

**Perception of sheep welfare and sentience by citizens, veterinarians, biologists and animal scientists of
Curitiba, Parana, Brazil**

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Abstract: We compared the perception of citizens (C), veterinarians (V), biologists (B) and animal scientists (A) from Curitiba, Parana, Brazil, regarding sheep welfare and sentience. Knowledge about animal welfare in C (15.2%) differed from V (0.0%), B (1.1%) and A (0.0%), in terms of respondents who did not know about the subject ($P < 0.01$). Animal welfare was defined mainly considering terms related to Freedom from fear and distress, Freedom from hunger, thirst and malnutrition and Freedom from discomfort. C and B differed from V and A on the perception of farm animal welfare, as C and B believed that welfare is not or less considered for farm animals ($P < 0.05$). In addition, C and V showed higher perception of association between higher levels of animal welfare and productivity than B and A ($P < 0.05$). The perception of sheep sentience did not differ among respondents ($P > 0.05$). When asked about sheep suffering caused by management practices, in general, V and A attributed lower scores of suffering, when compared to C and B ($P < 0.05$). The results suggest that C and B, and V and A, have similar perceptions on the consideration of welfare for farm animals and sheep suffering. The respondents showed similar perceptions of sheep sentience.

Keywords: attitudes, animal welfare, human-animal interaction, suffering

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Introduction

It has been reported that the attribution of emotional experiences to animals is directly associated with a positive treatment towards them (Knight et al., 2004). Combined with scientific studies on affective states and cognition in farm animals, the recognition that they are sentient beings may increase the importance and acceptance of the need to prioritize their welfare. This way, it is important to understand citizens' perception of animal welfare and sentience, as they participate in political processes. In addition, research on the perception of different professionals who interact with animals is essential, as such professionals are directly involved in issues associated with animal welfare, are commonly involved in decisions that affect animals and may contribute to spread information on animal welfare to several sectors of the society, such as citizens, consumers, farmers and stockpeople. Therefore, our study aimed to compare the perception of citizens and different professionals who interact with animals from Curitiba, Parana, Brazil, toward sheep welfare and sentience.

Material and Methods

Respondents from Curitiba, Parana, Brazil were invited to participate in an online survey on Survio® platform from November 2014 to May 2016. The study population was divided in four categories: citizens (C), veterinarians (V), biologists (B) and animal scientists (A). From a total of 986 respondents, 753 were selected, as they lived in Curitiba, being 388 C, 248 V, 92 B and 25 A. The survey comprised a sample with a margin of error equal to 5% and confidence level of 95% for each respondent category. The study was previously approved by the Human Research Ethics Committee of the Federal University of Paraná (Comética - SCS/UFPR), under protocol number 814 835/2014.

The study comprised questions on animal welfare, sheep welfare and sentience (Table 1). Data were analyzed using descriptive statistics and by comparing responses of C, V, B and A. Non-parametric Kruskal-Wallis and Wilcoxon tests were used at $P < 0.05$, through Minitab software, version 17.

Table 1. Main questions (Q) available to 388 citizens (C), 248 veterinarians (V), 92 biologists (B) and 25 animal scientists (A) from Curitiba, Parana, Brazil; November 2014 to May 2016.

Questions	Content	Options of answers
Q01	Have you ever heard of animal welfare?	Yes, I know what animal welfare is; Yes, I know the subject superficially; No, I have never heard of animal welfare.
Q02	If yes, what do you think animal welfare consists of?	Open question.
Q03	Do you think welfare is taken into consideration for farm animals?	Yes, fully; Yes, most of the times; Yes, half of the times; Yes, a few times; No, never; I do not know.
Q04	In a scale from 1 to 5, please select the rating that best describes your opinion: Sheep that are healthy and grow well have their welfare guaranteed. Sheep are capable of feeling emotions, such as fear and happiness, in addition to suffering.	1 strongly disagree; 2 disagree; 3 neutral/unsure; 4 agree; 5 strongly agree.
Q05	In a scale from 1 to 5, classify the management practices that are frequently performed on sheep farms according to your perception of sheep suffering: identification ¹ , castration ¹ , tail docking ¹ , shearing ¹ , reproductive techniques ¹ and weaning ¹ .	1; 2; 3; 4; 5; I do not know 1 no suffering; 2 mild suffering; 3 moderate suffering; 4 severe suffering; 5 very severe suffering.

	<p>The same management practices from the previous question are described below, with definitions on how they are commonly performed. Rate them again according to your perception of sheep suffering:</p>	
	<p>Identification²: through ear notching or punching, tattooing, ear tagging or micro-chipping.</p>	
	<p>Castration²: removal or destruction of the testicles, through rubber rings, emasculator/burdizzo or surgery.</p>	
Q06	<p>Tail docking²: through rubber rings, cauterization using a hot docking iron or surgery.</p> <p>Shearing²: cutting or shaving the fleece/wool, though the use of electric shears, shearing machines or scissors.</p> <p>Reproductive techniques²: artificial insemination, synchronization of estrus (through the use of intravaginal sponge impregnated with progestagen) and laparoscopic embryo transfer.</p> <p>Weaning²: separation of ewes and lambs before the lambs reach 6 months of age.</p>	<p>1; 2; 3; 4; 5; I do not know 1 no suffering; 2 mild suffering; 3 moderate suffering; 4 severe suffering; 5 very severe suffering.</p>
Q07	<p>In a scale from 1 to 5, classify the ability of each animal to feel emotions: pigeon, butterfly, human baby, rat, dog, chicken, fish, sheep, cattle, cockroach and wolf.</p>	<p>1; 2; 3; 4; 5; I do not know 1 the animal does not feel emotions; 5 the animal certainly feels emotions; intermediate values are equivalent to a growing capacity to feel emotions.</p>

Results and Discussion

Citizens differed from veterinarians, biologists and animal scientists in their knowledge about animal welfare. A total of 15.2% C responded that they have never heard of animal welfare, in contrast with 0% V, 1.1% B and 0% A ($P < 0.01$), which might be explained by the fact that the topic is studied by the surveyed professionals. Schnettler et al. (2008) also found that 17% of the consumers in Chile stated that they do not have knowledge about animal welfare.

Most C defined animal welfare in terms of Freedom from fear and distress (27.0%), Freedom from hunger, thirst and malnutrition (20.5%) and Freedom from discomfort (17.8%). Freedom from fear and distress was acknowledged 24.8% of the times by V and 25.9% by B, Freedom from hunger, thirst and malnutrition was mentioned 20.9% of the times by V and 23.1% by B and Freedom from discomfort, 18.5% by V and 17.0% by B. Terms related to Freedom from fear and distress (21.9%) and Freedom from hunger thirst and malnutrition (18.8%) were mostly acknowledged by A. Aspects related to animal nutrition, animal health and human-animal relationship, in addition to environmental aspects, animal suffering and stress, were also acknowledged by Belgian respondents in a study by Vanhonacker et al. (2008).

A total of 46.9% C and 29.3% B believed that welfare is not taken into consideration for farm animals, in comparison with 18.5% V and 12.0% A ($P < 0.01$). Higher concern by citizens and biologists may be related to the fact that they are not used to interact with farm animals, as veterinarians and animal scientists do; the latter, being used to management practices and farming systems, may end up banalizing the scenario faced by farm animals and considering it normal.

When asked if sheep that are healthy and grow well have their welfare guaranteed, 15.5% C and 11.3% V strongly agreed with the statement, differing from 6.5% B and 4.0% A ($P < 0.05$) (Fig. 1). It was expected that professionals that interact with farm animals, mainly veterinarians and animal scientists, would have a similar perception, therefore further studies are necessary to better understand such finding. In a survey with students of a veterinary faculty, 40% agreed that if animals are producing (e.g. gaining weight or producing eggs) they have good welfare (Heleski et al., 2005). No differences were found among C, V, B and A for the perception on sheep sentience ($P > 0.05$); in general, most of respondents agreed or strongly agreed that sheep experience emotions.

When the perception of suffering caused by management practices that are commonly performed in the sheep industry was compared, the perception of identification¹ differed significantly. A total of 16.1% C

believed that sheep suffer very severely, in contrast with 2.5% V, 8.6% B and 12.0% A ($P<0.01$) (Fig.1). Lower consideration toward suffering in management practices by the professionals might be due to loss of sensitivity in the end of graduation, which might persist during the professional life. A total of 74.1% C believed that sheep suffer very severely in castration2, in contrast with 52.5% V, 64.1% B and 64.0% A ($P<0.01$) (Fig.1). Higher concern about sheep suffering by citizens might be due to the fact that this group may be more sensitive toward farming practices, as the other categories are more exposed to common practices in livestock industry. The perception of tail docking1 was the lowest by V, as 41.1% believed that sheep show very severe suffering, in contrast with 58.7% C, 50.7% B and 60.0% A ($P<0.01$) (Fig.1). The perception of tail docking2 was higher by C (74.6%) and B (71.7%) than by V (52.65%) and A (52.0%) ($P<0.01$) (Fig.1). The groups also differed on their perception to shearing1. A total of 10.8% C and 3.3% B claimed that sheep suffer very severely when sheared, in contrast with 1.6% V and 4.2% A ($P<0.01$) (Fig.1). For shearing 2, similar results were found; higher perception of suffering was found by C (10.7%) and B (4.4%), when compared to V (1.2%) and A (4.0%) ($P<0.01$) (Fig.1). Significant differences were noted for reproductive techniques1: C (17.7%) and B (28.1%) showed higher perception of suffering in sheep, than V (4.2%) and A (0.0%) ($P<0.01$) (Fig.1); and reproductive techniques2: C (31.0%) and B (9.5%) believed that sheep suffer very severely, than V (11.0%) and A (0.0%) ($P<0.01$) (Fig.1). Weaning 1 and 2 were also perceived differently. A total of 40.3% C attributed the highest level of suffering for weaning1 ($P<0.01$), differing from B (32.9%), V (24.4%) and A (20.0%) ($P<0.01$) (Fig.1). For weaning2, C and B differed from V and A; 55.5% C and 44.9% B believed that sheep suffer very severely, in comparison with 33.1% V and 20.0% A ($P<0.01$) (Fig.1). In general, the respondents attributed some level of suffering to sheep due to management practices. In addition, C and B showed similar perceptions of sheep suffering due to management practices, as well as V and C.

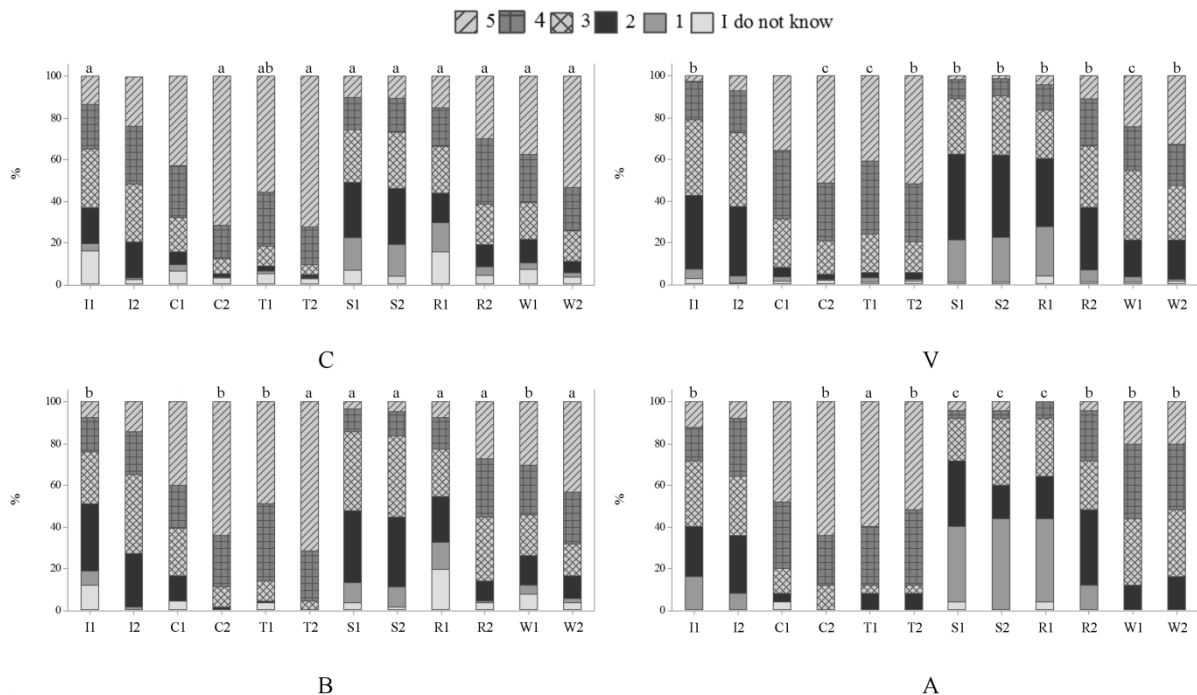


Figure 1. Levels of suffering attributed to different management practices (Q05-Q06) by 388 citizens (C), 248 veterinarians (V), 92 biologists (B) and 25 animal scientists (A) from Curitiba, Parana, Brazil; November 2014 to May 2016; 1 = no suffering; 2 = mild suffering; 3 = moderate suffering; 4 = severe suffering; 5 = very severe suffering; I1 = identification1; I2 identification2; C1 = castration1; C2 = castration2; T1 = tail docking1; T2 = tail docking2; S1 = shearing1; S2 = shearing2; R1 = reproductive techniques1; R2 reproductive techniques2; W1 = weaning1; W2 = weaning2; letters indicate differences between respondents for each management practice ($P<0.05$, Kruskal-Wallis test).

Mammals were given the highest scores of emotional capacities and invertebrates, the lowest (Fig.2). Significant differences were found among respondent groups for some animals; a total of 29.4% C showed the highest perception of sentience to butterfly, compared with 19.2% V, 29.5% B and 15.0% A ($P<0.05$) (Fig.2). As butterflies are commonly attributed some aesthetic appeal, compared to other invertebrates, it was expected that they were given higher levels of sentience by all the respondents. On the opposite, 74.2% B showed the highest perception toward rats, differing from the other groups ($P<0.01$) (Fig.2). Mice are usually rated the lowest in preference/empathy ranks, due to the fear appeal and low concern, as they are known to spread diseases (Borgi & Cirulli, 2015). However, higher perception of sentience in rats by biologists may be due to

interactions and familiarity with such animals during the graduation course, for example. The attribution of higher emotional capacities to specific animals by the respondents suggests the necessity of more studies to better understand the results.

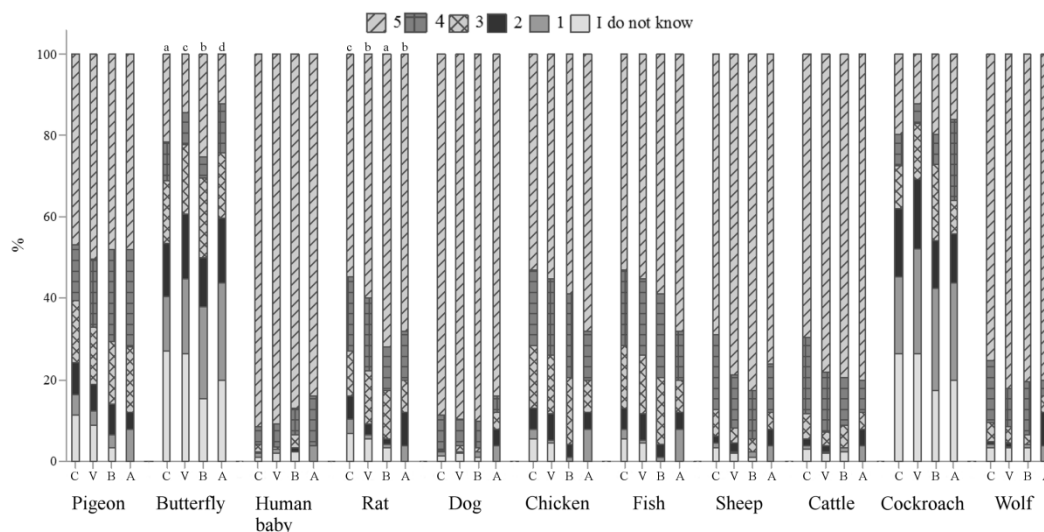


Figure 2. The ability of different animals to feel emotions (Q07), in a scale from 1 to 5, being 1 the animal does not feel emotions, 5 the animal certainly feels emotions and intermediate values are equivalent to a growing capacity to feel emotions, according to 388 citizens (C), 248 veterinarians (V), 92 biologists (B) and 25 animal scientists (A) from Curitiba, Parana, Brazil; November 2014 to May 2016; letters indicate differences between respondents ($P < 0.05$, Kruskal-Wallis test).

Conclusions

The results suggest that citizens and biologists, as well as veterinarians and animal scientists, have similar perceptions on the consideration of welfare for farm animals and suffering caused to sheep due to specific management practices. The respondents showed similar perceptions of the emotional capacities of sheep. This is the first time that differences in the perception of animal welfare issues between citizens, veterinarians, biologists and animal scientists are observed in Brazil. The knowledge presented may guide specific initiatives to improve perceptions, as well as future research.

Acknowledgements

The project was funded by a grant to the first author from the Coordination for the Improvement of Higher Education Personnel (Capes). The authors are grateful to the participants, as well as the Regional Council of Veterinary Medicine, the Regional Council of Biology of the State of Parana and ADAPAR.

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