RESEARCH ARTICLE

A more fine-grained measure towards animal welfare: a study with regards to gender differences in Spanish students

Beatriz Mazas [1,2] · Rosario Fernández-Manzanal [1]

Received: 17 April 2018 / Accepted: 19 October 2018

Abstract
The environmental issue is nowadays taking more importance in the environmental awareness all around the world, and in this field, animal consideration is more and more spread. A highlighted part in globalisation is the animal welfare awareness. This article presents a study comparing attitudes towards animals among secondary and university students in reference to gender. It was carried out on 1394 Spanish participants from 11 to 26 years. The instrument used in the study is the reviewed version of the Animal Welfare Attitude Scale which was renamed as "Animal Welfare Attitude-Revised Scale" (AWA-R Scale), with a Cronbach α reliability value of 0.85. It is subdivided into four components namely C1: animal abuse for pleasure or due to ignorance; C2: leisure with animals; C3: farm animals; and C4: animal abandonment. These components have been deeply detailed by a confirmatory factor analysis (CFA), which highly contributes to define the position of participants for the different dimensions of animal welfare. It is concluded that significant differences exist between males' and females' attitudes in all components of the AWA-R Scale. It is also suggested that two social characteristics—people's attitudes towards animals and towards environmental protection—are, at the very least, coexistent and may indeed be interdependent. These differences between gender in matters of socialisation could thus be reflected in environmental attitudes, and also in others related to them, i.e. animal welfare attitudes.

Keywords Animal welfare · Animal protection · Attitudes · Confirmatory factor analysis · Environmental education · Gender differences

Introduction

Animal welfare is an important aspect of sustainability, and also of product quality, and may result in consumers refusing to buy products. Welfare includes feelings and health and can be measured scientifically. It is a biological concept, quite different from rights, and refers only to living animals (Broom 2017). Public concern about animal welfare has increased in many countries during the last 40 years and especially in the last 20 years.

The use of animals in popular Spanish traditions has been present for ages. Events in which animals are used, such as bullfights, have been associated with prototypical cultural acts of the Spanish society (María et al. 2017). However, nowadays, many people do not consider bulls as culture but as cruel and inconsiderate acts towards animals. Something similar happens with the circuses with animals, adding in this case the qualifier of "non-educative". What once seemed like something fun with a little touch on didactics has now become a spectacle that is banned every time in more cities of Spain.

Public concern about animals has certainly advanced and continues to increase rapidly. This has occurred, in part, because of new knowledge about animal abilities and an expansion in the concept of which beings are sentient. As Oakley et al. (2010) pointed out, the "question of the animal" represents an emergent interest area in the environmental education field. Moreover, according to these and other authors (Kahn and Humes 2009), in recent years, scholarly work exploring the animal question has emerged from the social sciences and humanities, forming an animal study network with

Responsible editor: Philippe Garrigues

✉ Beatriz Mazas
bmazas@unizar.es

[1] Universidad de Zaragoza, Zaragoza, Spain

[2] Departamento de Didáctica de las Ciencias Experimentales, University of Zaragoza, C/ Pedro Cerbuna, 12, 50009 Zaragoza, Spain

Published online: 10 November 2018

trajectories across disciplines. Given the interdisciplinary nature of animal studies and the socioecological turn the general environmental education field has taken (Gruenewald 2003), it is not surprising that environmental education researchers are also grappling with the animal question.

The inclusion of the concept of 'animal welfare' came about through advances in education and thanks to lifelong learning on the part of all agents involved in the treatment of animals. It led to the formulation of the *Five Freedoms* (The Farm Animal Council 1979; Webster 2001) to be exercised in all human activities related to the use of animals: they clearly define our responsibilities towards pets as well as towards wild animals.

The knowledge of attitudes is currently a great value associated with different fields of civic life: political, economic or social in the effort to understand progress and the magnitude of changes. It is known that there is a strong correlation between attitudes and behaviour, and this is one of the great virtues that bring the exploration of attitudes in any field. For example, there is a strong correlation between attitude intensity and self-reported environmental behaviour and political activism in environmental issues (Steel 1996). Similarly, perceived importance across a variety of animal welfare and rights issues is positively correlated to engagement with animal welfare (Phillips et al. 2012).

As an overview of attitude assessment, in the following paragraphs, we present relevant theories and findings concerning student attitudes towards animals which play an important role in the current debate on gender differences. Starting from a consideration of what is meant by 'attitudes to animal welfare', we consider the problems inherent to their measurement, what is known about students' attitudes towards animal welfare, and the many factors of influence, such as gender.

Herzog et al. (1991) analysed gender differences in attitudes to animal welfare and point out that they were significant in all animal-related measures with the exception of self-reported comfort when touching positively perceived animals. Gender and the expressive (feminine) dimension of sex role orientation accounted for a significant proportion of the variation in attitudes towards animal welfare issues and comfort with other species.

In a study conducted in the USA, Japan and 13 European countries on attitudes towards the use of animals—dogs and chimpanzees—for research purposes, Pifer et al. (1994) found that women are generally more sensitive than men towards animal welfare and towards harmful practices.

Further examples can be found in the literature: Serpell (2004) has investigated different factors influencing human attitudes towards animals and their welfare, Heleski et al. (2004) have assessed attitudes towards farm animal welfare. The same authors Heleski et al. (2006) have also pointed out that background variables showed significant relationships with summed attitude scale scores: females were more concerned about farm animal welfare than males. Those with liberal political views were more concerned than those with conservative views, and those exhibiting a higher degree of religiosity showed less concern than those with lower devotion to religion.

Likewise, Apostol et al. (2013) analysed psychological and socio-demographic predictors of attitude towards animals, among them, gender is regarded as an important factor, and differences between males and females were observed on a systematic basis.

Short time ago, an animal welfare attitudes' study has been published (Ostovic et al. 2017) in which they said: 'attitudes towards animals are important because they influence validation of animal life in economic or emotional terms human behaviour towards animals and how animals are treated'. Public opinion is the most potent driving force for animal welfare improvement. Broom (2017) remarks that along with a large body of scientific research conducted in recent decades, the increasing public concern for farm animals and their breeding conditions has resulted in new, more stringent legal provisions from the European Union on animal breeding related to their welfare protection.

As Sinclair and Phillips (2017) point out, significant gender differences exist in animal welfare attitudes in the literature. Likewise, Ling et al. (2016) show that gender differences are most prominent in relation to empathetic abilities and tendencies, with women usually more empathic than men).

This work is situated in the context of a larger project to explore the attitude about animal welfare in different educational levels such as secondary and university students. Considering the findings documented in the literature, attitude towards the environment, specifically between males and females in the field of animal welfare, is addressed in the following paper, in which a specific analysis aspect about Spanish secondary and university students' differences has been extensively described. In the present study, we have carried out a comparison of animal welfare attitude in secondary and university students according to gender. The aim of the study is, firstly, to improve the measurement in the AWA Scale (Animal Welfare Attitude Scale), by carrying out a confirmatory factor analysis (CFA) thereof (Mazas et al. 2013), in order to gain a greater understanding of the different needs of students in relation to education regarding animals, the consumption of animal products or leisure with animals, all with respect to gender.

Methodology

Participants of the study

The sample of 1394 students (458 males and 936 females) stems from different parts of Spain, some from

rural areas (36%) and others from urban centres (64%), with an age range of 11 to 26 years, including students attending both public and state educational centres. The students questioned were enrolled secondary schools and to university-level institutions located in Aragón (N = 746), Navarra (N = 81), Catalonia (N = 78), Galicia (N = 145) and Andalucía (N = 344). The scale was administrated by science teachers who were instructed to ensure that the students filled it out correctly.

Scale characteristics

Well-known authors in the field of attitude studies—Ajzen (2005)—have defined attitude as a learned predisposition to respond to an object in a consistently favourable or unfavourable manner. In their studies, these authors state that attitude has the following clearly differentiated dimensions: the cognitive, the affective and the behavioural.

In this study, it has applied an animal welfare attitude scale, the AWA Scale, the items of which are classified under the three above-mentioned aspects of attitude. The cognitive items are associated with the respondent's awareness of animal suffering. An example of this type of item is i1: *Animals suffer; they get hurt when you beat them.* Other items are more closely associated with affective aspects, for example i11: *I am concerned about bulls suffering in the bullring, even if it only lasts for a few minutes* has an emotional charge related to experience, or a process of reflection in which students reveal their concern about the controversy regarding bullfighting. Behavioural nature and behavioural intention are revealed in items such as i6: *I sometimes have fun chasing animals*, in which people who carry out this type of act identify with the item or when there is a certain predisposition to behave in some way in relation to the attitude object, such as, for example, in i10: *I would never beat my pet in order to educate it.*

The scale is a 5-point Likert type scale, i.e. containing a mid-point. It has the same number of items that portray favourable or unfavourable positions in relation to animal welfare and, in addition, it highlights four components of attitudes towards animal welfare, namely, C1: animal abuse for pleasure or due to ignorance; C2: leisure with animals; C3: farm animals and C4: animal abandonment. Component 1 includes items in which students can express agreement or disagreement concerning how animals are treated, as well as items that reveal their awareness or lack thereof in relation to situations that produce suffering in animals. Component 2 groups together a series of items related to activities that are classed as entertainment, or festivals which involve animal suffering. Component 3 includes items regarding the living conditions of animals on farms, such as the space available to them, freedom of movement, a comfortable environment, the production rate in relation to real or potential suffering caused by being held in captivity in adverse conditions, or the protection of animals by law. Lastly, component 4 includes items referring to the circumstances in which students who are pet owners could abandon their pet.

The scale was validated with a sample of 329 Spanish participants from various secondary school and university centres. Its original version contained 29 items distributed along the four previously mentioned components (Mazas et al. 2013).

CFA analysis

The novelty of the present construct requires that one performs factor analysis on the confirmatory sample should be done. It is appropriate to confirm the proposed grouping factor obtained from the exploratory factor analysis (EFA) on the AWA Original Scale. A fine-grained review of the AWA Scale could provide an interesting vantage point for measuring animal welfare attitude with a high representation of all four components and their item statements. Thus, to accomplish this goal, it is resorted to structural equation modelling (SEM). This methodology was applied from a confirmatory perspective: a confirmatory factor analysis (CFA) was carried out on the original scale of 29 items in this study.

All CFA values in the new scale have more accurate values than those in the original AWA Scale. The data in the theoretical model of the AWA Scale did not provide the best fit vis-à-vis the real model. Adjustment values for both scales were as follows. In the AWA Scale, the obtained Chi-square is 3103.43 for 371 degrees of freedom; thus, the comparative fit index CMIN/df value is 5.43, a higher value than that recommended by authors. Marsh and Hocevar (1985) postulated 5 as this statistic's maximum value as a reasonable indication of good model fit. However, considering the result from the AWA-R scale which amounts to 3.71, it can state that it achieves a higher degree of points than in the AWA scale.

The AWA scale's CFI value is .84, i.e. lower than the .90 recommended by Weiber and Mühlhaus (2009) to determine the fit of the model. The AWA-R value which determines the fit of the model is 0.91. In this sense, AWA scale-R accomplished a GFI = 0.945 which is no sensible to the size of the sample and shows a very good adjustment according to Rodríguez et al. (2013).

Regarding the Akaike information criterion (AIC), Akaike (1987) suggested that the lower the value, the better the fit between the data and the model purposed. The value in the AWA-R scale (1091.29) is lower than in the AWA scale (2144.86); thus, we can state that the result in the AWA-R scale has a better fit than the original.

Another index usually used to ascertain whether data fit a proposed model is the RMSEA index: authors such as Browne and Cudeck (1993) report that must be lower than .05. In the

AWA scale model, the value for RMSEA was .05, thereby leading us to deduce that it was still in need of improvement. In the revised AWA-R scale, however, the value obtained is .04, which thus does not exceed the recommended maximum value of .05. If the adjustment criteria established by authors such as Ramos-Díaz et al. (2016) or by Villardón-Gallego et al. (2013) is taken into account, this new model therefore presents a good fit data.

According to the data references of some previous studies, four of the items were eliminated. These were related to farm animals, such as AWA scale-i9: *I usually eat eggs of chickens grown up out of cages*; related to animal abuse due to pleasure and ignorance, or such as AWA Scale-i14: *Destroying the living places of animals does not matter; they can find another one*. The two other ones were related to leisure with animals, specifically to bulls: AWA scale-i18: *Bulls are brave animals; their goal is to die in bullrings* and AWA scale-i25: *I think that social events such as bullfighting should not exist in a civilized society.*

It is found that it was now necessary to carry out content analysis of the retained and excluded items in order to ensure acceptance of the construct of animal welfare over the entire scale; we thus eliminated two items favourable towards animal welfare and two unfavourable ones, thereby ensuring that the remaining number of items in each component was balanced. The eliminated item referring to farm attitude is supported by others which were retained, i.e. AWA scale-i13: *Farm animals should be kept in cages so that they can be easily managed*.

Those removed items associated with leisure with animals, especially with bulls (i18 and i25 from AWA scale), were supported by other retained items, such as 'I am concerned about bulls suffering in the bullring, even if it only lasts for a few minutes'.

In the case of i14: 'Destroying the living places of animals does not matter; they can find another one'; which exemplifies attitudes towards animal habitats, the content analysis suggested that perhaps this item is not as related with animal welfare as one might think, within the terms defined in the AWA-R scale components.

Table 1 shows the data obtained from CFA on the 29-item AWA scale, and the proposed 25-item scale which have been named AWA-R in order to differentiate it from the original one.

Table 1 Adjustment values of the CFA of the AWA Scale and the AWA-R Scale

Indexes	AWA-scale values (29 items)	AWA-R scale values (25 items)
CMIN/df	5.43	3.71
CFI	.84	.91
RMSEA	.05	.04
AIC	2144.86	1091.29

In accordance with these scientific standards, we can thus consider that the 25-item model presents a good fit with the data coming from the students' answers and represents an improvement vis-à-vis the 29-item model.

As one can tell from Table 2, a few items have factorial weight in two different components. For the sake of overall comprehensibility, we believe that each item should have factorial weight in just one component; thus, basing ourselves on the theoretical construct and on the loads displayed by the items in their respective factors (Table 2), we can assume that i1 and i9 belong to the C1 component and that items i22 and i23 belong to the C4 component, all of these observations owing to the higher factor loading, marked in bold in the table. In the case of i20, taking into account that differences between the loads in one factor (C2) or in another (C4) are small and following our previous theoretical considerations, we find that this item conceptually fits better under the C4 component.

Table 2 Standard regression loads of items of AWA-R scale

		Components	Estimate (.005)
i1	<---	**C1**	.32
i2	<---	C1	.38
i3	<---	C1	.69
i5	<---	C1	.63
i6	<---	C1	.37
i9	<---	**C1**	.21
i17	<---	C1	.39
i1	<---	C2	.10
i4	<---	C2	.72
i8	<---	C2	.36
i9	<---	C2	.19
i10	<---	C2	.81
i11	<---	C2	.48
i13	<---	C2	.32
i20	<---	C2	.29
i22	<---	C2	.29
i23	<---	C2	.17
i24	<---	C2	.84
i7	<---	C3	.26
i12	<---	C3	.49
i15	<---	C3	.61
i19	<---	C3	.54
i25	<---	C3	.44
i14	<---	C4	.52
i16	<---	C4	.54
i18	<---	C4	.25
i20	<---	**C4**	.31
i21	<---	C4	.35
i22	<---	**C4**	.31
i23	<---	**C4**	.37

Based on the grouping obtained from CFA, the items for each of the components in the animal welfare attitude scale present themselves as follows: component 1 (of the AWA-R scale) comprises i1, i2, i3, i5, i6, i9, i17; these items' maximum score on the scale is 35 points, the minimum being 7 points. Component 2 (of the AWA-R scale) comprises items i4, i8, i10, i11, i13, i22, i24; their maximum score on the scale is 25 points, the minimum 7 points. Component 3 (of the AWA-R scale) comprises items i7, i12, i15, i19, i25; their maximum score on the scale is 25 points and the minimum 5 points. Finally, component 4 (of the AWA-R scale) comprises items i14, i16, i18, i20, i21, i23; their maximum score on the scale is 30 points and the minimum 6 points.

It has also proven a new, refined version of the instrument by calculating scale and component reliabilities. Our reliability calculation for the composite instrument revealed a Cronbach alpha value of .85, considered as "good" by Boza and Conde (2015) or even 'very good' by De Vellis (1991), while the item-total correlations fall into a range between .22 and .60, considered appropriate by Nunnally and Bernstein (1995), i.e. similar to .25–.30 (Fig. 1).

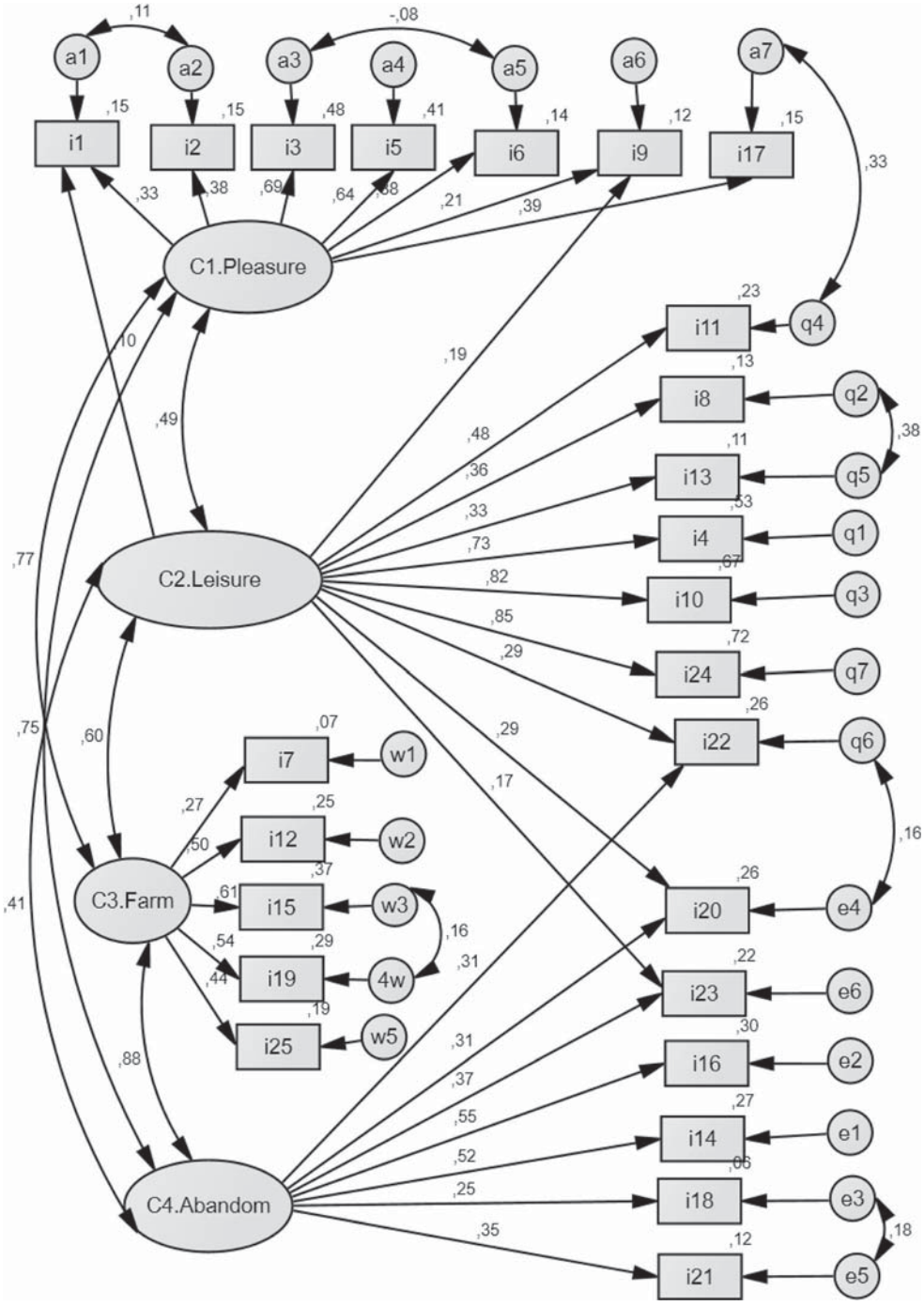

Fig. 1 CFA graph for AWA-R scale (25 items). *Nota:* C1 = pleasure corresponds with *Animal abuse for pleasure or due to ignorance*; C2 = leisure corresponds with *Leisure with animals*; C3 = farm corresponds with *Farm animals*; and C4 = abandon corresponds with *Animal abandonment* of the AWA-R scale. The complete AWA-R scale can be found in the Appendix 1 Table 8

Results

Component analysis results

After applying the AWA-R scale to the defined sample, the results show significant differences in means among the four sample components according to gender. As shown in Table 3, females are found to have higher mean scores and less typical deviations in all of the AWA-R scale components. The component that obtains the most favourable scores towards animal welfare in both genders is C1. On the other hand, the component that obtains the least favourable scores in relation to animal welfare is C2, again in both females and males. The size effect on the variance of the C2 variable due to the action of the gender is 8.2%. In accordance with Cohen (1988), values between .06 and .14 indicate an average effect on the variable.

The differences between males and females according to educational centre and age are also analysed. Regarding the former, we also analysed differences among students in the sample study according to whether they were studying at state secondary schools, public secondary schools or university centres.

As shown in Table 4, significant differences between males and females appear according to the type of educational centre they attend, in relation to two (C1 and C4) of the four components of the AWA-R scale.

Analysing the differences within components C1 and C4 in greater detail, Table 5 shows that in C1, female students at university centres obtain the higher score (4.68). There are no significant differences between the female students at privately owned state-funded centres (4.63), but there are significant differences ($p \leq .05$) between state secondary students (4.52) and university female students (4.68).

In the case of male students, it can be observed that there are no differences among male students at public institutions (4.31) and state secondary students (4.33), but there are significant differences between both types of secondary centre and university male students (4.53). Gender differences between the male and female university students can also be observed ($p = .000$).

The same situation is revealed for students of both genders with regard to C4. Female university students (4.49) show significant differences ($p \leq .05$) compared to those enrolled in state schools (4.34) and in public schools (4.37). Male university students (4.42) also show significant differences ($p = .000$) compared to those of state schools (4.09) and public schools (4.03). However, in this case, no gender differences between the male and female university students appear ($p = .276$) (Table 6).

Item analysis results

It is considered that a point score lower than 4 reveals an unfavourable attitude towards animal welfare (Mazas et al. 2013).

We also looked for differences between males and females in every item of the AWA-R scale. Here, the data also reveal significant differences between genders in each item except i7, *I think that animals suffer from both physical and psychological diseases*', about which boys and girls expressed the same opinion. Items i2: *Every domestic animal should be taken care of* and i1: *Animals suffer; they get hurt when you beat them* have the highest outcomes related to animal abuse for pleasure or due to ignorance. Thus, students are indeed concerned about animal care, or their opinion is supported by their knowledge of the issue.

On the other hand, as revealed by answers concerning leisure in items such as i13: *Animal shows are events where people have fun at the expense of their suffering*, or as in i8: *Animals used in shows are not being respected*, not just males, but also females do not seem to mind the degree of suffering animals may actually undergo in shows. In i13, the male group achieves point scores of 2.95, the lowest in the entire scale. The lowest scores obtained by female students also appeared specifically in this item (3.16).

Table 3 ANOVA analyses in the components of AWA-R scale

		N	Mean	SD	F[a]	*p* value	η^2
C1	Male	458	4.34	.54	90.46	.000	.07
	Female	936	4.61	.38			
C2	Male	458	3.37	.87	105.229	.000	.08
	Female	936	3.85	.68			
C3	Male	458	3.93	.66	45.186	.000	.04
	Female	936	4.17	.53			
C4	male	458	4.10	.57	92.055	.000	.07
	female	936	4.40	.48			

[a] Brown Forsythe statistic. Significant differences ($p \leq .001$)

Table 4 ANOVA analyses between gender and type of centre in the components of AWA-R scale

		F[a]	*p* value
Gender and type of centre	C1	3.69	.025
	C2	.05	.948
	C3	.86	.422
	C4	4.34	.013

[a] Brown Forsythe statistic. Significant differences ($p \leq .05$)

The other variable we also studied in relation to attitude towards animal welfare and gender was age. The sample was divided into five age groups (Table 7). Here, the highest scores were obtained by the oldest students. Following the tests carried out on this group, we can state that there are no significant differences between the responses given by the older female students and male students in the AWA-R scale.

In the 19–22-year-old group, significant gender differences only appear in component C2, and female students obtain the highest score (3.91) in comparison to male students (3.52) in this group. The group of 17–18-year-olds reveals gender differences in all four AWA-R scale components, with female students obtaining significantly higher scores than those of their male counterparts.

Discussion

Reviewing a previously existing scale is a common procedure when one wants to improve a tool's applicability and pertinence, as can be seen in Dunlap et al. (2000); Karazsia et al. (2008) or Powell et al. (2011). As a scale of attitudes towards animal welfare, the AWA scale was validated, and it proved itself extremely useful in ascertaining people's attitudes in this area. However, in the current comparative study, we have found that the AWA scale becomes more pertinent and well-adjusted if certain items from the original scale are discarded.

Table 5 ANOVA post hoc analyses between gender and type of centre in the components

Gender	Type of centre	C1 mean	C4 mean
Male students	State secondary school	4.33[a]	4.09[a]
	Public school	4.31[a]	4.03[a]
	University centre	4.53[b]	4.42[b]
Female students	State secondary school	4.52[c]	4.34[c]
	Public school	4.63[d]	4.37[c]
	University centre	4.68[d]	4.49[b]

Different letters within column and component represent significant differences ($p \leq 0.05$)

Table 6 Item analysis related to gender in AWA-R scale

		Mean	SD	Brown Forsythe	*p* value
i1	Male	4.78	.53	4.38	.037
	Female	4.84	.42		
i2	Male	4.81	.40	19.44	.000
	Female	4.90	.35		
i3	Male	4.10	1.04	39.14	.000
	Female	4.45	.79		
i4	Male	3.03	1.46	50.66	.000
	Female	3.59	1.25		
i5	Male	4.22	.96	25.50	.000
	Female	4.48	.76		
i6	Male	3.97	1.19	29.03	.000
	Female	4.31	.99		
i7	Male	4.05	1.10	3.26	.071
	Female	4.16	.86		
i8	Male	3.00	1.22	10.30	.001
	Female	3.22	1.14		
i9	Male	4.12	1.29	20.08	.000
	Female	4.44	1.09		
i10	Male	3.71	1.30	58.34	.000
	Female	4.23	.98		
i11	Male	3.36	1.41	245.82	.000
	Female	4.49	.90		
i12	Male	3.59	1.12	25.01	.000
	Female	3.90	.97		
i13	Male	2.95	1.32	7.75	.005
	Female	3.16	1.26		
i14	Male	4.58	.84	25.39	.000
	Female	4.80	.58		
i15	Male	4.24	.93	30.61	.000
	Female	4.51	.73		
i16	Male	4.10	1.06	40.59	.000
	Female	4.46	.84		
i17	Male	4.42	1.10	75.21	.000
	Female	4.88	.47		
i18	Male	4.34	1.20	17.02	.000
	Female	4.61	.98		
i19	Male	4.04	1.12	33.70	.000
	Female	4.38	.83		
i20	Male	3.44	1.16	37.47	.000
	Female	3.82	.98		
i21	Male	4.59	.92	8.84	.003
	Female	4.74	.78		
i22	Male	3.99	1.05	4.79	.029
	Female	4.11	.90		
i23	Male	3.60	1.12	45.22	.000
	Female	4.02	.99		
i24	Male	3.59	1.35	60.71	.000
	Female	4.15	1.08		
i25	Male	3.75	1.18	7.03	.008
	Female	3.92	1.01		

As a consequence of CFA, it was thus eliminated four items, based exclusively on statistical support. At this

Table 7 Non-parametric[a] test between age and gender in the components of AWA-R scale

	23–26-year-olds		19–22-year-olds		17–18-year-olds		15–16-year-olds		11–14 year-olds	
	Z	*p* value	Z	*p* value	Z	*p* value	Z	*p* value	Z	*p* value
C1	.804	.538	1.144	.146	2.739*	.000	2.212*	.000	2.238*	.000
C2	.579	.891	1.568*	.015	2.923*	.000	2.724*	.000	1.868*	.002
C3	.365	.999	1.206	.109	2.340*	.000	.476	.977	1.091	.185
C4	.536	.936	.686	.734	2.435*	.000	1.897*	.001	1.880*	.002

[a] Kolmogorov-Smirnov test

*Significant differences ($p \leq .05$)

point, and following Nadelson and Southerland (2012), a content analysis of both retained and excluded items was conducted. In the wake of content analysis, we do not find any reason to withhold us from removing those four items from the scale. We eliminated two favourable items towards animal welfare and two unfavourable ones; thus, in this respect, the AWA-R scale remained well-balanced. The removed items were supported by others which still encompassed their meaning, or their meaning was upheld by retaining similar items.

An analysis of this study's results shows that differences in attitudes towards animal welfare between female and male students do exist: females obtain higher scores than males. The differences are significant in all analysed components. These results are in line with other relevant gender studies found in the literature (Furnham and Pinder 1990; Furnham et al. 2003; Serpell 2004; María 2006; Phillips et al. 2011). In addition to these authors, differences in gender relating to women's concern about animal welfare were examined in previous studies such as those of Wells and Hepper (1997) and Heleski et al. (2004).

Further studies also highlight differences between genders according to the type of animals involved. In studies on care of pets (a subject related to component 1 of the AWA-R scale), Vidovic et al. (1999), Phillips et al. (2011) and Ling et al. (2016) found that women have a more positive relation with pets than men. Heleski et al. (2004) state that women have a stronger perception of farm animal welfare and are more concerned about animal rights than men, which is in line with the results obtained in this study.

Peek et al. (1996) commented that these differences may be due to women's role in society: they tend to assume primary responsibilities in matters concerning nurture, empathy and care for others. Likewise, other researchers such as Kruse (1999) allude to the different relation each sex has with nature: men tend to be more dominant, whereas women are more emotional and concerned about treating nature in an ethical manner.

With regard to attitudes towards animal welfare, the situation would seem to be similar to that reported in studies on attitudes in other fields—for example, research on attitudes towards the environment carried out by Zelezny and Schultz (2000) and Fernández-Manzanal et al. (2007). As Norgaard and York (2005) point out, societies displaying higher levels of gender equality are generally also more inclined to foment environmental protection, suggesting that these two social characteristics—people's attitudes towards animals and towards environmental protection—are, at the very least, coexistent and may indeed be interdependent. These differences between gender in matters of socialisation could thus be reflected in environmental attitudes, and also in others related to them, i.e. animal welfare attitudes.

In this study, two further variables were analysed: the type of learning centre the students attended and their age, in order to observe possible further connections regarding attitudes to animal welfare. Concerning the first variable, we observed that male students show no differences associated with the type of centre they attend; in the case of female students, those attending public and state-funded schools obtain a slightly higher score in component C1, similar to that obtained by female university students. We have found significant differences between males and females according to the type of educational centre they attend in the components of animal abuse for pleasure or due to lack of knowledge (C1) and abandonment (C4). This has something to do with the religiosity of Spanish public schools as opposed to state-funded ones. As Heleski et al. (2006) had previously pointed out, females are more concerned about farm animal welfare than males. These authors attribute these differences to the fact that those with liberal political views were more concerned than those with conservative views; and those expressing higher religiosity expressed less concern than those with lower religiosity.

In terms of age, as reported in other studies (Holfve-Sabel 2011), students' responses towards animal welfare are much more favourable in the older age categories.

Thus, the university students are those who show the greatest sensitivity towards animal welfare according to the scores obtained on the AWA-R scale. In the oldest age group, there are no differences between male and female students in any of the scale components. In the next youngest age group (19–22-year-olds), gender differences only appear in C2, where results show that female students reject leisure activities involving animals more than male students. Finally, in the 14–18 age group, gender differences systematically appear in components C1, C2 and C4, which lead us to conclude that females tend to develop a greater concern for issues such as animal welfare than males, particularly at an earlier age, and these differences gradually decrease in adults until they disappear completely in the oldest age group.

Finally, one of the limitations of this study is that it was a convenience sample conducted with respondents who were students from a part of Spain, not from the whole country. Therefore, it is possible that the results of this study may not be representative of the student community as a whole. While inferences can and have been made here in an attempt to interpret the results, further research including a more complete analysis of Spanish students is required.

Conclusion

In the scientific community at large, there is an agreement—which the authors of the current study likewise share—that the four "I situations" described by Gregory (1998), i.e. ignorance, inexperience, incompetence and indolence, could be solved by the "E" of education and "F" of formation.

Thus, to conclude, we would like to state that the promotion of favourable attitudes towards the environment—which has always been a component of education—is increasingly becoming a matter of concern. In our view, animal welfare should be included in educational environmental issues, particularly regarding the defence of animal diversity, an aspect we regard as basic in ensuring sustainability. The protection of the environment, of animals, and of biodiversity in general should be treated as a major topic in science subjects taught at primary and secondary schools, even when the animal question emerged from the social sciences and humanities (Oakley et al. 2010).

Welfare concepts are indispensable in the whole field about animals. Evidence for this can be found by analysing the structure of theories of animal ethics and the different ways in which these theories employ welfare concepts. Furthermore, the fundamental values underlying any welfare theory are essential if we want to pursue animal welfare science. The construct of animal ethics can make help clarify normative assumptions with regard to the value of the animal, ideas about what is valuable for the animal, and also for actions that should ensue from the results obtained in animal welfare science.

Appendix

Table 8 AWA-R scale

	*	**	***	****	*****
1. Animals suffer, they get hurt when you beat them.					
2. Every domestic animal should be taken care of.					
3. I have the right to beat an animal if it is annoying me.					
4. I like bullfighting being a Spanish identity sign.					
5. I would beat my pet if I got angry.					
6. I sometimes have fun chasing animals.					
7. I think that animals suffer from both physical and psychological diseases.					
8. Animals used in shows are not being respected.					
9. I would never beat my pet in order to educate it.					
10. I am concerned about bulls suffering in the bullring, even if it only lasts for a few minutes.					
11. I would love to go hunting.					
12. Farm animals should be kept in cages so they can be easily arranged.					
13. Animal shows are events where people have fun at the expense of their suffering.					
14. I would leave an animal in the countryside if I got bored of it.					
15. Farm animals are not affected by their living conditions because they are inferior living beings.					
16. Abandoned animals feel free.					
17. Killing small animals, for example sparrows or pigeons, is my hobby.					
18. Animal abandoning is a very coward and irresponsible practice.					
19. Farm animals do not suffer.					
20. I would love to collaborate with a shelter for abandoned animals.					
21. I would never abandon my pet.					
22. Animals must be protected by law					
23. I always buy pets from pet shops, the ones in animal shelters are old and ugly.					
24. I feel very sad when bulls suffer in the bullring while people are having fun.					
25. Aggressive animals should be immediately sacrificed because they cannot be cured.					

*Strongly agree

**Agree

***Neither agree nor disagree

****Disagree

*****Strongly disagree

References

Ajzen I (2005) Attitudes, personality, and behavior (2nd Ed). Open University Press, McGraw-Hill, Milton-Keynes

Akaike H (1987) Factor analysis and AIC. Psychometrika 52:317–332

Apostol L, Rebega OL, Miclea M (2013) Psychological and socio-demographic predictors of attitudes toward animals. Soc Behav Sci 78:521–525

Boza A, Conde S (2015) Training, attitude, use and impact of web 2.0 in higher education: scale validation. Cult Educ 27(2):372–406. https://doi.org/10.1080/11356405.2015.1034531

Broom DM (2017) Animal welfare in the European Union. Directorate General for Internal Policies, Policy Department C: Citizens' Rights and Constitutional Affairs. Petitions. European Union. 74 pp. Available at: http://www.europarl.europa.eu/RegData/etudes/STUD/2017/583114/IPOL_STU(2017)583114_EN.pdf

Browne MW, Cudeck R (1993) Alternative ways of assessing model fit. In: Bollen KA, Long JS (eds) Testing structural equation models. Sage, Newbury Park, pp 136–162

Cohen J (1988) Statistical power analysis for the behavioral sciences, 2nd edn. Lawrence Erlbaum, Hillsdale

De Vellis R (1991) Scale development: theory and applications. Sage, Newbury Park

Dunlap RE, Van Liere KD, Mertig AG, Jones RE (2000) New trends in measuring environmental attitudes: measuring endorsement of the new ecological paradigm: a revised NEP scale. J Soc Issues 5(3): 425–442

Fernández-Manzanal R, Rodríguez-Barreiro LM, Carrasquer J (2007) Evaluation of environmental attitudes: analysis and results of a scale applied to university students. Sci Educ 91:988–1009

Furnham A, Pinder A (1990) Young people's attitudes to experimentation of animals. Psychologist 10:444–446

Furnham A, McManus C, Scott D (2003) Personality, empathy and attitudes to animal welfare. Anthrozoös 16(2):135–146

Gregory NG (1998) Animal welfare and meat science. Cab International, Wallingford

Gruenewald D (2003) The best of both worlds: a critical pedagogy of place. Educ Res 32(4):3–12

Heleski CR, Mertig AG, Zanella AJ (2004) Assessing attitudes toward farm animal welfare: a National Survey of animal science faculty members. J Anim Sci 82:2806–2814

Heleski CR, Mertig AG, Zanella AJ (2006) Stakeholder attitudes toward farm animal welfare. Anthrozoös 19(4):290–307

Herzog HA, Betchart NS, Pittman R (1991) Gender, sex role identity and attitudes toward animals. Anthrozoös 4(3):184–191

Holfve-Sabel MA (2011) Gender attitudes in school have changed mainly in peer relational factors over a period of 35 years. Gend Educ 23(1): 73–86

Kahn R, Humes B (2009) Marching out from the ultima Thule: critical counterstories of emancipatory educators working at the intersection on human rights, animal rights, and planetary sustainability. Can J Environ Educ 14:179–195

Karazsia BT, van Dulmen MH, Wildman BG (2008) Confirmatory factor analysis of Arnold et al.'s Parenting Scale across race, age, and sex. J Child Fam Stud 17:500–516

Kruse CR (1999) Gender, views of nature and support for animal rights. Soc Anim 7:179–199

Ling RZ, Zulkifli I, Lampang PN, Nhiem DV, Wang Y, Phillips CJC (2016) Attitudes of students from southeast and east Asian countries to slaughter and transport of livestock. Anim Welf 25(3):377–387

María GA (2006) Public perception of farm animal welfare in Spain. Livest Sci 103:250–256

María GA, Mazas B, Zarza FJ, Miranda de la Lama GC (2017) Animal welfare, National Identity and social change: attitudes and opinions of Spanish citizens towards bullfighting. J Agric Environ Ethics 30(6):809–826

Marsh HW, Hocevar D (1985) Application of confirmatory factor analysis to the study of self-concept: first- and higher order factor models and their invariance across groups. Psychol Bull 97:362–582

Mazas B, Fernández-Manzanal R, Zarza FJ, María GA (2013) Development and validation of a scale to assess students' attitude towards animal welfare. Int J Sci Educ 35(11):1775–1799

Nadelson LS, Southerland S (2012) A more fine-grained measure of Students' acceptance of evolution: development of the inventory of student evolution acceptance-I-SEA. Int J Sci Educ 34(11):1637–1666

Norgaard K, York R (2005) Gender equality and state environmentalism. Gend Soc 19:506–522

Nunnally JC, Bernstein IH (1995) Teoría Psicométrica [PsychometricTheory]. McGraw-Hill, Madrid

Oakley J, Watson GPL, Russell CL, Cutter-Mackenzie AN, Fawcett L, Kuhl G, Russell J, van der Waal M, Warkentin T (2010) Animal encounters in environmental education research: responding to the 'Question of the animal. Can J Environ Educ 15:86–102

Ostovic M, Mikus T, Pavicic Z, Matkovic K, Mesic Z (2017) Influence of socio-demographic and experiential factors on the attitudes of Croatian veterinary students towards farm animal welfare. Veterinarni Medicina 62(8):417–428

Peek CW, Bell NJ, Dunham CC (1996) Gender, gender ideology, and animal rights advocacy. Gend Soc 10:464–478

Phillips CJC, Izmirli S, Aldavood SJ, Alonso M, Choe BI, Hanlon A, Handziska A, Illman G, Keeling L, Kennedy M, Lee GH, Lund V, Mejdell C, Pelagic VR, Rehn T (2011) An international comparison of female and male students' attitudes to the use of animals. Animals 1:7–26

Phillips CJC, Izmirli S, Aldavood SJ, Alonso M, Choe BI, Hanlon A, Handziska A, Illmann G, Keeling L, Kennedy M, Lee GH, Lund V, Mejdell C, Pelagic VR, Rehn T (2012) Students'attitudes to animal welfare and rights in Europe and Asia. Anim Welf 21(1):87–100

Pifer L, Shimizu K, Pifer R (1994) Public attitudes toward animal research: some international comparisons. Soc Anim 2:95–113

Powell RB, Stern MJ, Krohn BD, Ardoin N (2011) Development and validation of scales to measure environmental responsibility, character development, and attitudes toward school. Environ Educ Res 17(1):91–111

Ramos-Díaz E, Rodríguez-Fernández A, Fernández-Zabala A, Revuelta L, Zuazagoitia A (2016) Apoyo social percibido, autoconcepto e implicación escolar de estudiantes adolescentes. Revista de Psicodidáctica 21(2):339–356. https://doi.org/10.1387/RevPsicodidact.14848

Rodríguez MJ, Martínez F, Olmos S (2013) Evaluación de competencias informacionales en educación secundaria: un modelo causal. Cult Educ 25(3):361–373

Serpell JA (2004) Factors influencing human attitudes towards animals and their welfare. Anim Welf 13:145–151

Sinclair M, Phillips CJC (2017) The cross-cultural importance of animal protection and other world social issues. J Agric Environ Ethics 30: 439–455. https://doi.org/10.1007/s10806-017-9676-5

Steel BS (1996) Thinking globally and acting locally? Environmental attitudes, behavior and activism. J Environ Manag 47(1):27–36

The Farm Animal Welfare Council (FAWC). (1979). Five freedoms. Available online: https://www.gov.uk/government/groups/farm-animal-welfare-committee-fawc#assessment-of-farm-animal-welfare%2D%2D-five-freedoms-and-a-life-worth-living (Retrieved 16 Feb 2018)

Vidovic VV, Stetic VV, Bratko D (1999) Pet ownership, type of pet and socio-emotional development of school children. Anthrozoös 12: 211–217

Villardón-Gallego L, Yániz C, Achurra C, Iraurgi I, Aguilar MC (2013) Learning competence in university: development and structural

validation of a scale to measure. Revista de Psicodidáctica 18(2): 357–374. https://doi.org/10.1387/RevPsicodidact.6470

Webster AJ (2001) Farm animal welfare: the five freedoms and the free market. Vet J 161(3):229–237

Weiber R, Mühlhaus D (2009) Strukturgleichungsmodellierung- Eine anwendungsorientierte Einführung in die Kausalanalyse mit Hilfe von AMOS, Smart PLS und SPSS. [Structure, equation modelling – An application-oriented introduction to the causal analysis using AMOS, Smart PLS and SPSS]. Springer Verlag, Berlin

Wells DL, Hepper PG (1997) Pet ownership and adults' views on the use of animals. Soc Anim 5:45–63

Zelezny LC, Schultz PW (2000) Promoting environmentalism. J Soc Issues 56(3):365578