aragon (51.9%) or organic lamb (57.5%) is better than others, whereas only 32.1% agreed that the  
172 Ojinegra de Teruel breed is better than others; 70.4% believe that grass-fed lamb is better, whereas  
173 29.9% think that cereal-fed lamb is best. The price of lamb is very important for 80.1% of respondents,  
174 and 68.7% think that lamb is easy to cook.

175

**Table 5.** Importance of the extrinsic attributes of lamb quality.

	CL1	CL2	CL3	CL4	Total	$\chi^2$	P
Respondents/Percentage of respondents	82/41%	4/2%	66/33%	48/24%	200		
Lamb meat with a mark of quality is better						15,88	t
Strongly disagree	3.8	33.3	5.0	2.3	4.3		
Disagree	25.3	0.0	11.7	11.6	17.3		

Agree	54.4	66.7	70.0	60.5	61.1		
Strongly agree	16.5	0.0	13.3	25.6	17.3		
Lamb is easy to cook						48.19	*
Strongly disagree	<b>1.3</b>	<b>100</b>	8.3	2.3	4.9		
Disagree	29.1	0	28.3	20.5	26.5		
Agree	55.7	0	50	50	51.9		
Strongly agree	13.9	0	13.3	<b>27.3</b>	16.8		
The best lamb is grass-fed						10.58	ns
Strongly disagree	7.6	33.3	5.0	2.3	5.9		
Disagree	20.3	66.7	23.3	27.3	23.7		
Agree	48.1	0.0	48.3	50.0	47.8		
Strongly agree	24.1	0.0	23.3	20.5	22.6		
The Ojinegra de Teruel breed is better than others						13.85	ns
Strongly disagree	8.9	33.3	10.9	9.8	10.1		
Disagree	65.8	33.3	56.4	46.3	57.9		
Agree	22.8	0.0	29.1	34.1	27.0		
Strongly agree	2.5	33.3	3.6	9.8	5.1		
The price of lamb is very important						25.20	**
Strongly disagree	1.3	<b>33.3</b>	1.6	2.3	2.2		
Disagree	17.7	33.3	24.6	7.0	17.7		
Agree	55.7	<b>0.0</b>	54.1	76.7	59.1		
Strongly agree	25.3	33.3	19.7	14.0	21.0		
The lamb from Aragon is better than others						14.550	ns
Strongly disagree	2.5	0.0	5.3	4.7	3.9		
Disagree	51.9	0.0	47.4	27.9	44.2		
Agree	25.3	50.0	36.8	37.2	32.0		
Strongly agree	20.3	50.0	10.5	30.2	19.9		
Organic lamb is better than others						7.72	ns
Strongly disagree	11.4	33.3	16.7	4.5	11.8		
Disagree	30.4	33.3	23.3	40.9	30.6		
Agree	43.0	33.3	46.7	40.9	43.5		
Strongly agree	15.2	0.0	13.3	13.6	14.0		
The best lamb is fed cereals						9.52	ns
Strongly disagree	11.4	33.3	6.8	11.6	10.3		
Disagree	60.8	0.0	67.8	51.2	59.8		
Agree	25.3	66.7	20.3	32.6	26.1		
Strongly agree	2.5	0.0	5.1	4.7	3.8		

176 ns, P>0.10; t, P<0.10; \*, P<0.05; \*\*, P<0.01; \*\*\*, P<0.001.

177 Cells in bold had the corrected standardized residual between the observed and expected cases within each cell greater than  
178 |1.96|.

179

180 The importance given to the intrinsic attributes of lamb at the time of purchase is listed in Table  
 181 6. The attributes valued as the most important were freshness (95.2%), age (84.5%), low fat content  
 182 (70.4%) and categorized as light lamb (67.2%). However, 58% of the respondents gave importance to  
 183 the lamb category, 50.8% preferred lamb to have light-colored meat, and only 38.5% rated the breed  
 184 as quite or very important at the moment of purchase.

185 **Table 6.** Importance of the intrinsic quality attributes of lamb meat at the time of purchase.

	CL1	CL2	CL3	CL4	Total	$\chi^2$	P
Respondents/Percentage of respondents	82/41%	4/2%	66/33%	48/24%	200		
Appearance of freshness						64.06	***
Nothing	0.0	33.3	0.0	0.0	0.5		
Little bit	2.5	0.0	6.6	4.5	4.3		
Quite	29.1	33.3	34.4	29.5	31.0		
A lot	68.4	33.3	59.0	65.9	64.2		
Lamb category						10.11	ns
Nothing	13.9	33.3	8.3	6.8	10.8		
Little bit	29.1	0.0	30.0	38.6	31.2		
Quite	34.2	66.7	46.7	29.5	37.6		
A lot	22.8	0.0	15.0	25.0	20.4		
Light lamb category						6.99	ns
Nothing	8.9	33.3	5.0	4.5	7.0		
Little bit	27.8	0.0	28.3	20.5	25.8		
Quite	41.8	33.3	48.3	50.0	45.7		
A lot	21.5	33.3	18.3	25.0	21.5		
Light colored meat						14.03	ns
Nothing	6.3	33.3	1.7	7.0	5.4		
Little bit	44.3	0.0	50.0	37.2	43.8		
Quite	38.0	33.3	41.7	34.9	38.4		
A lot	11.4	33.3	6.7	20.9	12.4		
Age						14.48	ns
Nothing	3.8	33.3	0.0	2.3	2.7		
Little bit	11.4	0.0	13.1	15.9	12.8		
Quite	48.1	33.3	47.5	38.6	45.5		
A lot	36.7	33.3	39.3	43.2	39.0		
Breed						18.82	*
Nothing	11.4	33.3	1.6	6.8	7.5		
Little bit	62.0	0.0	52.5	45.5	54.0		
Quite	16.5	33.3	36.1	38.6	28.3		
A lot	10.1	33.3	9.8	9.1	10.2		
Low fat						11.78	ns
Nothing	5.1	33.3	1.7	2.3	3.8		
Little bit	22.8	0.0	31.7	25.0	25.8		
Quite	51.9	33.3	45.0	56.8	50.5		

A lot	20.3	33.3	21.7	15.9	19.9
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186 ns,  $P > 0.10$ ; t,  $P < 0.10$ ; \*,  $P < 0.05$ ; \*\*,  $P < 0.01$ ; \*\*\*,  $P < 0.001$ .

187 Cells in bold had the corrected standardized residual between the observed and expected cases within each cell greater than  
188 |1.96|.

189

### 190 3.2. Types of consumers

191 Once the general sample was characterized, 4 types of consumers were identified based on their  
192 lifestyle related to their cooking and eating habits (Table 2). The first group (CL1) included 82  
193 respondents (41%), group 3 (CL3) included 66 respondents (33%), and group 4 (CL4) accounted for  
194 48 respondents (24%); the second group (CL2) was the minority, representing only 2% of the sample  
195 population including 4 respondents. The different groups of consumers did not differ in terms of  
196 level of income or place of residence ( $P > 0.10$ ).

197 Socio-demographic characteristics and lifestyles related to cooking and eating are presented in  
198 Tables 2 and 3, respectively. CL1 was made up of both women and men, most of them with university  
199 education. This group was distinct because the percentage of respondents who knew of the Ojinegra  
200 de Teruel breed was higher than the general average. In terms of their lifestyle, this group is  
201 consumers who love cooking and eating, they live in homes in which everyone cooks, and they spend  
202 a lot of time cooking. In addition, they like foreign recipes and variety, and accordingly, they do not  
203 believe that lifelong recipes are better. Regarding the importance given to the extrinsic attributes of  
204 the quality of lamb meat, this group of consumers exhibited greater disagreement than the general  
205 sample regarding which lamb meat with a mark of quality is better, and few strongly disagreed with  
206 the ease of cooking lamb. Although this group knew of the Ojinegra de Teruel breed, it did not have  
207 a different perception from the other groups regarding this breed having better quality. This response  
208 was in accordance with the fact that breed, as an intrinsic attribute of quality, seems to be an  
209 unimportant factor.

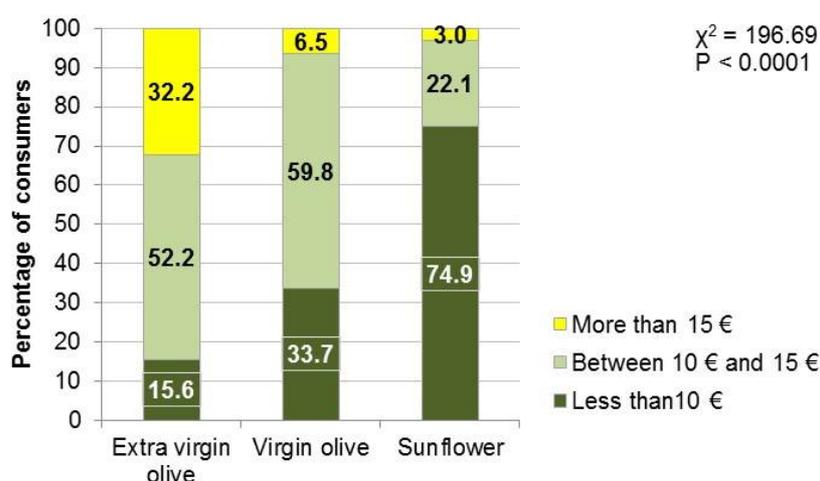
210 CL2 is a minority group, but it has a lifestyle very different from the other groups of consumers;  
211 it is formed by women with secondary education or without formal education. One-third of the  
212 consumers in this group are vegetarians, and another third have food restrictions because of their  
213 religious beliefs. Consumers belonging to this group have a clear disinterest in everything related to  
214 cooking and food habits. They do not like foreign food, but they do not think that traditional food  
215 recipes are better than modern recipes. They also stand out because they do not like dinners, and they  
216 do not cook at home. Compared to the general sample, a significantly greater fraction of this group  
217 strongly disagreed that branded lamb is better. All the respondents in this group disagreed strongly  
218 with the statement that lamb is easy to cook and that the price of lamb is important. They also  
219 considered the appearance of freshness, the age of the lamb and the light color of the meat as  
220 significant characteristics.

221 The third group (CL3) does not like to cook or devote time to cooking, but almost everyone likes  
222 to eat; at home, not everyone cooks equally. They do not prefer foreign food because they think that  
223 lifelong recipes are best. This group declared mostly not knowing of the Ojinegra de Teruel breed.  
224 This group does not stand out from the general sample in terms of the importance assigned to quality  
225 attributes, both intrinsic and extrinsic.

226 CL4 had a higher proportion of men than the other groups. They like to cook but without making  
227 changes, and 88.6% agree or strongly agree that traditional recipes are best. This group of consumers  
228 also do not like informal dinners. A total of 27.3% of these consumers agreed that lamb meat is easy  
229 to cook. Additionally, those that think that price is very important predominate, and there are fewer  
230 that disagree with the lamb from Aragon being better than the rest. This group assigned high  
231 importance to light-colored meat, although they do not assign more importance to the category (lamb  
232 or light lamb) than the other groups or the sample.

### 233 3.3. Willingness to pay

234 There was no relationship between the consumer group and the willingness to pay for lamb  
 235 confit in any type of oil. Of the general sample, almost 32% would pay more than € 15 for a can of  
 236 lamb confit preserved in extra virgin olive oil, and 52% would pay between € 10 and € 15 (Figure 1).  
 237 The remaining 15.6% would only pay less than € 10. The level of studies, income, sex and all other  
 238 socio-demographic questions did not have a significant relationship with the willingness to pay for  
 239 lamb confit ( $P > 0.05$ ) (data not shown). A significant relationship was found ( $P = 0.0362$ ) between  
 240 consumers with high cholesterol and their willingness to pay. A total of 64.6% of consumers willing  
 241 to pay between 10 and 15 € and 6.3% of those willing to pay less than € 10 had high cholesterol.  
 242 Consumers who would pay more than € 15 would do so regardless of whether they had high  
 243 cholesterol. Consumers who previously knew of lamb confit had a greater willingness (44.4%) to pay  
 244 more than € 15 for lamb confit ( $P = 0.052$ ).



245

246

**Figure 1.** Willingness to pay depending on the type of oil used in the lamb confit.

247 Regarding questions related to consumer habits when cooking and eating, only the frequency  
 248 with which the consumer eats outside the home ( $P < 0.011$ ) and how important it is to plan meals for  
 249 family nutrition ( $P < 0.062$ ) affected willingness to pay. Consumers who eat away from home were  
 250 less willing to pay for lamb confit. Regarding food planning, consumers who agree more about the  
 251 importance of planning are more willing to pay. In fact, 67.2% of consumers who would pay more  
 252 than € 15 strongly agree about the importance of planning.

253 The importance assigned by the consumers to most extrinsic quality attributes did not determine  
 254 the price that he or she would be willing to pay. It did affect the price that would be paid for the lamb  
 255 to be of Aragonese origin ( $P < 0.01$ ) and for organic lamb ( $P < 0.01$ ); therefore, consumers who do not  
 256 consider these two attributes important tend to be those who would pay less than € 10 for the lamb  
 257 confit. Consumers who value as important that the lamb they eat is categorized as light lamb ( $P =$   
 258  $0.017$ ) are willing to pay more than € 15, whereas consumers who do not give importance to this  
 259 categorization are only willing to pay up to € 10.

#### 260 4. Discussion

261 According to Cotes [10], the multiple factors that affect the consumption decisions of an  
 262 individual can be grouped based on his or her demographic characteristics. However, as seen in the  
 263 results of this work, the behavior of the food consumer does not differ so much based on socio-  
 264 demographic characteristics, but it does depend on their lifestyles [11]. The so-called psychographic  
 265 characteristics include all the perceptions or beliefs of the individual, such as beliefs regarding the  
 266 quality of a brand and propensity to value natural products. Thus, the opinion that each consumer  
 267 has about the nutritional characteristics or the composition of a product or its safety, brand or price  
 268 modify decisions at the time of purchase and even the degree of pleasure when it is consumed [12].

269 In short, consumers relate a group of products to a group of values through a system based on  
270 cognitive categories and actions that are embodied in a lifestyle [2].

#### 271 *4.1. Types of consumers*

272 It is possible to define numerous consumer groups; however, when these are framed regarding  
273 the lifestyle related to lamb consumption, the number of consumer segments in Spain is usually  
274 between three and five [4,13]. Although there are methodological differences in studies, the present  
275 work highlights the existence of four groups of differentiated consumers. These groups, due to their  
276 characteristics, could be called "Gourmet" (CL1), "Disinterested" (CL2), "Conservative" (CL3) and  
277 "Basic" (CL4). When Bredahl and Grunert [14] studied food lifestyles in Spain, they found five  
278 segments of consumers. The "Conservative" and "Uninvolved" segments of Bredahl and Grunert [14]  
279 are homologous to those found in this work and are called "Conservative" and "Disinterested",  
280 respectively. Consumers in the Conservative group like to cook but without making changes or  
281 innovations in the kitchen, which agrees with their opinion that traditional recipes are best. Another  
282 segment that the previous authors [4,14] called "Adventurers" would coincide with the gourmet  
283 group defined in this work, in that they are very fond of cooking, they use new recipes, and the whole  
284 family participates in culinary tasks. The segment called "Rational" by Bredahl and Grunert [14]  
285 would be comparable in many of its facets with our "Basic" segment. However, in the case of  
286 "Rational", the social role of food is particularly important, whereas for the "Basic" group, this facet is  
287 important but not more so than for other groups. Other studies have also found segments in other  
288 countries partially comparable with our results [15-17]. Of these recurrent segments in the literature,  
289 the one that represents the lowest percentage of the population is the Disinterested, which is formed  
290 mostly by women. Buckley, Cowan and McCarthy [15] found a group comparable to the  
291 Disinterested, consumers who were primarily women who exhibited great individualism in their  
292 style of consumption. They do not plan meals or purchases, tend to consume snacks between meals  
293 and do not easily accept new products. The fact that women declare that they like exotic foods less  
294 agrees with the female gender being positively related to consumer ethnocentrism [18,19]. Thus,  
295 consumers with high ethnocentrism prefer to eat and buy products exclusively known and related to  
296 their culture. The low consumption of meat is generally a feminine phenomenon [20], and women  
297 have a greater number of food restrictions, especially regarding the consumption of red meat [21]. In  
298 fact, in a survey in Norway and Sweden, 72.5% of people who consumed little meat were women  
299 [22].

#### 300 *4.2. Importance of intrinsic and extrinsic attributes*

301 Regarding the importance of the attributes of fresh meat, among the most important according  
302 to the results of this study and others are low fat content, freshness and a defined brand or category  
303 [4,23,24], all of which are assessed visually. In contrast, breed and organic production are the least  
304 valued [4]. Low fat content is an important attribute for all consumers without differences between  
305 segments [4]. However, meat with a mark of quality, such as Denomination of Origin or Protected  
306 Geographical Indication, can be highly valued or valued very little depending on the consumer group  
307 [4], as observed in the present study. The region of origin of the product determines the importance  
308 given to some characteristics, even within a certain country. For example, within Spain, consumers  
309 in Castilla and León prefer ovine meat from lamb [25], whereas consumers in Aragon [4,26] prefer  
310 ovine meat categorized as light lamb. Although it has been seen that breed is not one of the important  
311 factors for the consumer, positive value has been given to meat that has been produced in the region  
312 where the consumer lives [3,9,26]. However, in our study, the lamb or light lamb category is  
313 considered important, but it is not considered that the Ternasco de Aragón PGI (light lamb) or the  
314 Ojinegra breed are better than other marks of quality or breeds. As seen in this study, price is a very  
315 important factor in general but also for some groups of consumers more than others. Thus, regular  
316 lamb consumers perceive higher quality due to marks of quality, diet or ecology. All this information  
317 associated with quality makes the price less relevant to the consumer than when there is less  
318 information [27].

### 319 4.3. Willingness to pay

320 The process of perception of quality by consumers consists of two phases: the first is based on  
321 the perception of extrinsic and intrinsic attributes formed at the point of purchase, and the second is  
322 based on the experience formed during the preparation and consumption of the product [28,29]. This  
323 is when the expectations formed during the purchase are confirmed or rejected. These two stages are  
324 less important when a product is unknown (as may be the case of lamb confit because only a small  
325 part of the sample knew of it) or when the consumer does not know whether he or she has tasted it.  
326 In this case, the willingness to pay and even the decision to purchase the unknown product are  
327 probably based largely on the type of consumer. Thus, an "adventurous" consumer may pay more to  
328 try a product that he or she does not know, unlike more conservative or traditional consumers.  
329 However, in the scope of this work, there was no differential behavior between groups of consumers  
330 for willingness to pay for lamb confit. On the other hand, when the consumer is given information  
331 about the quality of the oil used in cooking, which is also a known product, perception of quality and  
332 price are positively related [27]. Moreover, although lamb confit is not a known product, olive oil is  
333 a well-known and traditional Mediterranean product, and prior knowledge of the product is  
334 important when buying food ([30,31]. In addition, the appreciation of the different oils includes  
335 factors that take into account health [28]. The perception of a food as healthy (as is the case of virgin  
336 olive oil), natural, organic or respectful of the environment leads to a greater willingness to pay for  
337 the product [31,32], as can be clearly seen in the results of this study. However, when the consumer  
338 is not willing to pay a certain price, the conclusion is that the product does not have perceived net  
339 value [27], which would be the case of lamb confit preserved in sunflower oil, whose price is limited  
340 to a maximum of € 15.

## 341 5. Conclusions

342 Market segmentation is a necessary requirement to ensure the creation of relationships between  
343 products and consumers. In this study, four types of consumers have been differentiated according  
344 to their lifestyle related to lamb consumption. One of these groups of consumers (gourmet) has  
345 characteristics that make it interesting to market a product such as lamb confit, considering they are  
346 unaware of this product. Therefore, a strategy to expand the commercialization of light lamb and the  
347 confit product would guide marketing to this niche market. To make the product known, a price  
348 strategy could be followed because although price is a clear indicator of perceived quality, when a  
349 consumer buys a product repeatedly, he or she gains experience, and the price has a lower weight as  
350 a key factor for the purchase. In fact, when the buyer is habitual, he or she values other factors, such  
351 as meat with a mark of quality, even though it has a higher cost associated with it. Because there is a  
352 direct relationship between the type of oil used in the processing of lamb confit and willingness to  
353 pay for the product, a range of products can be made based on this oil and the sale price. In the meat  
354 market, there is a range of opportunities that must be exploited with several strategies. In the case of  
355 lamb confit, it may be the promotion of the breed as an extrinsic attribute to transmit a higher-quality  
356 product.

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