

1 Attitudes of meat consumers in Mexico and Spain about farm animal welfare:  
2 A cross-cultural study

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13  
14 **Abstract**

15 The aim of this cross-cultural survey conducted in a developed country (Spain, n=1455) and  
16 an emerging country (Mexico, n=833), was to analyse how meat consumers perceive farm  
17 animal welfare and how these perceptions and attitudes can be convergent or divergent. The  
18 intercultural comparison shows that animal welfare is a convergent value between Mexicans  
19 and Spaniards. However, the importance of animal welfare for consumers varies according  
20 to sociodemographic variables such as gender, rural or urban origin, educational level and  
21 age. The motivations of consumers in both countries to build this convergence around the  
22 overall importance on farm animal welfare are divergent. For Spaniards, animal welfare  
23 seems to be a legal, administrative, and verifiable reality that must be profitable to society.  
24 In contrast, for Mexican consumers, animal welfare is still an aspirational ideal. Despite this,  
25 such divergences may end up building large consensus that are transformed into a stable  
26 added value of the market for meat products.

27 **Keywords:** Meat consumers; Farm animal welfare; Cross-cultural survey; Gender; Spain;  
28 Mexico.

29  
30 **1. Introduction**

31 Animal welfare is a crucial element for the sustainability of the meat industry, and is a term  
32 used to express ethical concerns about the quality of life experienced by animals, particularly  
33 animals that are used by human beings in animal production (Hansen & Østerås, 2019). The

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34 level of animal welfare provided to livestock is directly determined by farm management  
35 practices and pre-slaughter practices and logistics, but those practices are influenced by  
36 consumer attitudes, as expressed in the grocery store, the voting booth, and societal culture  
37 (Bell, Norwood, & Lusk, 2017). However, consumer attitudes about animal welfare are more  
38 diverse than meat supply chain personnel, so it is likely that there is no unified ‘public  
39 opinion’ on animal welfare issues (Busch, Weary, Spiller, & von Keyserlingk, 2017). The  
40 welfare of animals on farms is a heavily debated topic in both society and academic literature  
41 (Mulder & Zomer, 2017). This debate has resulted from the increasing degree of  
42 industrialization in animal production, meat safety concerns, socio-ethical considerations,  
43 animal abuse scandals (especially hidden-camera investigations), human bonds with  
44 companion animals, and also most likely from the increasing knowledge gained about the  
45 physiological and emotional states of animals (Robbins, Franks, Weary, & von Keyserlingk,  
46 2016).

47

48 Farm animal welfare (FAW) has been a topic of public debate in several European countries  
49 since the mid-1960s. More than nine out of ten EU citizens believe it is important to protect  
50 the welfare of farmed animals, and more than half of all European consumers express that  
51 they are prepared to pay more for products sourced from welfare-friendly production systems  
52 (Eurobarometer, 2016; Thorslund, Aaslyng, & Lassen, 2017). In other countries, an  
53 increasing public interest in sustainable, high quality and safe meat can be observed. With  
54 respect to farm animal production, many consumers expect that meat production processes  
55 take into account aspects such as animal welfare and other social and ethical attributes  
56 (Grunert, Sonntag, Glanz-Chanos, & Forum, 2018). Many cultures and religions recognise  
57 animals as sentient beings, which has resulted in practices to restrict meat consumption,  
58 forbidding the consumption of some species of animals or placing a ban on the slaughter and  
59 consumption of animals (Fuseini, & Sulemana, 2018). Buddhists, Muslims, Jews, and Hindus  
60 have strict religious laws governing the protection of the welfare of animals and which  
61 species can be consumed or kept as pets (Jalil et al., 2018). Although other religions may  
62 have laxer norms about the protection of animals or be more utilitarian, mercy towards  
63 animals is a moral constant between religions (Szűcs, Geers, Jezierski, Sossidou, & Broom,  
64 2012). However, growing scientific evidence indicates that the effect of religion on the  
65 treatment of animals is less determinate, while nationality and geographic proximity between  
66 countries can have a major influence on citizens’ attitudes towards animal welfare and rights

67 (Phillips et al., 2012). Differences between nationalities appear to be explained by national  
68 identity, per capita income and by the extent of legislation concerning animal use in the  
69 countries concerned (María, Mazas, Zarza, & Miranda-de la Lama, 2017).

70

71 Mexico and Spain have several cultural, religious, social and even ethnic similarities since  
72 Mexico's colonisation by Castilian monarchy, initiated between the fifteenth and sixteenth  
73 centuries (Pimenta, 2010). Nowadays, Spanish is the official language of most countries in  
74 Spain and Latin America. However, cross-cultural studies - including data from Mexico and  
75 Spain - suggest maintaining the focus of research on the differences amongst countries  
76 (Urien, Osca, & García-Salmones, 2017). There are several possible cross-cultural factors  
77 affecting food choice, such as differences in language, social origin, and attention and  
78 perception to social cues (Risvik, Rødbotten, & Olsen, 2007). An important reason for  
79 carrying out cross-cultural studies is the paucity of published research comparing Spanish-  
80 speaking countries in different contexts, such as between America and Europe. Comparing  
81 perceptions and attitudes of consumers towards FAW across emotional scales and in different  
82 cultural settings can reveal shared insights into the ability to adjust and evolve to socio-ethical  
83 change (María et al., 2017). Thus, exploring variations in what motivates consumers from  
84 different cultural backgrounds is important for national and global corporations in marketing  
85 and positioning their products around the world (Gassler, von Meyer-Höfer, & Spiller, 2016).  
86 Almost 470 million people speak Spanish as their native language, which is the third most  
87 spoken language (based on total number of speakers), after Mandarin and English (DeLapp-  
88 Culver, 2016). However, public knowledge of animal production and how it influences  
89 attitudes about FAW, and consumer behaviour is poorly understood in Spanish-speaking  
90 countries. In this sense, the aim of the present cross-cultural study conducted in a developed  
91 country (Spain) and an emerging country (Mexico), was to analyse how consumers perceive  
92 FAW and how these perceptions and attitudes can be convergent or divergent.

93

## 94 **2. Material and methods**

95 A field survey on consumer perceptions and attitudes towards FAW was conducted using a  
96 questionnaire directed at 2288 consumers of two cities from two countries: Toluca (Mexico;  
97 n=833) and Zaragoza (Spain; n=1455). These medium size cities are representative of their  
98 corresponding country and widely used in food market research, by marketers and consulting  
99 companies since the socio-demographic profile of these cities are considered as a good

100 representation of the respective average Mexican (Miranda-de la Lama et al., 2017; Rojas-  
101 Rivas, & Cuffia, 2020), and Spanish population (María, 2006; Sepúlveda, Maza, Chekmam,  
102 & Mancilla, 2016). Mexico, with a population of 112 million, is the most densely populated  
103 Spanish-speaking country in the world, the second-most in Latin America (after Portuguese-  
104 speaking Brazil), and the second-most in North America, after the United States. Spain has  
105 47 million inhabitants and has the third highest number of Spanish-speakers, being the sixth-  
106 most populated country in Europe, and the fifth in the European Union. Mexico and Spain  
107 are mainly of Catholic religious confession. The study was conducted in accordance with the  
108 ethical principles set out in the Declaration of Helsinki. Participants of the present study were  
109 informed that the data would be confidential and used only for research purposes.

110

### 111 *2.1. Survey and data collection*

112 Quantitative data were collected using a survey conducted with consumer samples from  
113 Mexico (n=843) and Spain (n=1455). The same survey with the same variables was used in  
114 both countries. Although Spanish is the native language in both countries, some  
115 modifications of expressions were made to the survey, adapted to each country, while  
116 maintaining the same meaning. The consumer interviews in each country were conducted  
117 individually at the meat section of the supermarkets (buying context) and took less than ten  
118 minutes to complete. During the first two weeks of sampling, a systematic process (one out  
119 of two) was used to select the persons to be surveyed according to a simple random sampling.  
120 Within the first two weeks we completed 717 surveys in Mexico and 1271 in Spain, but the  
121 sampling was biased in favor of women, which is typical in these types of consumer studies.  
122 In food-related consumer research women normally out-represent men, probably since they  
123 usually purchase the food for the household (Verbeke & Viaene, 1999). To mitigate this bias,  
124 the systematic process was discarded to use stratified sampling with gender as the main  
125 control variable and age, educational level, and origin (rural or urban) as co-variables  
126 (indicator but not control variables). The stratified sample was focused on proportional  
127 fixation by gender according to the census of each country. In this way, a certain  
128 representativeness of the sample was ensured, at least in terms of gender. Assigning p and q  
129 intermediate proportions ( $p = q = 0.5$ ) and for a confidence interval of the results of 95.5%  
130 ( $Z = 2$ ), the maximum error possible was 3.5% for Mexico and 2.6% to Spain. The  
131 characteristics of the sample are presented in Table 1. None of the consumers declared being  
132 vegetarian or vegan. Women were slightly over-sampled in Mexico (55.9%) and Spain

133 (53.5%), even so, these percentages are close to the census data of each country, which  
134 indicates a good representativeness of the sample. Regarding the age ranges, the  
135 representation was almost proportional for all ranges in Spain but not Mexico. This could be  
136 due to the different population pyramids in the two countries. Something similar occurred  
137 with the educational level as well. In Spain there were more respondents with a higher  
138 education than in Mexico. Regarding origin, in both countries the proportion was very  
139 similar.

140

141 The questionnaire used was drawn up following a Likert-type scale animal welfare attitude  
142 assessment model (Mazas & Fernández-Manzanal, 2017). A sample of 84 consumers was  
143 used to validate the scale (Mexico = 39 and Spain = 45). Cronbach's alpha was 0.722 for the  
144 total sample (Mexico = 0.727 and Spain = 0.738). The selected topics were based on a  
145 literature review and covered the whole supply chain, ranging from 'meat quality and  
146 welfare' up to 'consumer acceptance', and including issues related to legislation, traceability,  
147 and labelling, among others. Additionally, the questionnaire included some questions which  
148 were similar to those administered to consumers by the European Food Safety Authority in  
149 the Survey Attitudes of EU citizens towards Animal Welfare (Eurobarometer, 2007). The  
150 survey consisted of 20 questions distributed in two sections. The first section contained 5  
151 questions about the sociodemographic characteristics of the respondent. The second section  
152 had 15 questions about perceptions and attitudes about animal welfare. The questions and  
153 their codification as variables for statistical processing are summarized in Table 2.

154

### 155 *2.3. Statistical analyses and model description*

156 To identify the variables that determined the differences between Mexicans and Spaniards  
157 regarding attitudes towards animal welfare, a binary logistic regression model was carried  
158 out. However, before applying the logistic regression, several bivariate statistical tests were  
159 performed to analyse the relation between the assessment of the importance of animal welfare  
160 (questionnaire first question) and the socio-demographic characteristics of the Mexican and  
161 Spanish respondents. For that, a Mann-Whitney U and a Kruskal Wallis test were used. In  
162 our model,  $P_i$  measured the probability that a respondent was Spanish ( $G_i=1$ ) while  $1-P_i$   
163 measured the probability that a respondent was Mexican ( $G_i=0$ ). Probability  $P_i$  ( $G_i=1$ ) is  
164 defined by:

165

166  $P_i = Prob (G_i=1) = 1/(1-e^{-Z_i}) (1)$

167

168 While the probability of observing  $G_i=0$  would be expressed in the following way:

169  $1-P_i = Prob (G_i=0) = 1 - 1/(1-e^{-Z_i}) (2)$

170

171 Hence, the *Prob* of observing  $G_i=1$  with respect to observing  $G_i=0$ , can be established by  
172 the expression:

173

174  $1/(1-e^{-Z_i})/(1 - 1/(1-e^{-Z_i}))= e^{Z_i} (3)$

175

176 Applying *Ln* in (3) would obtain:

177

178  $Ln(e^{Z_i})=Z_i$

179

180 Where  $Z_i = B_0 + B_1X_{1i} + B_2X_{2i} + \dots + B_jX_{ji}$  that would correspond to the expression of a  
181 multiple linear regression model; where  $B_0$  is the model constant and  $B_j$  is the estimated  
182 parameter for each explanatory variable  $X_j$ . In binary logistic regression, each estimated  $B_j$   
183 corresponds to the partial derivative of  $e^{Z_i}$  with respect to  $X_j$ , so the sign of each  $B_j$  indicates  
184 whether the probability of observing  $G_i=1$  (Spanish consumer) increases or decreases  
185 compared to observing  $G_i=0$  (Mexican consumer) as the variable  $X_j$  associated with each  
186 estimated  $B_j$  increases by one unit. Table 2 presents the descriptions of the variables  $X_j$   
187 included in the model. The ordinal variables included in the questionnaire were treated in the  
188 binary logistic regression model as discrete continuous variables. The parameters were  
189 estimated through the maximum likelihood method including all the variables in the same  
190 set. The Nagelkerke R-square, the Hosmer and Lemeshow test and the classification table  
191 were used as measures of model adequacy. On the other hand, Wald statistics were used for  
192 the selection of the most significant variables. All statistical analyses were carried out using  
193 the software Package SPSS, Version 21.0.

194

### 195 **3. Results and Discussion**

196 Cultural values reflect the differences between cultures and have usually been operationalised  
197 at the individual level, through perceived cultural distance, and at the country level, through  
198 the national cultural distance that can be defined as the extent to which the shared norms and

199 values in one country differ from one another (Hofstede, 2001; García-Arroyo, & Segovia,  
200 2020). However, our results show a great convergence between the Mexican and Spanish  
201 meat consumers on the importance they assign to animal welfare, with an average score  
202 greater than 8, and a non-significant effect of nationality in the obtained scores for the FAW-  
203 Importance variable (U Mann-Whitney test, 8.4 vs. 8.1.,  $P \geq 0.05$ ). This contrasts with the  
204 widespread idea that Europe is the region with the highest social concern for the welfare of  
205 farm animals, where stakeholders have found consensus on the regulation of animal  
206 production (Eurobarometer, 2007; 2016). As a general rule, the more developed a country is  
207 regarding social, economic, and political areas, the more receptive it will be to a discussion  
208 in favour animal welfare (Cornish, Raubenheimer, & McGreevy, 2016). In particular, the  
209 less economically developed a country is, the more we can expect that animals are treated  
210 poorly (Naconecy, 2019). This convergence around the importance of animal welfare  
211 between Mexican and Spanish consumers shows that the concern and motivation for animal  
212 welfare is dynamic, not exclusive to specific countries or economic regions, and may be  
213 considered a part of a series of universal human values. These results are remarkable in a  
214 country like Mexico, where endemic social violence has increased in the last 15 years,  
215 recently acknowledged as the country with the highest rate of homicides, escalating from 9.1  
216 murders per 100,000 inhabitants in 2005 to 27.32 per 100,000 in 2019 (Escobar-Padilla,  
217 Márquez-González, Chapela, López-Sepúlveda, & Vildósola, 2019). In this context, it is  
218 possible that the social violence, sense of insecurity (personal, financial, social) and exposure  
219 to life-threatening situations, may have contributed to redirect the hopes, emotions and  
220 feelings of Mexican consumers towards animal welfare.

221

### 222 *3.1. Importance of animal welfare and socio-demographic characteristics*

223 Our study illustrates that the importance Spanish and Mexican consumers place on animal  
224 welfare depends on a variety of socio-demographic variables such as gender, origin,  
225 education, and age, all of which may (or may not) be affected by nationality.

226

#### 227 *3.1.1. Effect of gender*

228 In consumer studies, gender is an important factor because men and women often have  
229 different perceptions about the importance of animal welfare, that influence their willingness  
230 to pay for animal welfare friendly products (Miranda-de la Lama et al., 2019). When gender  
231 differences were compared within each country (Fig.1a), Spanish, women scored

232 significantly higher (U Mann-Whitney test,  $P = 0.000$ ) than men (8.7 vs. 8). For Mexico, a  
233 similar trend (U Mann-Whitney test,  $P = 0.003$ ) was observed (8.4 women vs. 7.9 men). This  
234 trend was also found without taking nationality into account (U Mann-Whitney test,  $P =$   
235  $0.000$ ), with women scoring higher than men overall (8.6 vs. 7.9). These findings support  
236 previous research that has repeatedly demonstrated women have more pro-animal welfare  
237 attitudes (Kavanagh, Signal, & Taylor, 2013). There are two different approaches to  
238 understand the marked gender differences in our study. The first would be related to the  
239 moral-environmentalist approach, where women are acknowledged to have eco-centric  
240 ideals, while men tend to possess anthropocentric principles. Therefore, women are more  
241 likely to hold attitudes which are consistent with improving animal welfare (Winter, 2020).  
242 Both views express environmental concern and an interest in preserving natural resources  
243 and the protection of animals, but their motives for this interest are distinguishable.  
244 According to Thompson and Barton (1994), ecocentric ideals tend to value nature and  
245 animals for their own sake and, therefore, judge that they deserve protection because of their  
246 spiritual dimension and intrinsic value. In contrast, a more anthropocentric viewpoint would  
247 tend to support protecting the environment because of its value in maintaining or enhancing  
248 quality of life, comfort and health for humans. The second approach is based on the theories  
249 of role-gender and gender-socialization, where men tend to be socialized according to  
250 traditional masculine roles, which are typically more utilitarian, competitive and dominant,  
251 whereas women tend to be socialized according to traditional feminine roles, which are  
252 typically more caring, concerned with others and emotionally expressive (Graça, Calheiros,  
253 Oliveira, & Milfont 2018). This may translate into stronger empathic concern and reduced  
254 dominance orientations among women, which may arguably generalise and spill over to  
255 encompass other animals (Amiot & Bastian, 2017).

256  
257 When comparing the importance that only men gave to animal welfare, there were no  
258 significant differences between men from either country (U Mann-Whitney test,  $P \geq 0.05$ ),  
259 implying that men value animal welfare less than women, regardless of their country of  
260 origin. The relative lack of enthusiasm for animal welfare on behalf of men may best be  
261 understood as an outgrowth of the construction of masculinity itself (Rothgerber, 2013).  
262 Normally, men have pro-meat attitudes, deny animal suffering, believe that animals are lower  
263 in the evolutionary hierarchy than humans, believe that eating animals is a human trait and  
264 adopt justifications based on religion and health (Kildal & Syse, 2017). According to



265 Hartmann and Siegrist (2020), metaphorically red meat is associated with masculinity and is  
266 a preferred food among men. Thus, some people might think that reducing meat consumption  
267 in order to favour animal welfare is a violation of the spirit of masculinity, given its well-  
268 defined characteristics such as stoicism, toughness, emotional restriction and social  
269 dominance (Kildal & Syse, 2017). Of course, some men are more or less inclined to establish  
270 their masculinity through meat consumption, but the above-described relationships might  
271 also partly explain the stronger resistance to changing the meat-eating behaviour typically  
272 observed in men (Hartmann & Siegrist, 2020).

273

274 Among women, we find differences between countries (**U Mann-Whitney test**,  $P = 0.004$ ),  
275 where Spanish women score higher (8.7) than Mexican women (8.4). Although the numerical  
276 difference is not very large, the statistical difference shows us that the cross-cultural  
277 difference between Spanish and Mexican women may be due to the levels of equity,  
278 empowerment and support for women's rights in their respective countries (Phillips et al.,  
279 2018). In Spain, the last 30 years have seen important legal and social changes that have  
280 empowered women and that have drastically decreased gender violence (Sweet & Ortiz-  
281 Escalante, 2010). These changes and their lesser cultural and economic dependence on men  
282 could make them a little more empathetic with the environment, people and, of course, with  
283 animals.

284

### 285 *3.1.2. Effect of origin: urban vs rural*

286 Consumer perceptions and attitudes towards animals are related to their beliefs and values,  
287 which are highly influenced by their rural or urban origin (Grunert, 2006). In the present  
288 study there were significant differences between the two nationalities (U Mann-Whitney test,  
289  $P > 0.05$ ), where Spaniards of rural and urban origins gave a slightly higher overall score than  
290 Mexicans. A possible explanation for these results would be related to the impact and  
291 awareness that Spain and European Union public policies have had on Spanish  
292 citizens/consumers. In Mexico, public animal welfare policies are still very emerging and  
293 more geared towards companion animals. However, when comparing the origin differences  
294 within each country (Fig. 1b); in the Spanish case, urban consumers scored significantly  
295 higher (U Mann-Whitney test,  $P = 0.018$ ) than rural ones. A similar trend (U Mann-Whitney  
296 test,  $P = 0.048$ ) was observed for Mexican consumers. Even independently of nationality,  
297 animal welfare was reported to be more important for those living in urban areas (U Mann-

298 Whitney test,  $P=0.003$ ), although rural origin respondents also had concerns. In our  
299 predominant urban lifestyle of modern technological and industrialized societies, many  
300 people find fewer and fewer opportunities to interact with animals and nature (O’Haire,  
301 2010). Therefore, urban consumers seem to look for more “humane” and “natural” conditions  
302 for farm animals (Jacques, 2014). In contrast, rural consumers are not as concerned about  
303 animal welfare and accept modern farming practises to a greater degree (Clark, Stewart,  
304 Panzone, Kyriazakis, & Frewer, 2016). This may be because rural citizens have a better  
305 knowledge of the economic and social reality of farmers and the living conditions of farm  
306 animals (Schröder & McEachern, 2004).

307

### 308 *3.1.3 Effect of education level*

309 The protection of animals and environmentalism have traditionally been considered  
310 distinctive features of the most educated people in society (Phillips, 2018). Therefore, some  
311 scholars argue that people in developed countries are more concerned about environmental  
312 quality and are more willing to pay for animal welfare improvements than their counterparts  
313 in developing countries (Sulemana, James, & Valdivia, 2016). Our study found that both  
314 countries have a high level of awareness about the importance of animal welfare. Although  
315 the results suggest that a higher general level of education tends to increase the importance  
316 of animal welfare, it is not a general rule. In Spain, no significant differences were found in  
317 the perceptions of animal welfare of consumers with different educational levels (Kruskal  
318 Wallis test,  $P \geq 0.050$ ) (Fig.2b), while the Mexican case is closer to that described by several  
319 authors in that the more educated were more concerned about animal welfare (see Clark,  
320 Stewart, Panzone, Kyriazakis, & Frewer, 2017; Rucinque, Souza, & Molento, 2017). When  
321 we compared the levels of education between countries, it was found that Spaniards with  
322 elementary school (U Mann-Whitney test,  $P=0.04$ ), or with junior/high school (U Mann-  
323 Whitney test,  $P = 0.00$ ) scored higher than their Mexican counterparts. These asymmetries  
324 between countries may be due to the fact that Mexican society is more socially stratified or  
325 less egalitarian. It is possible that with greater equality and quality of life, people have more  
326 ethical aspirations independently of education level, which seems to be the case with the  
327 Spaniards surveyed. Social equality is associated with the ability to enjoy various essential  
328 aspects, many of which are provided by the State, such as access to education, health or  
329 public safety; or that are considered fundamental, such as economic, social, cultural and  
330 human rights (Giménez, Ayvar-Campos, & Navarro-Chávez, 2017). Another interesting

331 finding is related to the Mexican respondents with a university education, who give a greater  
332 importance to animal welfare compared to their Spanish counterparts (U Mann-Whitney test,  
333  $P=0.03$ ). Therefore, when comparing the intercultural differences between both countries, we  
334 can conclude that in less egalitarian societies such as Mexico (with a high power distance  
335 index; Hofstede, 2001), the importance that people give to animal welfare is highly  
336 influenced by their level of studies, where Mexican university students are the most  
337 concerned. In Mexico, higher education is the main mechanism for social advancement in a  
338 highly stratified and unequal society (Olavarría-Jaraba, Cambra-Fierro, Centeno, &  
339 Vázquez-Carrasco, 2018). In more egalitarian societies such as Spain, this effect is lost and  
340 affected by other indicators such as gender, origin and age.

341

#### 342 *3.1.4. Effect of age*

343 Given the increased separation of meat production and consumption in many societies during  
344 recent decades (Benningstad & Kunst, 2020) the role of age or generational (cohort)  
345 differences in consumers' perceptions about animal welfare becomes relevant. When  
346 comparing the importance of animal welfare according to age, the results show that people  
347 aged between 31-45 years old assign the highest value in each country (not statistically  
348 different between countries, U Mann-Whitney test,  $P\geq 0.05$ ). A possible explanation may be  
349 due to the fact that consumers over the age of 30 are in the economic and family consolidation  
350 stage. This consolidation would imply that young families often have small children and/or  
351 companion animals. The presence of children and animals in a family has been related to a  
352 greater concern and sensitivity of parents towards animals (Rothgerber & Mican, 2014). For  
353 the age range between 18-30 years old, significant differences were observed (U Mann-  
354 Whitney test,  $P=0.028$ ), where Spaniards attach greater importance to animal welfare than  
355 Mexicans (8.4 vs. 8.1). Furthermore, the importance given by those under 30 is less than  
356 those between 31-45 years old both for the total sample and in the Mexican case. The oldest  
357 consumers (46 to 60 years, >60 years) in both countries assigned a lower grade to the  
358 importance of animal welfare compared to those between 30-45 yrs., and no significant  
359 differences were observed between the grade assigned by either nationality (Kruskal Wallis  
360 test,  $P>=0.05$ ). It is possible that the youngest and oldest consumers in our study were  
361 comparatively less receptive to animal welfare for different reasons. The oldest may have a  
362 more utilitarian view of animals because they were raised in less urban societies, where the  
363 separation of meat production and consumption were less evident. The reasons behind the

364 grades assigned by the youngest consumers to animal welfare and their differences from the  
365 older point in different directions.

366

367 Younger adults (<30 years) are recognized as being more sympathetic to ethical and  
368 environmental issues associated with dietary choices, compared to older generations (Faber  
369 et al., 2020), which corroborates our findings regarding Spanish consumers over 45 years of  
370 age, but not with respect to Mexicans between 31-45 years old. On the other hand, younger  
371 consumers include members of generation Y (millennials – born between 1986 and 1994)  
372 and Z (centennials – born in 1995 or later) (Severo, de Guimarães, & Dorion, 2018; Berkup,  
373 2014). These consumers may be more critical and pragmatic about environmental concerns,  
374 due to the permanent access to internet information. In addition, the incorporation of  
375 technology as a fundamental part of their lifestyle, makes “Generation Z” consumers behave  
376 differently than earlier generations, and may even influence their perceptions of FAW  
377 (Beaver, Proudfoot & von Keyserlingk, 2020).

378

### 379 *3.2. Binary logistic regression model*

380 Among the 15 variables related to perceptions and attitudes concerning animal welfare, the  
381 multivariable logistic regression model identified 13 variables allow to differentiate between  
382 the Spanish and Mexican consumers (Fig. 3). Table 3 presents the estimates of the parameters  
383 obtained. Nagelkerke’s  $R^2 = 0.458$  and Hosmer and Lemeshow test ( $P = 0.986$ ), indicate a  
384 good adequacy of the model. Likewise, through the classification table, the overall  
385 percentage of correct forecast was 78.4%, which is considered acceptable. With the exception  
386 of Animal-Emotions and FAW-New laws (Wald statistic,  $P \geq 0.05$ ), all the other variables  
387 allow significant discrimination between Mexican and Spanish consumers. Therefore, both  
388 Mexican and Spanish consumers agree that farm animals have emotions and laws are needed  
389 to prevent the abuse of farm animals. Although welfare science has faced difficulties in  
390 providing sufficient and impartial information to inform government and industry policy  
391 (Verrinder, McGrath, & Phillips, 2016), several scientific studies show that all vertebrates  
392 appear to have some capacity for primal affective feelings, whereby the implications for  
393 animal-welfare and how we treat other animals ethically are vast (Panksepp, 2011). In this  
394 sense, our results indicate that the recognition of emotions in animals and the need for laws  
395 to protect them as sentient beings, expressed by consumers in both countries, are two possible  
396 predictors of consistency on positive social attitudes towards animal welfare.

397 According to the multivariate model, some perceptions can be distinguished between  
398 Mexican and Spanish consumers. Thus, the probability that a consumer is Spanish increases  
399 when the score assigned to the importance of animal welfare is greater, as well as the  
400 perception of its improvement in the last ten years. This association can be established  
401 through the positive signs acquired by the parameters estimated in the variables FAW-  
402 Importance and FAW-Actual/improvements. Likewise, positive signs for  $B_j$  in the variables  
403 FAW-Education, Fed-Healthy, Natural-Behaviours and Fear-Stress, indicate that, as these  
404 variables increase in value, the probability of that individual being a Spanish consumer  
405 increases. Therefore, Spanish consumers, compared to Mexicans, give more importance to  
406 aspects such as: i) the health conditions of farm animals, ii) that farm animals should express  
407 normal patterns of behaviour, iii) that farm animals should be free from fear and stress, and  
408 iv) the need to educate about FAW in primary education. These perceptions suggest that  
409 Spanish consumers are closer to the concept of the five freedoms, compared to their Mexican  
410 peers. In this context, the five freedoms concept, originally based on the recommendations  
411 of the Brambell Committee at 1965 and revised by the Farm Animal Welfare Council in  
412 1993, and variations thereof, offer a utilitarian definition of animal welfare (Taylor & Signal,  
413 2009). It is possible that the Spanish consumer is more utilitarian and less idealistic than the  
414 Mexican regarding his motivations towards animal welfare. This may be because for  
415 Mexicans animal welfare is a relatively new concept and still related to avoiding cruelty,  
416 especially to companion animals (Ramírez, Quezada-Berumen, & Hernández, 2014).  
417 Mexicans may also have little confidence in the meat industry and government regulations  
418 (Miranda-de la Lama et al., 2019). While for Spanish consumers, animal welfare is a topic  
419 that is widely discussed and integrated into the economy, as part of European public policies.  
420 Formally, the European Union (EU) started discussions on animal welfare in the 1980s and  
421 adopted a series of Directives to protect farm animals (Veissier, Butterworth, Bock, & Roe,  
422 2008). Since then, European institutions have introduced regulations based on scientific  
423 evidence that have substantially improved the practices of handling, breeding, transporting  
424 and slaughtering animals (Jacques, 2014). In other words, the regulations of the last 30 years  
425 did not discourage the consumption of animal products at the time and achieved greater  
426 consumer trust in animal welfare throughout the meat industry.

427

428 The negative signs observed in the variables Animal-Pain, FAW-Information and FAW-  
429 Future/improvements, indicate that a higher valuation is given to these three variables,

430 increasing the probability of being a Mexican consumer. Compared to Spaniards, Mexican  
431 consumers consider that animals feel pain, that they would like to learn more about the FAW  
432 of farm animals and that the FAW of farm animals should be improved in their country. In  
433 this sense, although it is true that Mexican consumers are less sensitive in terms of production  
434 methods, they show a greater degree of concern for improving and learning about FAW and  
435 for empathy towards animals by recognizing their ability to feel pain and suffering. These  
436 results may be due to the fact that the legal regulations and the current operating conditions  
437 in which animals are raised, transported and slaughtered in Mexico are less demanding in  
438 terms of animal welfare compared to those in UE or Spain (Valadez-Noriega et al., 2018).  
439 Recognition of animal pain is an essential prerequisite for a person to have empathy and  
440 concern for the welfare of animals (Norrington, Wikman, Hokkanen, Kujala, & Hänninen,  
441 2014). Empathy refers to sensitivity to, and understanding of, the mental states of others  
442 (Smith, 2006). Therefore, the empathy of Mexicans towards farm animals may stem from  
443 mistrust towards the meat industry, since it is associated with suffering and pain (Miranda-  
444 de la Lama et al., 2019). Meanwhile, it seems that the empathy of Spaniards is highly  
445 influenced by their trust in national and European policies and regulations regarding FAW.  
446 Our results are similar to a cross-cultural study between Asian and European students by  
447 Phillips and McCulloch (2005). This survey found that students in European countries had  
448 greater concern for animal welfare, but not animal rights, than students in Asian countries.  
449 Likewise, the concern about improving the conditions under which animals are raised and  
450 produced in Mexico and being able to have more information on the welfare of animals,  
451 would be related to the current motivations of the country to enter this trend (Vargas-Bello-  
452 Pérez et al., 2017). In fact, Mexicans, in comparison with the Spanish, would be more likely  
453 to change their place of purchase in order to acquire products that respect animal welfare. A  
454 possible explanation for this result may be related to the tendency for animal welfare labelled  
455 foods to carry a 'halo effect', in which consumers associate improved animal welfare with  
456 higher quality, safer, tastier or healthier products (Ufer, Ortega, & Wolf, 2019). It is possible  
457 that increased exposure to international lifestyles and media, and access to frequently updated  
458 information and telecommunication technologies have globalized socio-ethical concerns,  
459 including animal welfare (Dowling, 2015). The emphasis on the better quality of welfare  
460 friendly products is probably the main reason their demand has increased in recent years in  
461 Mexico, due to a growing middle and upper class concerned about a healthier diet and the  
462 epidemic of obesity and diabetes that affects the country (Miranda-de la Lama et al., 2019).

463 Ensuring that consumers have enough information to make informed decisions highlights the  
464 importance of labelling welfare friendly products, providing an authenticity cue that delivers  
465 additional assurance to consumers who are prepared to pay more (Clark et al., 2017). An  
466 apparent contradiction is that a greater consideration towards the variable FAW-Labels,  
467 decreases the probability of being a Spanish consumer and, therefore, increases the  
468 probability that it is a Mexican consumer. This means that Mexicans further proclaim that  
469 the current labels of animal products allow them to identify the farming conditions and FAW  
470 with which they have been produced. This could be due to the lack of regulation in Mexico  
471 regarding labels related to animal welfare, contrary to what happens in Spain where it is more  
472 controlled on a local, national and UE levels. In addition to the potential for opportunism on  
473 the part of Mexican producers or marketers, the abundance of welfare-related claims and  
474 diversity of definitions of those claims can easily confuse consumers, which would explain  
475 our results (Ufer et al., 2019).

476

477 Spanish consumers were more in agreement with the fact that farmers should be compensated  
478 for their extra efforts derived from the adoption of production systems that respect FAW, a  
479 situation that is observed by the positive sign of the variable Farmers-Compensation. In  
480 addition to this, Spaniards, compared to Mexicans, were more sensitive to the need for  
481 imported animal products (from outside the EU) to comply with the same production  
482 conditions for FAW that are required within their country. These results are related to the  
483 strong trend in Spanish consumers who have a clear preference for products of animal origin  
484 produced in their country, compared to those imported, especially from outside the EU. This  
485 idea is most probably related to the politics of protecting rural economies (Andersson, 2019).  
486 Fernández-Ferrín et al. (2019), highlight five major reasons for purchasing national products,  
487 which are a combination of collective/public and individual/particular benefits, including  
488 distance with respect to the origin of the products, support to local and national farmers,  
489 environmental concerns, taste and freshness of products and especially confidence in  
490 European animal welfare insurance systems. On the other hand, for Mexican consumers,  
491 imported animal products are usually considered to be of higher quality than national ones,  
492 although this seems to be changing as the national market begins to mature (Ngapo, Varela,  
493 & Lozano, 2017). This preference for imported meat over Mexican (with exceptions such as  
494 Sonora beef) are the product of the introduction of meat products from the USA, certified as  
495 part of the North American Free Trade Agreement and especially due to the lack of a public

496 policy in favour of quality assurance schemes as a distinguishing element for meat (i.e.  
497 Protected Geographical Indications), being especially widespread in Spain. These  
498 mechanisms are useful because they are a distinctive label used to identify a product as  
499 originating in the territory of a particular country, region or locality where its quality,  
500 reputation, agroecosystem, or other characteristic is linked to its geographical origin  
501 (Bernabéu, Rabadán, El Orche, & Díaz, 2018).

502

### 503 *3.3. Future insights*

504 Although animal welfare is a relatively new commercial phenomenon, our results show that  
505 concern for animals can be a universal human value, which can overcome traditional  
506 dichotomies between rich-poor or developed-developing countries. The cultural and  
507 socioeconomic realities may establish differences in the perceptions of Spanish and Mexican  
508 consumers about animal welfare. Despite this, such a divergence may end up building a large  
509 consensus that is transformed into a stable added value for products of animal origin. The  
510 differences in the concerns and interests of consumers in Mexico and Spain regarding animal  
511 welfare reflect possible differences in the institutional and regulatory frameworks in force in  
512 each country on the matter and give clues about possible directions that public policies should  
513 take. In Mexico, consumer concerns about the suffering and pain of animals, as well as the  
514 improvement of animal welfare conditions in the near future, demonstrate the need for a  
515 comprehensive and consistent FAW public policy. This implies, on the one hand, developing  
516 legal frameworks that guarantee minimum mandatory levels in the practices of production,  
517 transport and slaughter of farm animals in the country, which will generate greater consumer  
518 confidence in the meat industry. But on the other hand, it also implies encouraging the  
519 improvement of animal welfare levels in companies in the meat sector, by way of product  
520 differentiation through labels and price differentials, to which consumers seem to be  
521 responding favourably. In addition, the government must concentrate on generating the  
522 necessary political conditions for the Mexican meat industry to actively participate in these  
523 new regulations and in a gradual change in animal production systems. This should aim to  
524 ensure that the supply of products that are “a little more respectful of animal welfare” goes  
525 beyond the niche market segment, and progressively becomes a more general condition.

526

527 In Spain, our results show a concern of consumers to maintain the achievements of FAW.  
528 They also highlight the need for public policies and institutionalization of strategic aspects



529 for animal welfare, such as the education of new generations, control of imported products,  
530 and the support and commercial protection for national producers who have welfare friendly  
531 practices towards animals on their farms. This is because Spanish consumers are deeply  
532 aware of the importance of farm animals in the meat chain and their role in the economy,  
533 culinary traditions and Mediterranean culture. This more holistic view of the FAW  
534 (especially when compared to Mexican consumers), is a strategic basis for developing  
535 integrative policies for rural development. In this context, animal welfare can be the  
536 articulating axis of policies aimed at improving the sustainability of animal production,  
537 linking it with environmental conservation, the re-evaluation of farming work and the  
538 preservation of rural livelihoods. Finally, in the case of both countries, and according to Clark  
539 et al. (2017), it is necessary to consider that although there is a group of highly concerned  
540 consumers, the majority of those who consume meat products are unlikely to consider FAW  
541 at the point of purchase, with their also being a growing proportion of the population who do  
542 not consume animal products altogether. Market based solutions can therefore only be part  
543 of the strategy for improving FAW, with legislation also required to reflect the concerns of  
544 non-purchasers. Consequently, a multifaceted response is needed to provide feasibly  
545 acceptable standards of FAW supplemented with more stringent independent standards.

546

#### 547 **4. Conclusions**

548 Our cross-cultural comparison shows that animal welfare is a convergent value between  
549 Mexicans and Spaniards. However, the importance of animal welfare for consumers varies  
550 according to sociodemographic variables such as gender, rural or urban origin, educational  
551 level and age. Thus, both in Spain and Mexico, women, urban consumers and adults aged 30  
552 to 45 years, tend to be more concerned than men, rural consumers and adults over 45 years,  
553 respectively. The education level marked differences only among Mexican consumers, where  
554 those with a higher education assigned greater importance to animal welfare. The motivations  
555 of consumers in both countries to build this convergence around the overall importance on  
556 farm animal welfare are divergent. For Spaniards, animal welfare seems to be a legal,  
557 administrative, and verifiable reality that must be profitable to society. Their interest in  
558 educating younger generations, helping farmers, and controlling the entry of products into  
559 the country according to farm animal welfare criteria, make animal welfare a collective goal,  
560 which implies making efforts that go beyond the scope of supply and demand. In contrast,  
561 for Mexican consumers, animal welfare is still an aspirational ideal at the country level. They

562 acknowledge that improving animal welfare still requires important efforts, where informed  
563 consumers acquire relevance at the individual level, through their purchasing decisions. The  
564 lack of legal regulations in Mexico regarding animal welfare may reinforce the perceptions  
565 of its consumers about the greater validity of the market as a pathway to improve farm animal  
566 welfare conditions.

567

#### 568 **Declaration of Competing Interest**

569 The authors declare that they have no known competing financial interests or personal  
570 relationships that could have appeared to influence the study reported in this paper.

571

#### 572 **Acknowledgements**

573 This work was partially supported by PROMEP grants 103.5/13/8925 UAMPTC-417 to G.C.  
574 Miranda-de la Lama.

575

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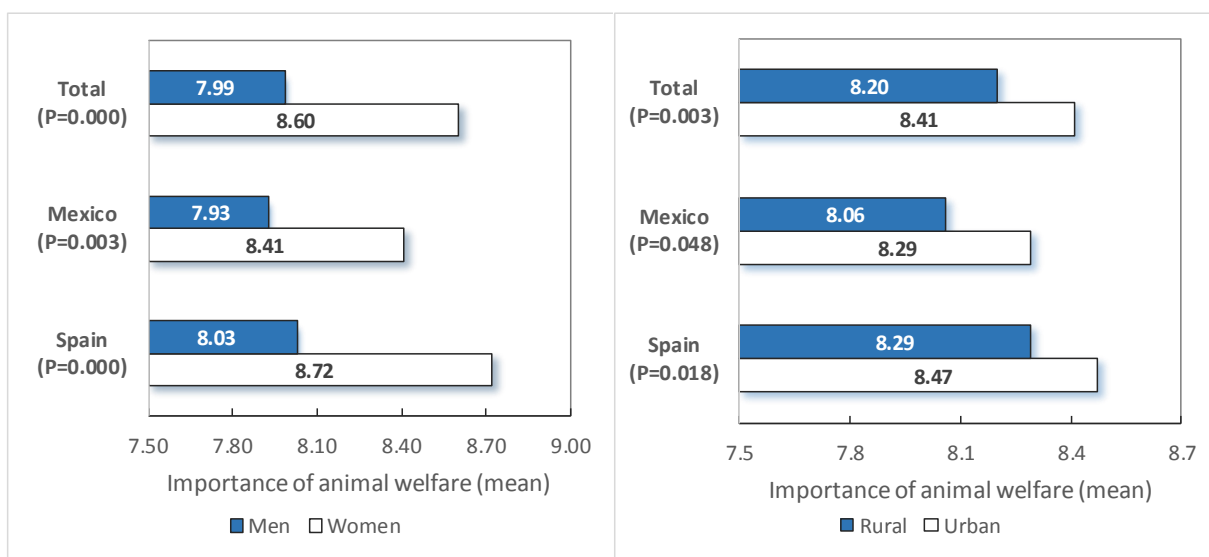
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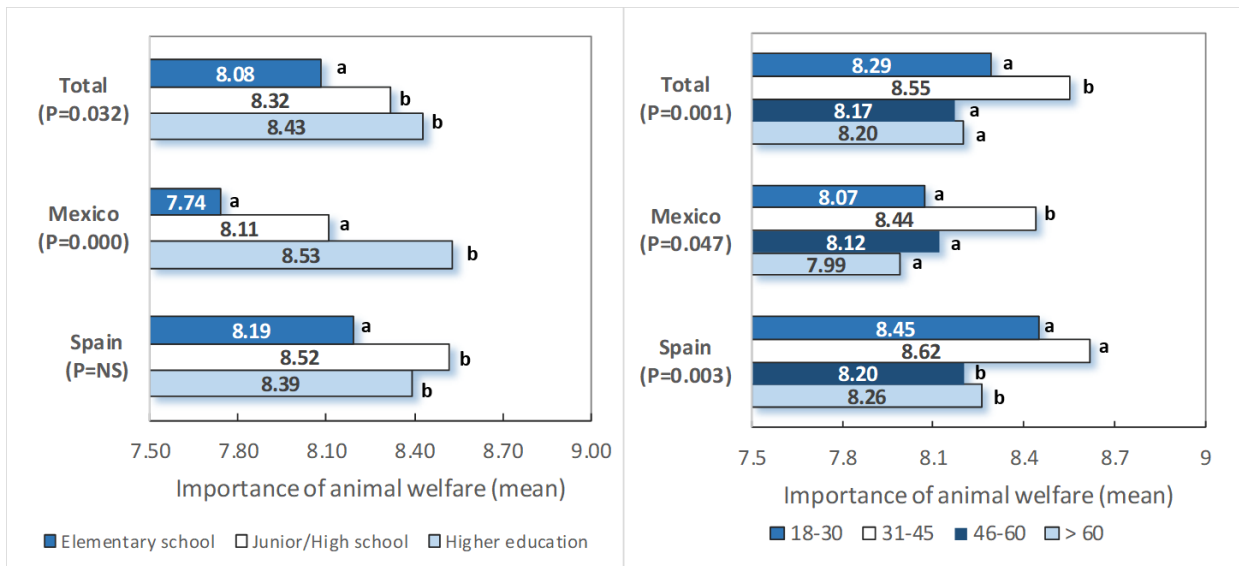
**Fig. 1.** Importance of farm animal welfare (10-point scale, from 0 -not important- to 10 -very important) according to gender (a) and origin (b) of Mexican (n=833), and Spanish (n=1455) consumers.



a. Effect of gender

b. Effect of origin

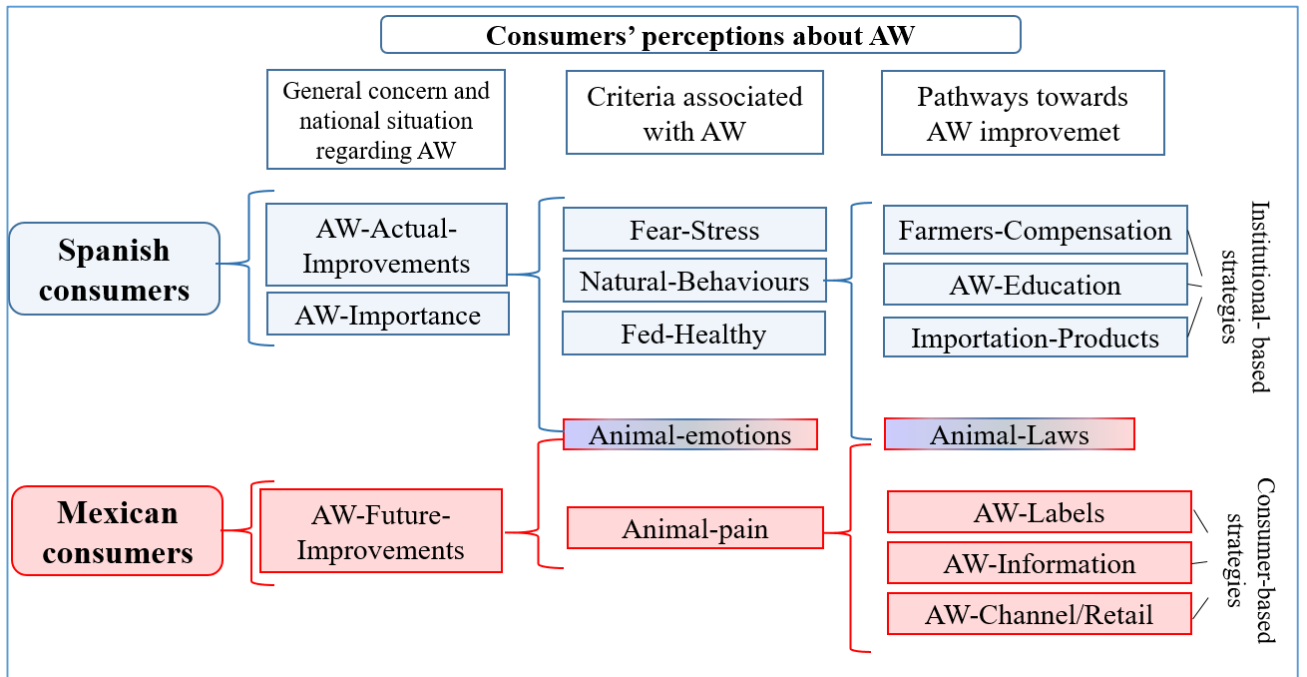
**Fig. 2.** Importance of farm animal welfare (10-point scale, from 0 -not important- to 10 -very important) according to educative level (a) and age (b) of Mexican (n=833), and Spanish (n=1455) consumers. Different letters refer to significant differences ( $P<0.05$ ) according to post-hoc analysis using the Mann–Whitney U test.



a. Effect of education level

b. Effect of age

**Fig.3.** Mexican and Spanish consumers' perceptions model regarding animal welfare.



**Table 1.** Socio-demographic characterization of the sample populations in México and Spain that were given the questionnaires, in terms of gender, age, educational level and origin.

<i>Consumers</i>	<i>Percentage (%)</i>	
	<i>Mexico</i> <i>(n=833)</i>	<i>Spain</i> <i>(n=1455)</i>
Gender		
Female	55.9	53.5
Male	44.1	46.5
Age (years old)		
18-30	31.4	24.5
31-45	34.2	30.3
46-60	23.6	24.8
>60	10.8	20.4
Educational level		
Elementary education	10.7	18.7
Middle education	59.7	36.3
Higher education	29.7	45.0
Origin		
Urban	59.1	60.4
Rural	40.9	39.6

**Table 2.** List of 15 questions in the survey applied to Mexican (n=833) and Spanish (n=1455) consumers. Additionally, the coding of the questions is presented as studied variables.

<i>Question</i>	<i>Variable descriptions (X<sub>j</sub>)</i>	<i>Key</i>
1. How important is animal welfare to you? 2.	Discrete quantitative variable, from 0=not important- to 10=very important.	FAW-Importance
3. Do you believe that farm animals should be well fed, well sheltered and healthy?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	Fed-Healthy
4. Do you believe that farm animals should be able to express the natural behavior of their species?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	Natural-Behaviors
5. Do you believe that farm animals should be free of fear and stress?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	Fear-Stress
6. Do you believe that farm animals can feel pain and suffering?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	Animal-Pain
7. Do you believe that farm animals can feel positive or negative emotions?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	Animal-Emotions
8. Do you believe that the living conditions of farm animals have improved in the last 10 years?	Discrete quantitative variable, from 1 = Have gotten much worse to 5=Have improved very much.	FAW-Actual/improvements
9. Do you think that the welfare and protection of farm animals in our country should be improved?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	FAW-Future/improvements
10. Do you believe that children should be educated about animal welfare in schools?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	FAW-Education
11. Do you believe that new animal welfare laws are needed to prevent abuse in the treatment of farm animals?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	FAW-New laws
12. Would you like to be informed about the living conditions of farm animals you eat?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	FAW-Information
13. Do you believe that the farmers should be economically compensated by the cost increments as result of improvements in animal welfare?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	Farmer-Compensation
14. Do you believe that imported foods should be respectful of animal welfare, as well as in your country?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	Import-Products
15. Will you change your retail store in order to acquire products respectful of animal welfare? (i.e. organic, ecological)	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	FAW-Change/Retail
16. Do you believe that current labels on products of animal origin provide information about how animals are raised and their welfare?	Discrete quantitative variable, from 1=surely not to 5 = definitely yes.	FAW-Labels

FAW: Farm animal welfare.

**Table 3.** Multivariable logistic regression model to differentiate Mexican (n=833) and Spanish (n=1455) consumers regarding attitudes towards animal welfare.

<i>Explanatory variables (X<sub>j</sub>)</i>	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>d.f.</i>	<i>P</i>
FAW-Importance	0.074	0.034	4.901	1	0.027
FAW-Actual/improvements	0.666	0.052	161.204	1	0.000
FAW-Education	0.164	0.074	4.887	1	0.027
FAW-New laws	0.078	0.076	1.062	1	Ns
Fed-Healthy	0.658	0.127	27.058	1	0.000
Natural-Behaviours	0.473	0.075	40.020	1	0.000
Fear-Stress	0.332	0.099	11.339	1	0.001
Animal-Pain	-0.210	0.101	4.308	1	0.038
Animal-Emotions	-0.049	0.071	0.478	1	Ns
FAW-Information	-0.783	0.063	155.646	1	0.000
FAW-Future/improvements	-0.436	0.092	22.583	1	0.000
Farmer-Compensation	0.325	0.052	38.401	1	0.000
Import-Products	0.336	0.081	17.304	1	0.000
FAW-Change/Retail	-0.525	0.059	78.870	1	0.000
FAW-Labels	-0.398	0.043	83.815	1	0.000
Constant	-3.528	0.646	29.850	1	0.000

$B > 0$  = Probability that a respondent was Spanish,  $B < 0$ , Probability that a respondent was Mexican.  $SE$  = Standard Error,  $df$  = degrees of freedom. Significance level at  $P \leq 0.05$ .

Zaragoza, Spain, November 10, 2020

*“Attitudes of meat consumers in Mexico and Spain about farm animal welfare: A cross-cultural study”*

**AUTHOR DECLARATION TEMPLATE**

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

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**CRedit author statement**

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