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Perspective on pig welfare among different professional groups in Poland*

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This study examined the knowledge of Polish citizens regarding pig welfare, comparing the perspectives of farmers, animal science/veterinary professionals, students, and regular citizens. An online survey, distributed from August 6th to September 1st, 2023, gathered 140 responses. The survey assessed participants' understanding of pig welfare and their reactions to videos depicting various pig behaviours. Targeted recruitment ensured that farmers, professionals, and students comprised 42% of the respondents (N=59). Kruskal-Wallis tests and Principal Component Analysis revealed that professional groups exhibited the most significant differences in video perception, with students differing most from regular citizens. All groups accurately identified pig behaviours, suggesting a tendency towards increased animal welfare awareness, even among those with limited

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farm animal contact. Limitations include the online survey format and targeted recruitment of specific professional groups.

KEY WORDS: Poland / citizens / animal scientists / students / farmers

Poland is one of Europe's biggest consumers of meat per capita and a clear leader in pork consumption worldwide (FAO, 2024). However, as in many countries, the consumers' needs change over time, leading to different food choices. It is predicted that in the coming years, pork consumption in Poland will decrease from a per capita meat consumption of 46,079kg in 2024 to 41,969kg in 2027 (source: FAOSTATS, April 2024). There might be many reasons for this change.

One of them can be an extensive discussion on farm animal welfare and the overall use of animals for human needs in Europe (e.g. Vanhonacker *et al*. [2009a], Weible *et al*. 2016], Alonso *et al.* [2020]) has also reached Poland [Małażewska and Gajos 2018, Hanus 2021]. The pressure from European citizens to improve animal welfare has already led to numerous legislation changes in livestock husbandry practices [Molnár and Fraser 2020, Fernandes *et al.* 2021]. Individuals' perceptions of how animals behave and are treated affect the societal debates on livestock welfare [Te Velde *et al*. 2002, Fleming *et al*. 2016, Camerlink and Turner 2017, Tønnesen and Grunert 2021]. Thus, another aspect is how Polish pork consumers perceive animal welfare and how they interpret the different behaviours of pigs. Additionally, how citizens perceive animal behaviour and welfare can be expected to differ among socio-demographic groups of consumers and is especially likely to be influenced by whether consumers are directly or indirectly linked to the animal/pig husbandry sector. A study by Duijvesteijn *et al.* [2014] in the Netherlands revealed significant differences in perceptions of pig behaviour among animal scientists, pig farmers, and regular citizens. Duijvesteijn *et al*. [2014] employed the Qualitative Behaviour Assessment (QBA) tool, which was developed to facilitate the quantitative assessment of animal welfare on farms [Wemelsfelder *et al.* 2001, Rousing and Wemelsfelder 2006] The QBA could also help study Polish consumers' perceptions.

Therefore, in this study, we aimed to characterize Polish citizens by their understanding of pig welfare while considering different groups: regular citizens, animal scientists/veterinarians, students of animal sciences/veterinary medicine, and pig farmers. To gather a substantial number of respondents related to animal husbandry, we have reached out to those specific groups via email and social media.

Material and methods

The data for this study were collected through an internet survey distributed via email and Facebook from August 6 to September 1, 2023, in Poland. In addition to regular citizens, it was essential to collect a substantial representation of respondents involved in the pork sector or working with animals in general, similar to the work of Duijvesteijn *et al.* [2014]. To ensure this, the survey was sent via email to scientists

and students in animal sciences or veterinary medicine from different life science universities across Poland, as well as via Facebook to several pig farmer groups. Participants were encouraged to share the survey link further if they felt it was suitable.

Questionnaire

The survey had three sections. First, the survey covered the following general aspects of the respondents' socio-demographics: place of residence, gender, age group, level of education, professional group, previous contact with pigs, and whether they consume pork meat. Detailed levels are presented in Table 1.

Table 1. General questions and their levels in a survey

Place of living	Gender	Age group	Level of education	Professional group	Previous contact with pigs	Do you eat pork meat?
Countryside	Female	18-24	Elementary school	Pig farmer or Employee of the pig farm	Yes, I work with pigs every day.	Yes.
City up to 5,000 citizens	Male	25-35	Vocational education	Animals Sciences or Veterinary Medicine Student	Yes, I have contact with pigs at least few times a year.	No, but I eat meat from other species.
City with 5,000-20,000 citizens	Other	36-45	High school	Animal Sciences or Veterinary Medicine scientist	Yes, but not too often.	No, I am vegetarian.
City with 20,000-50,000 citizens	Prefer not to reply	46-55	Bachelor or Engineer	None of the above	Yes, but only during studies.	No, I am vegan.
City with 50,000-100,000 citizens		56-65	Master of Science		Yes, but only when vacationing in countryside.	
City with 100,000-500,000 citizens		>65	Doctorate or other Postgraduate studies		No never.	
City above 500,000 citizens						

The second section was dedicated to knowledge of farm animal welfare. The questions included obtaining information about personal views on the importance of farm animal welfare, identifying factors that may describe improved/reduced welfare husbandry practices, and assessing the types of emotions that could be observed in farm animals, assigning them to positive and negative categories. Detailed questions and their levels are presented in Table 2.

The final part of the survey was focused on evaluating five short videos with different situations involving pigs and judging the observed behaviour based on the pig's boredom/activeness, scared/relaxed, aggressive/playful, stressed/calm, skittish/friendly, as well as the emotions of the individual watching those videos, being negative/positive and bored/interested. The emotions of the pigs and the person watching the videos were measured on a scale of 1-10.

Table 2. Questions used in survey related to the consumers' understating of farm animal welfare

Is welfare of farm animals important to you?	Which of the selected factors describe INCREASED welfare conditions?*	Which of the selected factors describe DECREASED welfare conditions?*	Which of the following emotions and behaviours can be observed in farm animals?*	Which of the following emotions and behaviours are POSITIVE in farm animals?*	Which of the following emotions and behaviours NEGATIVE in farm animals?*
Yes.	Substantial space per animal in a pen.	Substantial space per animal in a pen.	Apathy.	Apathy.	Apathy.
I am not interested in this topic.	Access to natural light.	Access to natural light.	Boredom.	Boredom.	Boredom.
I do not know/It is hard to say.	Group housing (several animals in one pen).	Group housing (several animals in one pen).	Aggression.	Aggression.	Aggression.
No.	Individual housing (one animal per pen).	Individual housing (one animal per pen)	Liveliness.	Liveliness.	Liveliness.
	Free access to outdoors.	Free access to outdoors.	Playfulness.	Playfulness.	Playfulness.
	Concrete floor.	Concrete floor.	Need of rooting.	Need of rooting.	Need of rooting.
	Floor covered in straw (straw bedding).	Floor covered in straw (straw bedding).	Need of physical activity e.g. running jumping.	Need of physical activity e.g. running jumping.	Need of physical activity e.g. running jumping.
	Explorative materials, toys.	Explorative materials, toys.	Sleeping,	Sleeping,	Sleeping,
	Free access to water.	Free access to water.	Rhythmic performance of the same activity without a physiological purpose.	Rhythmic performance of the same activity without a physiological purpose.	Rhythmic performance of the same activity without a physiological purpose.
	Outdoor run with grass.	Outdoor run with grass.	Need to play with the toys or straw or other materials placed in the pen.	Need to play with the toys or straw or other materials placed in the pen.	Need to play with the toys or straw or other materials placed in the pen.
	Outdoor run with concrete floor.	Outdoor part of the pen with concrete floor.	Self-aggression.	Self-aggression.	Self-aggression.
	Ventilation.	Ventilation.			
	Minimal amount of noises.	Minimal amount of noises.			
	Air free from dust.	Air free from dust.			

*Multiple answers possible.

Video selection

Five videos collected during the farm welfare assessment were used in the survey. This was done by two trained persons who evaluated the animals with the animal welfare protocol developed within the *mEATquality* project (Tine Rousing, Aarhus University). This protocol was based on the animal welfare part of the SusPigSys protocol (http://dx.doi.org/10.13140/RG.2.2.17828.09605), with add-ons derived from Welfare Quality® (http://www.welfarequalitynetwork.net/media/1018/pig_protocol.pdf) and elements from other registration schemes (DVFA, 2020. Danish Veterinary and Food Administration, DVFA, Guide to animal welfare control in pig herds - Revised 2020).

Since the survey was distributed freely online, we wanted to avoid unnecessary issues arising from drastic, yet possible, situations on pig farms. Thus, no videos with clear aggression between the pigs or visible severe injuries were used. Their description is presented in Table 3 and can be viewed as Supplementary material (Videos 1-5). The videos contained a variety of positive and negative behaviours that could be observed among pigs. The positive behaviours were oral manipulation of the toys, curiosity, playfulness, and activeness, whereas the negative behaviours were playfulness leading to showing domination and stereotypic behaviour of repeating the same activity without meaning (observed in bored or ill animals). The videos were short (15 to 30 seconds) to ensure the viewers would not get distracted while watching

Table 3. Description of the five videos used in the survey

Video	Breed of pigs	Type of housing	Video description	Interpretation of the observation
1	Commercial hybrid	Animals kept on slatted floor	The video shows pigs' interest in the chewing toy used on farm as a space enrichment.	Positive oral manipulation behaviour, curiosity, activeness.
2	Commercial hybrid	Animals kept on slatted floor	Video shows pigs playing with ropes and plastic containers on a chain.	Positive manipulation behaviour, curiosity, activeness.
3	Zlotnicka Spotted Polish pig breed	Animals kept under intensive farming conditions with free access to open-air paddocks with shelters	The video shows pigs on the outdoor run using a cooling system on a warm day; when the sprinkler is turned on, the animals move towards the cool water.	Positive use of the outdoor enrichment protection from heat stress, activeness.
4	Commercial hybrid	Animals kept on a deep straw	Video shows pigs kept on the deep straw playing with each other in a rather aggressive manner.	The playfulness that is leading towards presenting dominating behaviour, which can be read as aggression
5	Commercial hybrid	Animals kept on slatted floor	The video presents a pig in a typical stereotypical behaviour i.e. repetition activity that is not justified in any way. In this case the pig moves the jaw for no reason.	Purely negative behavior of the bored animal, could also be a presentation of some diseases.

them. At the same time, the situation presented among the pigs was clear to judge within that time frame. Each video presented finishers.

All five videos were included in every survey, i.e., each respondent could view each video. There was no limit to the number of times a single video could be viewed.

Statistical analysis

Analysis of socio-demographic data. All analyses performed and figures created in this study were carried out using R statistical software. The Chi^2 test was used to investigate significant differences between respondents (based on the socio-demographic part of the survey presented in Table 1) and their answers to one question from Table 2: "Is animal welfare important to you?". This allowed us to investigate the differences in responses based on different socio-demographic characteristics of the respondents.

Analysis of video assessment. To prepare the list of questions for the video assessment, we have adapted the Welfare Quality® [Blokhuis 2008], which includes a section dedicated to pigs. The 10-point scale (1-10) was assigned to pairs of possible antagonistic behaviours and emotions of pigs:

– bored (1) or active (10),
– scared (1) or relaxed (10),
– aggressive (1) or friendly (10),
– anxious (1) or calm (10),
– skittish (1) or sociable (10);

as well as directly linked with viewers' emotions:

– negative (1) or positive (10),
– boredom (1) or interest (10).

Based on the answers to the videos, means with standard deviations were calculated using the socio-demographic levels from Table 1. Then, the Kruskal-Wallis test was used to verify their significant differences. For questions where a significant difference was observed between the socio-demographic descriptions of the citizens, a post hoc analysis for pairwise comparison using a Dunn test was performed.

Finally, a principal component analysis (PCA) was performed to investigate in detail the differences between answers to the videos done by members of different professional groups: farmers, students, scientists, and "other," i.e., "regular citizens". In such cases, PCA is used to reduce the dimensionality of the collected data, resulting in a smaller number of terms and fewer participants. This is achieved in PCA by clustering the answers within each group of interest, such as participants from different professional groups. Two main dimensions of the PCA were generated in our study. Each participant scored the same videos, and each video had the same number of answers; thus, each video obtained the same number of scores on each of the two dimensions of a PCA. The outcomes of the PCA were compared across professional groups to investigate their differences and similarities. This was achieved by presenting the results in a correlation circle with the first two principal dimensions,

and every term describing the video was indicated in that circle with an arrow. The analysis and figures were generated using Factoshiny v2.6 [Husson *et al.* 2010] within R Statistical software.

Results and discussion

This study aimed to describe the understanding of Polish citizens regarding pig welfare and the differences between professional groups, including regular citizens, animal scientists/veterinarians, students of animal sciences/veterinary medicine, and pig farmers. The knowledge of respondents on the topic of animal welfare is essential, as the European Commission continually adjusts laws concerning the husbandry conditions of farm animals. The extensification of the husbandry conditions in pigs and poultry became the core focus of the Horizon2020 project *mEATquality* [Ludwiczak et al. 2023, Sztandarski *et al*. 2025], which this study is a part of.

Descriptive statistics

First, we have asked general socio-demographic questions. Our survey collected 140 responses, from 92 women, 47 men, and one person who was not willing to share their gender. The majority of respondents were from rural areas (50.7%, N=71), while only 22.1% (N=31) were residents of cities with a population exceeding 500,000. A total of 38.6% (N=54) held an MSc or equivalent degree, whereas 20% (N=28) had a PhD or pursued other postgraduate studies. The majority were between 25 and 45 years old (N=92), and nearly 90% of them eat pork (N=123). Contact with pigs varied, with 23.6% participants working with them daily (N=33), 6.4% having contact only during studies (N=9), and 58% of participants not working with pigs or other farm animals (N=81). There were a few vegetarians (N=9) and vegans (N=1), possibly due to the survey's focus on professional groups working with animals. More details about the socio-demographic variability among the participants can be found in the publication Sell-Kubiak *et al*. [2025], which focused on consumer preferences among the studied professional groups.

Knowledge of pig welfare

In the second section of the survey, we have focused on understanding animal welfare among Polish citizens. Firstly, we asked a general question: "Is animal welfare important to you?". The results from the Chi-squared test indicated that the only significant differences (in socio-demographics) were between professional groups (p-value = 0.035). This was caused by the regular citizens selecting all possible options in this question (Fig. 1).

Figure 2 presents the answers of the selected Polish citizens to questions related to their understanding of the welfare conditions on the farm. The participants were given two separate questions to choose "positive" and "negative" aspects of pig husbandry. Each question had the same list of possible answers; the participants could choose

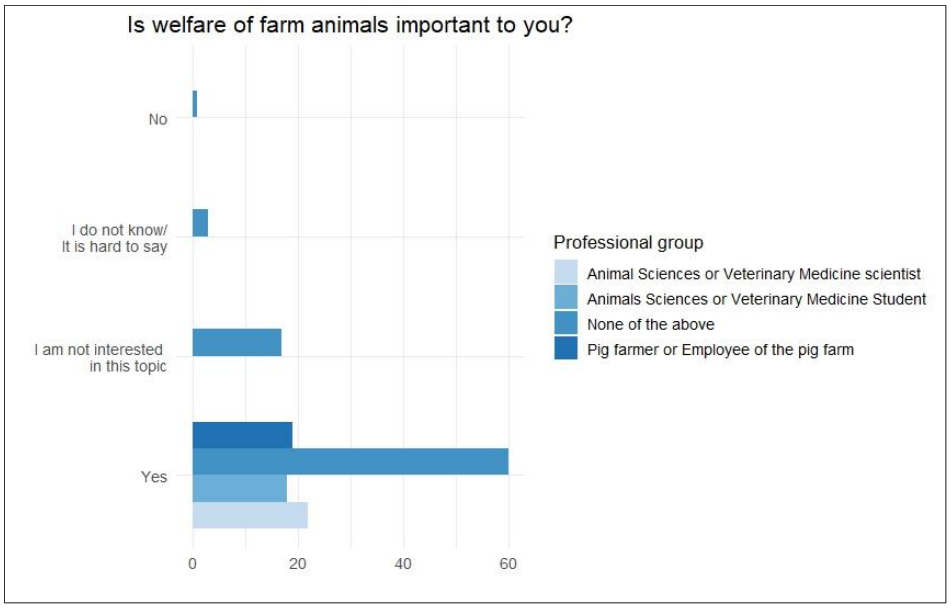

Fig. 1. Importance of animal welfare based on a professional group.

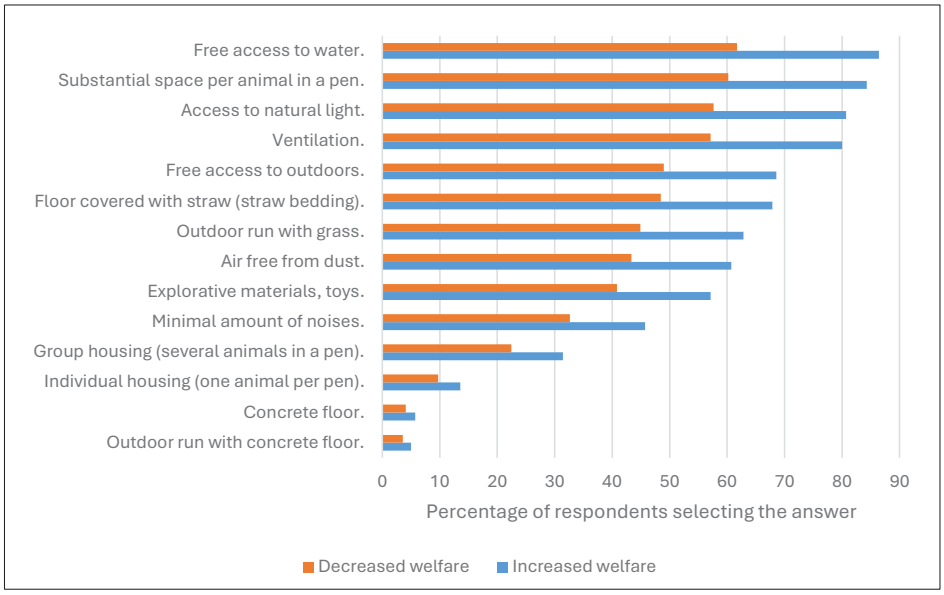

Fig. 2. Percentage of Polish citizens' answers to the question about on-farm environmental factors that potentially increase or decrease the welfare of the animals (multiple answers possible).

multiple options. None of the answers was selected by all respondents. The factor with the most significant percentage of responses indicating improved welfare was 'free access to water' (N=120, 86% of participants). The participating Polish citizens generally agreed on which environmental conditions would increase the animal welfare status. In contrast, more differences were found in the selection of options, which may compromise animal welfare conditions. Interestingly, concrete outdoor runs were not considered beneficial for the animals and were the second most frequently chosen feature, resulting in decreased welfare conditions (Fig. 2). Additionally, the same percentage of consumers selected individual and group housing as a means of reducing animal welfare.

Respondents' perspectives on the expected, positive, and negative emotions and behaviours of farm animals are presented in Figure 3. Here, three questions were asked: 1) what emotions and behaviours are possible in animals, 2) which of them are positive, and 3) which of them are negative. Each question had the same list of possible answers, and the participants could select as many answers from the list as they chose. All listed emotions and behaviours were selected by at least 50% of the respondents (Fig. 3), indicating that despite socio-demographic differences, the participants view farm animals as creatures with emotions and possibly human-like behaviours. However, it is surprising that a few respondents selected apathy, boredom, and the rhythmic performance of the same activity without a physiological purpose as positive. In contrast, they considered liveliness, playfulness, the need for physical activity, and rooting as unfavourable (Fig. 4).

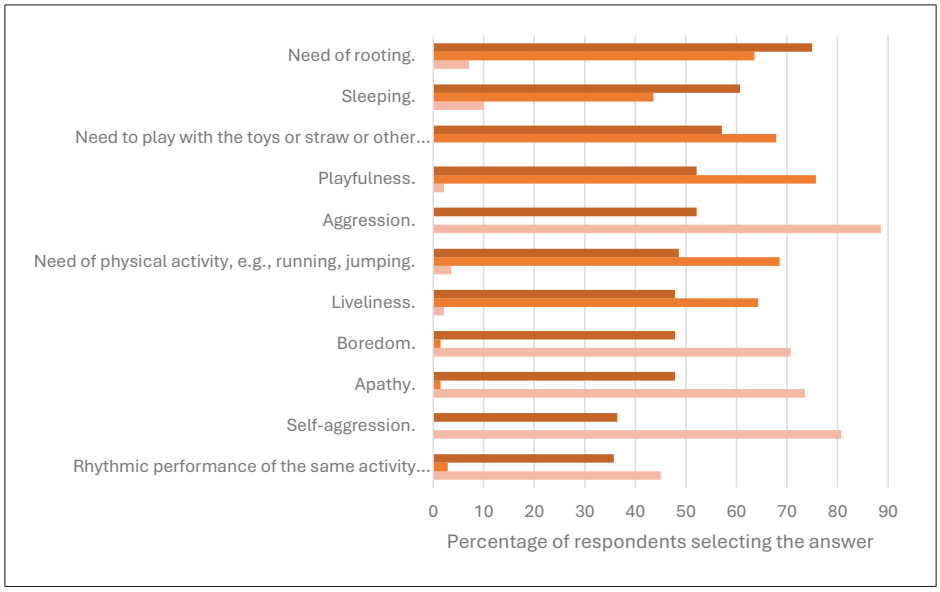

Fig. 3. Percentage of Polish citizens who answered the question about possible/positive/negative emotions and behaviours that can be observed in farm animals (multiple answers possible).

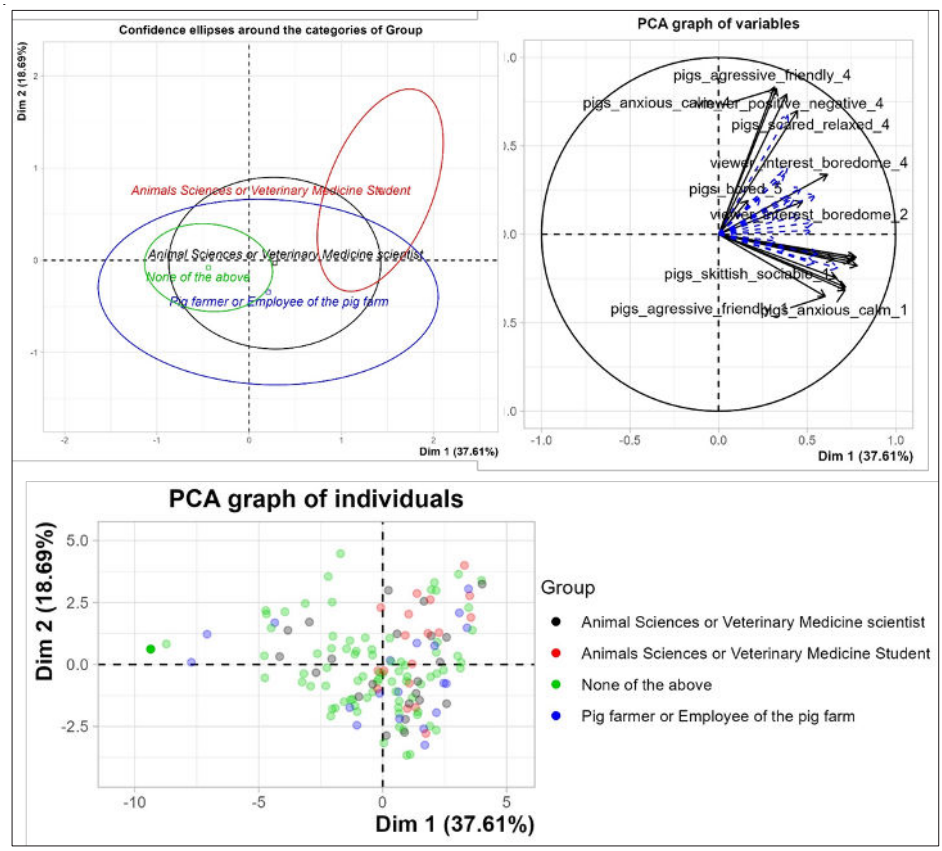

Fig. 4. Principal component analysis (PCA) of combined answers to the videos per professional group. The *x*-axis indicates the first dimension, and the *y*-axis indicates the second dimension. **A)** Plot with an ellipse representing a 95% CI around the mean of the professional group. **B)** Correlation circle with an arrow per variable. **C)** Corresponds to the plot with an ellipse and indicates individual answers per professional group.

Reactions to videos with different behaviours of pigs

The reaction of participating Polish citizens to selected videos with different behaviours of pigs was evaluated using the Kruskal-Wallis test and PCA. The first test assessed each video and its corresponding answer separately, resulting in 280 individual Kruskal-Wallis tests (Tab. 4 and Supplementary Material Table 1-6). In contrast, the PCA was a combined analysis of all answers across all videos. Based on the initial analysis, among the examined factors, members of a specific professional group showed significant differences in their perception of the videos (Tab. 4 and Supplementary Material, Tables 1-6).

Table 4. Polish consumers' reaction to the videos with pigs per professional group (n=140)

Video	Question to the viewer	Pig farmer or Employee of the pig farm (n=19)	Animal Sciences or Veterinary Medicine student (n=18)	Animal Sciences or Veterinary Medicine scientist (n=22)	None of the above (n=81)	p-value
1	Pigs are bored (1) or active (10)	7.6±3	7.9±1.8	8.4±1.7^{A}	7±2.4^{B}	0.049
	Pigs are scared (1) or relaxed (10)	8.1±3	8.7±1	6.9±3.2	7.4±2.8	0.127
	Pigs are aggressive (1) or friendly (10)	8.8±1.6	8.2±2.5	7.8±3	7.9±2.8	0.712
	Pigs are anxious (1) or calm (10)	8.4±2.4	8.4±1.9	7.4±3.2	7.6±2.6	0.454
	Pigs are skittish (1) or sociable (10)	7.9±2.6	8.9±1.9	7.7±3	7.6±2.7	0.249
	Viewer emotions negative (1) or positive (10)	8.9±1.8^{Aa}	9.1±1.1^{Ab}	8.6±1.7	7.5±2.6^{B}	0.013
	Viewer emotions boredom (1) or interest (10)	8.5±2.3	7.9±2	8.5±1.7	7.2±2.7	0.059
2	Pigs are bored (1) or active (10)	5.1±3.1	5.9±2^{Aa}	4.4±2.2^{b}	4.3±2.5^{B}	0.048
	Pigs are scared (1) or relaxed (10)	8.1±2.1^{A}	8.1±1.8^{A}	7.2±2.1	6.2±2.5^{B}	0.003
	Pigs are aggressive (1) or friendly (10)	7.7±2.6	8.3±2^{A}	6.8±2.2^{B}	6.9±2.2^{B}	0.035
	Pigs are anxious (1) or calm (10)	7.8±2.5^{a}	8.4±1.8^{Ab}	7±2.4	6.8±2.3^{Bb}	0.025
	Pigs are skittish (1) or sociable (10)	7.8±2^{A}	8±2^{A}	6.9±2.2	6.3±2.3^{B}	0.007
	Viewer emotions negative (1) or positive (10)	7.4±2.3^{A}	7.7±2.4^{A}	6.4±2.8	5.8±2.7^{B}	0.018
	Viewer emotions boredom (1) or interest (10)	7.2±2.6	7.3±1.9	6.7±2.3	6.3±2.4	0.227
3	Pigs are bored (1) or active (10)	8.6±2.3^{a}	8.4±1.7^{a}	8.9±1.5^{A}	7.2±2.3^{Bb}	0.0003
	Pigs are scared (1) or relaxed (10)	8.6±2.5	9.4±0.8	9.1±1.4	8.3±2.1	0.155
	Pigs are aggressive (1) or friendly (10)	8.8±2.1	9.4±0.8	8.6±2.2	8.4±2	0.167
	Pigs are anxious (1) or calm (10)	8.7±2.7	9.5±0.7	9.3±1.4	8.4±2.3	0.079
	Pigs are skittish (1) or sociable (10)	7.9±2.9	9±1	8.6±1.9	7.8±2	0.055
	Viewer emotions negative (1) or positive (10)	8.8±2.3^{a}	9.1±1.7^{a}	9±1.8^{a}	8±2.2^{b}	0.027
	Viewer emotions boredom (1) or interest (10)	7.9±3	8.6±1.7	8.3±2.3	7.7±2.4	0.444
4	Pigs are bored (1) or active (10)	8.6±2.1^{a}	9.1±1.7^{a}	9.2±1.1^{A}	7.7±2.5^{Bb}	0.015
	Pigs are scared (1) or relaxed (10)	4.8±2.3	5.7±1.7	5±1.8	4.5±2.2	0.164
	Pigs are aggressive (1) or friendly (10)	3±2.1	4.9±2.7	3.1±2.5	3.4±2.2	0.069
	Pigs are anxious (1) or calm (10)	3.4±2.3	4.6±2.5	3.2±2.2	3.3±1.9	0.189
	Pigs are skittish (1) or sociable (10)	4.3±2.4	5.7±2.9^{a}	5±1.8^{a}	4.1±2.3^{b}	0.049
	Viewer emotions negative (1) or positive (10)	4.2±2.7	5.7±2.8	4.8±2.6	4.1±2.4	0.118
	Viewer emotions boredom (1) or interest (10)	5.7±2.7	7.7±2	7±1.8	6.1±2.6	0.057
5	Pigs are bored (1) or active (10)	4.7±2.9	5.3±1.8	4.8±2.1	4.1±2.2	0.121
	Pigs are scared (1) or relaxed (10)	6.5±1.9^{a}	7.1±2^{A}	6.4±2.1^{a}	5.4±2.3^{Bb}	0.014
	Pigs are aggressive (1) or friendly (10)	6.7±2.3^{a}	7.2±2.3^{A}	6.6±2.2^{a}	5.3±2.4^{Bb}	0.003
	Pigs are anxious (1) or calm (10)	6.3±2.3^{a}	7.1±2.2^{A}	6.1±2.4	5.2±2.5^{Bb}	0.015
	Pigs are skittish (1) or sociable (10)	6.1±2.2^{a}	6.8±1.7^{A}	6.3±1.8^{A}	4.9±2.4^{B}	0.001
	Viewer emotions negative (1) or positive (10)	6.3±2.2^{A}	6.9±2.1^{A}	6.2±2.5^{a}	4.9±2.5^{Bb}	0.002
	Viewer emotions boredom (1) or interest (10)	6.7±2.9^{a}	7.3±1.9^{A}	6.4±2.3	5.6±2.7^{Bb}	0.044

$^{aA\cdots}$Means in rows bearing different superscripts differ significantly at: small letters – $p<0.05$; capitals –$p<0.01$.

Most differences were observed in answers to almost all questions regarding video 2 (video shows pigs playing with ropes and plastic containers on a chain – only positive behaviours) and video 5 (the video shows a pig displaying stereotypical behaviour – purely negative behaviour of a bored animal). Even though overall, the participants correctly assumed the animals presented positive (video 2) or negative (video 5) behaviour, the farmers and students judged the observed situation with significantly higher scores than regular citizens. This tendency was mainly observed between Students and regular citizens, leading to a 2.0 difference in average score. This can be linked to differences in generations, as students were, on average, younger than regular citizens and had more recent access to knowledge on welfare through lectures. In the case of the remaining videos, two questions per video showed significant differences between the groups. In video 1 (positive oral manipulation of the chewing toy), in the

scientist's opinion, the pigs were more active than what was observed by regular citizens (8.4 vs. 7.0; p-value=0.049; Tab. 4), whereas most positive emotions while viewing this video had students, then farmers and both groups were significantly different from regular citizens (9.1 vs. 8.9 vs. 7.5; p-value=0.013; Tab. 4). In video 3 (positive use of the outdoor enrichment protection), regular citizens scored pigs as being less active than other groups (7.2 vs. 8.6 by farmers vs. 8.4 by students vs. 8.9 by scientists; p-value=0.0003; Tab. 4) and also had fewer positive emotions while watching the video (8.0 vs 8.8 by farmers vs. 9.1 by students vs. 9.0 by scientists; p-value=0.0003; Tab. 4). The pigs' behaviour in video 4 (the playfulness that is leading towards presenting dominating behaviour, which could be interpreted as aggression) was again judged by regular citizens as the least active (7.7 vs. 8.6 by farmers vs. 9.1 by students vs. 9.2 by scientists; p-value=0.0003; Tab. 4) and also the least sociable (4.1 vs. 5.7 by students vs. 5.0 by scientists; p-value=0.049; Tab. 4). In general, the respondents accurately identified the positive or negative behaviours of the pigs presented in the videos. However, if the type of behaviour was not easily detected, the answers of all professional groups were close to the middle of the scale, i.e., "5".

Since the results of the Kruskal-Wallis test indicated significant differences only among different professional groups, the PCA was performed only for these groups, not for the other socio-demographic characteristics (Tab. 5 and Fig. 4). The first two dimensions of the principal component analysis explained 54% of the variance between the pig behaviours and respondents' responses. Table 5 presents the most harmful and positive correlations between the PCA dimension 1 or 2 and the possible behaviours observed in the videos or experienced by the viewers. For dimension 1, there were no negative correlations. In dimension 1, the highest scores were "friendly", "active", "relaxed", whereas in dimension 2: "calm", "relaxed", and "active", but the correlations were lower than for dimension 1. For dimension 2 the most negative scores were for

Table 5. Two most positive and two most negative significant correlations (p-value < 0.05) between the first dimension from the PCA and the observed behaviour in videos, and between the second dimension and the observed behaviour in videos, for each professional group

	Dimension 1				Dimension 1			
	positively correlated term	positive correlation	negatively correlated term	negative correlation	positively correlated term	positive correlation	negatively correlated term	negative correlation
Regular citizens	pigs_skittish_sociable_2	0.70			pigs_anxious_calm_4	0.49	viewer_positive_negative_3	-0.60
	pigs_agressive_friendly_2	0.74			pigs_scared_relaxed_5	0.50	viewer_interest_boredome_3	-0.59
Animal scientists	pigs_scared_relaxed_1	0.76			pigs_bored_active_5	0.53	viewer_positive_negative_2	-0.53
	pigs_bored_active_1	0.87			pigs_bored_active_4	0.56	pigs_agressive_friendly_2	-0.53
Students	pigs_scared_relaxed_1	0.76			pigs_anxious_calm_4	0.90	viewer_interest_boredome_3	-0.68
	pigs_bored_active_1	0.87			pigs_scared_relaxed_4	0.93	viewer_positive_negative_3	-0.52
Pig farmers	pigs_agressive_friendly_3	0.83			pigs_bored_active_5	0.48	viewer_interest_boredome_3	-0.75
	viewer_interest_boredome_5	0.86			pigs_agressive_friendly_4	0.53	pigs_scared_relaxed_3	-0.74

viewer perception of the videos (Tab. 5). Importantly, there are differences between the professional groups in terms of correlations depending on the dimension of PCA. In dimension 1, scientists and students share the same terms, whereas regular citizens and Farmers differ the most from the other groups. Still, the correlations with dimension 1 have highly similar values, ranging from 70 to 87%. In dimension 2, the positive correlations reflect similar terms but from different videos (video 4 vs. video 5), and there are substantial differences between professional groups; for example, the correlation for anxious_clam_4 is 90% for students, whereas it is 49% for regular citizens. Again, this highlights the differences between the two groups of participants. The negative correlations for dimension 2 were very similar between groups of participants, based on the terms and level of correlations; for example, viewer reaction positive_negative_3 had a correlation of -52% for students and -60% for regular citizens.

As mentioned earlier, the Students scored the videos significantly differently from other groups, which was confirmed in PCA. The greatest differences were found between Students and regular citizens, as well as between Students and Scientists (Fig. 4). This interesting finding indicates that a combination of young age and being a student gives a different perspective of the pig's behaviour than in other groups. This is not in line with the study by Duijvesteijn *et al.* [2014], where the group most different in their perception of pigs' behaviour on videos was Farmers. Despite the significant differences between various professional groups in the videos.

Study limitations

Our study is a relatively small one compared to the European online survey of consumers done for example by Verbeke *et al.* [2010], where about 500 respondents per country were collected in Belgium, Denmark, Germany, Greece, and Poland; however, a relatively big one compared to the video evaluation of different stakeholders groups done by Duijvesteijn *et al*. [2014], where a total of 44 participants took part. Still, there are some limitations to our study, including the online distribution of the survey and the focus on collecting a sufficient number of questionnaires from specific professional groups (i.e., professionals working with pigs).

The online distribution of the survey with questions regarding shopping habits may lead to a selection of a "socially expected" answer that would not be applied in the shop. To ensure this answer is honest, we have included the option that money is the issue when selecting products with welfare labels. Regarding questions related to understanding animal welfare, the presence of scientists could help explain the meaning of specific terms used in the survey, as needed by the general public. Based on the answers, participants may have struggled to understand the particular conditions under which the pigs could be kept. Nevertheless, online distribution of surveys remains the most efficient method in terms of time and reaching a high number of participants.

In our study, we needed to collect responses from animal scientists, students, and professionals who work with pigs daily. This resulted in an unusual imbalance in the

distribution of all professional groups working with animals (N=59, 42%) compared to the rest of the respondents (N=81, 58%). Such a setup was, however, an intentional action on our part to ensure ~20 respondents per professional group, including animal scientists/veterinarians, students of animal sciences/veterinary medicine, and pig farmers, to obtain sufficient data for further analysis.

Conclusion

Females were more likely to pay attention to the welfare label than men. At the same time, females were 7 out of 8 vegetarians/vegans, which supports the general trend of females being more aware of different diets. People with the most frequent contact with pigs also eat pork most often. Only regular citizens used all possible answers to the importance of animal welfare, whereas scientists, students and farmers highlighted only one answer – "yes". Our survey was designed to include a sufficient number of respondents from animal/veterinary scientists, students, and pig farmers, who together accounted for 42%. This resulted in the most significant differences between those groups viewing the videos. However, all professional groups correctly identified the pig behaviours from the videos, giving positive/negative scores to videos with corresponding behaviour. This suggests a growing awareness of animal welfare in society, despite some groups not having direct contact with farm animals. At the same time, students, the closest to the knowledge and the youngest group, differed the most from regular citizens.

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Data statement

The data generated in this study is available upon reasonable request from the corresponding author of this paper. Supplementary material can be found under the link: https://drive.google.com/drive/folders/1KoswooTPlxcJHSKjYvhB8dG1C_48Xhaa?usp=sharing

Ethics approval

No animals were used to generate the results of this study. The questionnaires were fully anonymized, no personal data was used, and the respondents were informed that the collected information would be used in scientific publications.

Declaration of interest

The authors declare non-competing interests.

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