Should organic animals be slaughtered differently from non-organic animals? A cluster analysis of German consumers

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Abstract Public criticism of livestock husbandry is increasing, and better animal welfare is a main buying motive for organic animal products. The slaughter process is a crucial point for animal welfare impacts, but there are no specific regulations regarding slaughter methods according to the European organic label. Research is missing on what (organic) consumers expect and what they demand from slaughter when considering organic meat. We examined these questions in a survey with 1,604 consumers in Germany. We identified three groups of participants based on their different views on the treatment of organic and non-organic animals at slaughter. The results show that especially organic consumers expect specific regulations for the slaughter of organic animals to be in place already, and they therewith perceive advantages for meat quality. However, the cluster analysis reveals one group (36.8%) that is for a different slaughter of organic animals and simultaneously favors the equal treatment of all animals at slaughter. Consumers in this ambivalent cluster justify their meat consumption by buying organic meat more often, which might be a coping strategy with the moral dilemma of meat consumption (“meat paradox”). A second cluster (32.4%) rejects different slaughtering methods and is highly interested in animal welfare. These consumers seem to plead for general animal welfare improvements. A third cluster (30.8%) is not interested in the slaughter methods at all. The results show that specific regulations for the slaughter of organic animals might reduce the risk of losing consumer trust and open up further differentiation strategies.

Keywords Organic meat · Consumer expectation · Segmentation · Slaughtering · Animal welfare · Meat paradox

Introduction

The public and political debate about animal welfare and consumers’ expectations mainly focuses on husbandry systems and their influence on animal welfare and product quality. Slaughter processes are largely disregarded in these discussions. Research regarding slaughter processes shows that the handling of animals before and during slaughter, such as the structure of the lairage pens before slaughtering, the movement to the stunning area (e.g., use of voices and electric prodders), or stunning effectiveness, influences not only the animals’ welfare but also the meat quality (Velarde and Dalmau 2012). In addition, Dalmau et al. (2009) show that there are large differences between slaughterhouses concerning animal welfare levels, e.g., there are slaughterhouses where animals are five times more likely to fall or slip on the
floors. The authors attribute differences, such as fear, slipping, or stunning effectiveness, mainly to the type of installations and management. So far, there are no studies investigating the differences between the processes or between the handling of organic and conventional animals during slaughter. Indeed, organic animals in the EU are often slaughtered in conventional (large) slaughterhouses. These slaughterhouses require an organic certification. However, this certification only states that the organic animals must be slaughtered separately from conventional ones and that the separation of meat must be guaranteed. Thus, according to the law and the European organic label, it is not mandatory for organic animals to be slaughtered differently compared to conventionally raised animals in the EU (European Union 2009; Duval et al. 2020).

Also in consumer research, only a few studies have analyzed consumer interest and expectations towards the slaughtering process of animals. De Jonge and van Trijp (2014) show that an “animal friendlier” slaughter method is, at least for a small group of consumers (14%), of importance for animal welfare in broiler production. Schnettler et al. (2009) conducted a conjoint analysis with the attributes of origin (local vs. imported), information on pre-slaughter treatment, and price with Chilean meat consumers. Overall, respondents derived the most benefits from local origin, followed by information about the pre-slaughter treatment. For one group, the information about pre-slaughter treatment was significantly more important than the other aspects. Respondents in this group eat meat less frequently and are most interested in animal welfare. Thus, the authors conclude that, for consumers with high animal welfare concerns, the animal-friendly treatment before slaughter is important too. Hoeksma et al. (2017) also confirmed this and found that animal welfare concerns are the main drivers for buying meat from alternatively slaughtered animals, e.g., using mobile slaughtering.

Nevertheless, studies further show that many consumers tend to ignore the issue of slaughter in meat production and consumption and have little knowledge about it (Wrenn, 2018). Loughnan et al. (2012) describe meat eating as a “morally problematic issue,” meaning that some people do not want to think about the killing of animals when they eat meat, as they are simultaneously convinced that animals should not be hurt. To avoid feeling uncomfortable when eating meat, some consumers disassociate meat from killing animals (Benningstad and Kunst 2020). This phenomenon is also referred to as the “meat paradox” (Rothgerber 2012; Bastian and Loughnan 2017). Meat consumers confronted with this moral dilemma cope with it in different ways: justification of meat consumption as “natural, normal and necessary” (Bastian and Loughnan 2017), buying more animal-friendly products, such as organic meat, or systematic trust that control mechanisms guarantee food safety and animal welfare during the production process are some of these strategies (Simons et al. 2018).

Against this background and the fact that one main motive for buying organic meat is the expected improved animal welfare (e.g., McEachern and Willcock 2004; Padel and Foster 2005), the question arises whether consumers expect specific slaughter procedures for organic animals to be in place. Presumably, at least some (organic) consumers have such expectations, especially when considering that slaughtering impacts animal welfare and meat quality. As already mentioned, there are no specific statutory regulations for the slaughter of organic animals. If consumers nevertheless expect them, it might jeopardize their trust in organic meat production when consumers realize this gap. Trust is an important dimension for the organic sector, as it influences the willingness to buy and pay for organic products directly (Ilchmann and Abdulai 2013; Nuttavuthisit and Thøgersen 2017).

To the best of our knowledge, whether (organic) consumers expect different regulations for the slaughter of organic animals, and whether they appreciate such a differentiation, is still unanswered. Therefore, the first aim of this study is to answer the following question:

**R1: What do (organic) meat consumers expect from the slaughter of organic animals, and do they want organic animals to be slaughtered differently compared to conventional animals?**

The second aim of this study is to find underlying attitudes that guide the opinion for or against specific regulations for the slaughter of organic animals. As heterogeneous attitudes are expected, groups with different attitudes are carved out using clustering methods and are described with relevant aspects, such as sociodemographics, (organic) meat consumption habits and buying motives, expectations towards and knowledge about existing regulations,
trust in different slaughterhouses, and their dealing with the issue of animal welfare and slaughtering during (organic) meat purchases. Additionally, statements displaying the meat paradox are used because consumers address the topic of killing animals in different ways, which might influence their attitudes towards slaughtering. Thus, the second research question is:

R2: How do meat consumers differ in their attitudes towards differences in the slaughter of organic and conventional animals, and what characterizes these consumer groups?

We chose Germany as a study area because of its strong meat industry, high consumption rates of meat, and emerging organic sector. The results of this study are significant for the organic sector as they reveal important consumer attitudes and also offer marketing possibilities for the organic sector to push animal welfare forward and to distinguish the slaughter of organic animals from that of conventional ones through stricter regulations.

Data and methods

Ethics approval

The ethical committee at the University of Göttingen approved the study before data collection. We informed participants about the use of data, and they provided written informed consent online. They were informed that they could withdraw consent at any time and leave the survey by closing their internet browser. Further, we informed them about the topic (“slaughtering of farm animals”) at the beginning of the survey.

Qualitative pre-survey

In the first step, a qualitative pre-survey was conducted with 36 people. We interviewed 12 people on fattening pigs, dairy cows, and laying hens using individual online interviews. The sample consisted of meat consumers and vegetarians to get comprehensive insights into existing expectations, attitudes, and opinions towards the topic of slaughter. Respondents were recruited in a snowball system through contacts of the authors and their colleagues in their circle of acquaintances. The prerequisite for participation was that participants have no direct contact to agriculture. Concerning age, gender, occupation, and consumption frequency of organic meat the sample was quite heterogeneous. Thus, age ranges between 18 and 68 years and there were some students as well as retirees and full-employed respondents within the sample. Additionally, whereas some only buy organic food, others never have bought it in the past. The interviews were conducted online via Zoom in March and April 2021 and lasted 30 min on average. The questions included expectations towards organic meat production focused on the slaughtering of animals. We used guideline questions to structure the interviews and subsequently transcribed the recorded sessions. The evaluation took place with a qualitative content analysis according to Mayring (2015). The results from the interviews were then used to design the quantitative survey.

Quantitative survey

We collected the quantitative data in June 2021 by a panel provider as part of a web-based survey of German consumers (including vegetarians [3.9%] and vegans [1.2%]) aged 18 years and older. These consumers did not have to be responsible for purchasing food. The selection of participants was based on the idea that the attitude and perception of different slaughter methods are relevant for meat consumers and all consumers because this issue might affect the image of the organic sector in general. However, the vast majority of respondents regularly consumes meat. Quotas were set for gender, age, place of residence, income, and education to generate a sample approximately representative of the German population in these characteristics (Table 1). In total, 1,708 persons participated in the survey. Due to inconsistent answers, straightlining behavior, or answering the survey too fast (duration below 30% of the median), 104 (6.09%) participants were excluded from further analysis. Thus, 1,604 records remained for data analysis. As the topic of the questionnaire was related to organic meat consumption, we boosted the participation of organic meat consumers in the sample by a subset of 500 respondents who consume organic meat at least often. In order to achieve this, the panel provider invited subjects to whom the information regarding regular organic consumption was available in a focused manner. The
organic consumption of respondents was further recorded at the beginning of the survey and tracked with a quota. This resulted in a higher average consumption of organic meat compared to the German population.

**Questionnaire**

First, participants were asked to supply their sociodemographic data and to answer questions regarding their buying and consumption behavior of (organic) meat (1 = “(Almost) always”; 3 = “Sometimes”; 5 = “Never”). Additionally, participants had to state the importance of taste, price, and animal welfare during meat shopping on a scale from 1 (“Very important”) to 5 (“Not important at all”). Next, participants were asked to assess their subjective level of knowledge about the slaughter of organic animals (“How familiar are you with the regulations on the slaughter of organic animals?”), scale from 1 = “Very familiar” to 5 = “Completely unfamiliar”), whether they expected specific rules for the slaughter of organic animals to be in place (“What do you think: Are there also specifications in the organic regulation for the transport and slaughter of the animals to differentiate from conventional animal husbandry?”, scale from 1 = “Yes, definitely”; 3 = “Partly”; 5 = “No, definitely not”) and if they think that organic animals are slaughtered in specific slaughterhouses (“Where do you think organic animals are slaughtered?”, scale from 1 = “Only in specific organic slaughterhouses”; 3 = “Partly”; 5 = “Only in the same slaughterhouses as conventional animals”; 6 = “Don’t know”).

After that, trust in four different types of slaughterhouses was gathered (large slaughterhouse, small- to medium-sized slaughterhouse, slaughterhouse with organic certification, non-industrial butchery). As trust is a multidimensional concept containing the assessment of human competence (“I think that there is well-trained and competent staff working in this slaughterhouse to ensure animal welfare.”), technical conditions (“I think that the best technology is used to ensure the most humane slaughter possible.”), transparency/honesty (“I think that this slaughterhouse honestly informs the public about animal welfare.”), and care/integrity (“I think animal welfare is a high priority in this slaughterhouse.”) (Poortinga and Pidgeon 2003; de Jonge et al. 2007; Albersmeier and Spiller 2010; Nuttavuthisit and Thøgersen 2017), respondents answered four questions for each type of slaughterhouse related to the trust dimensions (scale from 1 = “Fully applies”; 3 = “Partly”; 5 = “Does not apply at all”).

Subsequently, we surveyed the attitudes towards slaughter. The statements were developed based on the qualitative pre-survey interviews, which indicated very heterogeneous opinions on the question if organic animals should be slaughtered differently from conventional ones. While some respondents argued that there should be a difference, others were clearly in favor of all animals being slaughtered in the same way. Accordingly, in the quantitative survey, we included three statements each for both positions. In addition, ten statements representing the meat paradox were included that we adapted from Rotherger (2012) and Bastian and Loughnan (2017). The level of agreement with all attitudinal statements was measured on a 5-point Likert scale with neutral midpoints (1 = “I totally agree”; 3 = “Partly”, 5 = “I totally disagree”).

| Table 1 Sociodemographics of the sample, n = 1,604 |
|---------------------------------------------------|
| Sample | German population |
|--------|-------------------|
| Age (Ø; [min, max]) | 50.4 [18, 88] | 51.0 [18+] |
| 18–34 years | 23.2% | 23.9% |
| 35–49 years | 21.9% | 22.1% |
| 50–64 years | 28.4% | 27.5% |
| 65+ years | 26.6% | 26.3% |
| Male | 49.1% | 49.4% |
| Female | 50.9% | 50.7% |
| Low education | 32.4% | 34.5% |
| Medium education | 31.8% | 31.9% |
| High education | 35.8% | 33.6% |
| Monthly net household income | | |
| < 1,300 € | 20.6% | 18.3% |
| 1,300–2,599 € | 37.4% | 36.6% |
| 2,600–4,499 € | 29.9% | 28.7% |
| ≥ 4,500 € | 12.1% | 16.2% |
| Organic meat consumption | | |
| Always | 12.7% |
| Often | 21.9% |
| Occasionally | 24.8% |
| Rarely | 17.7% |
| Never | 22.8% |

Sources: Statista 2022a, Destatis 2022, Statista 2022b, Statista 2022c
Data analysis

First, the level of knowledge and expectations regarding the slaughter of organic animals was analyzed descriptively. In addition, we calculated a two-sided Pearson correlation analysis of the frequency of organic meat consumption on the one side, and the level of subjective knowledge, the expectation of specific rules for the slaughter of organic animals, and the perception of where the animals are slaughtered. Additionally, based on the four statements for measuring trust, we developed an index for each type of slaughterhouse (large slaughterhouse, small- to medium-sized slaughterhouse, slaughterhouse with organic certification, non-industrial butchery), by taking the mean value (average) from the four trust dimension statements. The indices make it more straightforward to show the trust of the various segments in a condensed form. For these trust-related statements and indices, we conducted t-tests to detect significant differences between the assessment of the different types of slaughterhouses regarding specific dimensions as well as overall (by indices).

The further steps included two factor analyses and a cluster analysis. The first factor analysis was performed with six statements dealing with the respondents’ attitudes towards the different ways of slaughter of organically and conventionally reared animals. The two resulting factors were used to carry out a cluster analysis and to define clusters that differ in their attitudes regarding the slaughter of organic animals. In the second factor analysis, we reduced ten statements on the meat paradox to three respective dimensions to use them as cluster-describing factors.

For both factor analyses, we used principal component analysis (PCA) with orthogonal varimax rotation. The usage of varimax rotation in social science is sometimes criticized as it requires uncorrelated variables that are often not given in psychological constructs (Tabachnick and Fidell 2007). However, there are also supporters of using varimax rotation due to the better interpretability and independence of gained factors which is useful for the following cluster analysis (Field 2009; Park et al. 2017) — and this is why we decided to use varimax rotation for our study. First, we tested the data for suitability for PCA using the Kaiser–Meyer–Olkin (KMO) criterion and Bartlett’s test (Backhans et al. 2016). These test whether there are any correlations between the variables (Bartlett’s test) and whether there is an appreciable relationship between the variables (KMO). Larger KMO values indicate that the variables are closely related. According to Kaiser and Rice (1974), a value below 0.5 is considered unsuitable for PCA. Following Kaiser (1960), we extracted factors with an eigenvalue greater than 1. In addition, items with loadings below 0.50, significant double loadings, or commonalities below 0.50 were excluded from the analysis (Hair et al. 2006). In order to further prove that all items were needed and reasonable, we tested the items by means of measuring sampling adequacy (MSA) at the single-item level in accordance with Lorenzo-Seva and Ferrando (2021). The MSA values ranged between 0.676 and 0.745 for the first and between 0.571 and 0.886 for the second factor analysis. Additionally, the lower level of the 95% confidence intervals is above 0.5 for all items. Thus, all items were assessed as appropriate for the respective factor analysis. Moreover, correlation matrix shows a correlation of variables for each factor above 0.5 (Tabachnick and Fidell 2007). After the factors were determined in this first step, we calculated Cronbach’s alpha to check the reliability of the factors. Cronbach’s alpha should reach a value of at least 0.7 for the factors to be used for further analyses (Field 2009). The factor values were saved using the Anderson-Rubin method. This approach is recommended to avoid any correlation between factors because the factors serve as the basis for the following cluster analysis (Field 2009).

The two factors on attitudes towards slaughter served as cluster-building variables in the cluster analysis. Before starting the analysis, the sample was checked for outliers using the single linkage method but no outliers were detected. However, 20 respondents were not included in the cluster analysis due to missing values in the statements composing the factors. Next, we used hierarchical cluster analysis using the Ward method and squared Euclidean distance to identify the number of clusters. For this purpose, both the dendrogram and the agglomeration table (elbow criterion) were examined. Additionally, we checked the cluster number for its interpretability in terms of content. The cluster centroids were then used as a starting point for the final clustering with the K-means algorithm, which improves the homogeneity of the groups (Backhans et al. 2016). Finally, we assessed the classification accuracy of the analysis using discriminant analysis. The $F$-values and the
significance of the results were used to assess the heterogeneity of the identified clusters. In addition, we conducted ANOVA and post hoc tests to reveal significant differences between clusters. Data were analyzed using IBM SPSS Version 27.

**Results**

**Knowledge, expectation, and trust about the slaughter of organic animals**

Consumers tended to be rather uninformed about the slaughter of organic animals or at least rated their knowledge as low. Only 6% stated that they were (rather) well acquainted with the regulations on the slaughter of organic animals. At the same time, however, 61% of the respondents expected specific rules to be in place for the slaughtering of organic animals compared to conventional ones, whereas only 15% did not (Fig. 1).

In addition, the expectations on where organic animals are slaughtered were quite heterogeneous. While 31% assumed that organic animals are slaughtered only or mostly in specialized organic slaughterhouses, another 22% believed that organic and conventional animals are slaughtered in the same slaughterhouses, and 31% expected both to be true. Moreover, 17% were unsure. Additionally, many respondents thought that organic slaughterhouses are always or predominantly small (45%) or to be both small and large (48%), but just a few expected organic slaughterhouses to be only large operations (7%).

Table 2 shows that the consumption frequency of organic meat was positively correlated with the subjective knowledge \((r=0.259)\), the expectation that there are stricter rules for the slaughter of organic animals \((r=0.100)\), and the assumption that organic animals are slaughtered in special organic slaughterhouses \((r=0.102; \; all \; p \leq 0.01)\). In addition, respondents who rated their knowledge higher also had higher expectations about specific rules. Thus, consumers of organic meat not only assumed that they were well informed but also had higher expectations regarding stricter rules and specific slaughterhouses for organic animals. For correlation analysis, the answer “Don’t know” was set to missing.

![Fig. 1](image)

**Table 2** Two-sided Pearson correlations between consumers’ meat consumption, knowledge, and expectations, \(n=1,604\)

| Correlations \((r)\) | M | SD |
|----------------------|---|----|
| 1 Frequency of organic meat consumption\(^1\) | 3.16 | 1.339 |
| 2 How familiar are you with the organic animal slaughter regulations?\(^2\) | 3.96 | 0.913 | .259** |
| 3 Do you think there are specific regulations for the slaughter of organic animals?\(^3\) | 2.37 | 0.988 | .100** | .166** |
| 4 Where do you think organic animals are slaughtered?\(^4\) | 2.78 | 1.001 | .102** | .010n.s | .354** |

\(*p\)-value ≤ 0.01; \(^{n.s.}\) not significant; \(^{1}\)Scale: 1 (“Almost always”) to 5 (“Never”); \(^{2}\)Scale: 1 (“Very familiar”) to 5 (“Not familiar at all”); \(^{3}\)Scale: 1 (“Yes, definitely”) to 5 (“No, definitely not”); \(^{4}\)Scale: 1 (“Only in specific organic slaughterhouse”) to 5 (“Only in the same slaughterhouses as conventional animals”)
Figure 2 shows how respondents rated the different types of slaughterhouses on the following dimensions of trust: transparency about animal welfare, care about animal welfare, staff competence, and appropriateness of technology used. Large slaughterhouses were assessed significantly more negatively in all areas, while medium-sized abattoirs were in the neutral range, and slaughterhouses with organic certification as well as handcrafted butchers were rated more positively in all aspects. For the technology used, the differences were smaller between the slaughterhouses, with large slaughterhouses rated less negatively than in the other dimensions. The trust indices show that overall trust was lowest for large slaughterhouses and highest for slaughterhouses with organic certification.

Factor analysis regarding different slaughtering regulations and correlation with organic meat consumption

Table 3 displays the two resulting factors and the factor loadings, means, and standard deviations of the six statements about whether there should be differences between the slaughter of organic and conventional animals. On average, respondents seemed to rather or somewhat agree with the statements that organic animals should be slaughtered differently from conventional ones (means between 2.53 and 2.93). However, the standard deviations are high, indicating heterogeneous consumer attitudes. In addition, there was a higher agreement with the statements loading on the second factor that all animals should be treated equally at slaughter (means between 1.50 and 2.00).

The agreement with statements loading on the first factor “Pro Different Slaughter” showed a significant but low positive correlation with the frequency of organic meat consumption, whereas there was no correlation for statements of the second factor “Pro Equal Slaughter” (Table 3).

Cluster analysis

Table 4 shows the findings of the cluster analysis, which resulted in three clusters based on the two factors presented above. While the first cluster A seems to be ambivalent by simultaneously agreeing not only that organic animals should be slaughtered differently...
but also that all animals should be treated the same, cluster B refuses different slaughter methods for organic and conventional animals. Cluster C disagrees more with statements for equal slaughter. The discriminant analysis confirms a classification accuracy of 99.42% for the clusters built by the factors.

In addition to the cluster-building variables, further criteria are used to describe the clusters and therewith get more insights into the respective consumer groups. The clusters are therefore characterized as follows based on results displayed in Table 4.

Cluster A is the largest group (36.8%) and has the highest agreement with the “Pro Different Slaughter” factor and a similar strong agreement with the “Pro Equal Slaughter” factor. This group shows the highest consumption frequency of organic meat and animal welfare is the most important aspect when buying meat followed by meat quality. Respondents in this cluster are most likely to believe that there are (already) specific rules in place for the slaughter of organic animals and that organic animals are slaughtered in different abattoirs compared to conventionally raised animals. In line with these findings, these consumers also have a significantly higher trust in organic slaughterhouses. In addition, participants in this cluster show the highest agreement that consumers are responsible for animal welfare when buying meat and at the same time justify their meat consumption with statements such as “Meat is important for a healthy and balanced diet.” Respondents in this cluster tend to repress thoughts about slaughtering animals. This cluster is named “Ambivalent meat eaters,” as they are not only very interested in and concerned about animal welfare but also like to eat (organic) meat.

Cluster B (32.4%) shows a clear positioning against differentiation and for equal treatment of all animals at slaughter. Consumers in this group have the lowest trust in not only large but also organic slaughterhouses and have the lowest agreement that existing regulations are sufficient. In this cluster, the proportion of women and individuals who tend to eat less meat (“Flexitarians”) is highest, while the frequency of those who buy organic meat is the lowest. It is also evident that this group increasingly rejects the statements related to a justification of meat consumption or repression of the slaughter process; however, animal welfare is an important issue when buying meat. Thus, this group takes a very reflective and critical look at meat production and slaughter resulting in lower consumption of not only meat in general but also meat produced organically. Therefore, this cluster is named “Critical animal welfare (AWF) supporters.”

| Table 3 | Results of the factor analysis with statements regarding attitudes towards different slaughter regulations for organic animals and two-sided Pearson correlation with organic meat consumption frequency (OMCF) |
|---|---|---|---|
| Factor/statements | Factor loading | Mean (std. dev.) | Correlation with OMCF |
| **Pro Different Slaughter**; Cronbach’s alpha: 0.741 | | | |
| I think it is good if there are stricter rules for the slaughter of organic animals than for conventional animals | 0.808 | 2.68 (1.405) | .049* |
| Stress-free slaughter is more important for organic animals, as higher meat quality is expected than for meat originating from conventional husbandry | 0.806 | 2.53 (1.315) | .091** |
| Different regulations at slaughter are important to differentiate organic meat from conventional meat | 0.781 | 2.93 (1.389) | .052* |
| **Pro Equal Slaughter**; Cronbach’s alpha: 0.725 | | | |
| There should be no difference in the slaughter of organic and conventional animals | 0.838 | 1.79 (1.087) | .039n.s |
| Every animal should be treated the same at slaughter, regardless of whether it is organic or conventional | 0.816 | 1.50 (0.808) | .019n.s |
| The origin of the animals (organic or conventional) should not matter for the slaughter process | 0.722 | 2.00 (1.214) | − .018n.s |

Scales: 1 (“I totally agree”) to 5 (“I totally disagree”)
Explained variance: 66.69%, KMO: 0.750, Bartlett’s test: p-value < 0.001
**p-value ≤ 0.01, *p-value ≤ 0.05, n.s. not significant**
Cluster C is the smallest cluster (30.8%) and shows an average agreement with the factor that organic animals should be slaughtered differently. However, participants agree significantly less than the other clusters with the statement that all animals should be slaughtered the same way. Animal welfare is less important to consumers in this cluster when buying meat. This also fits with individuals being less critical
of large slaughterhouses. They assume that existing (conventional) regulations on transport and slaughter are strict enough, and they see themselves as less responsible for changing the welfare of farm animals through their consumption habits. As a result, they agree less with the justification statements. For them, eating meat is not linked to personal responsibility, and they trust that the system guarantees suitable conditions. The percentage of women and individuals who identify themselves as flexitarians is the lowest in this group and respondents in this group are younger. In addition, these consumers pay more attention to the price and have the lowest income (Table 4). This cluster can therefore be named “Uninterested price sensitives.”

Discussion

This study aimed to analyze what (organic) meat consumers expect from the slaughter of organic animals, whether they want organic animals to be slaughtered differently, and to characterize consumer groups based on their attitudes. For this purpose, we descriptively determined which attitudes consumers have and conducted a cluster analysis based on respective statements. This allows deep insights into the underlying motives for different consumer groups and their buying behaviors.

Knowledge, expectation, and trust

Our results show that most consumers rate their knowledge about how organic animals are slaughtered as low. This is in line with other studies dealing with consumers’ subjective knowledge regarding agriculture and livestock husbandry (Hall and Sandilands 2007; Di Pasquale et al. 2014; Sonntag et al. 2018). However, subjective knowledge of slaughtering processes seems to be even lower. This may be due to two factors. First, there is less information about it, e.g., because it is not advertised, while husbandry systems such as pasture access are sometimes labeled or shown on product packages. These impressions might at least delude consumers into thinking that they know something about animal farming. Second, it is known that many consumers repress thoughts about the slaughter of animals when they buy meat (Kunst and Hohle 2016; Escobedo del Bosque et al. 2020). The low level of subjective knowledge is accompanied by false assumptions, such as that there are specific regulations for the slaughter of organic animals in place and that organic animals are slaughtered in special abattoirs. These assumptions are more pronounced for consumers who buy organic meat more often. Expectations that exceed reality have also been found for organic products in other studies (“Halo-Effect”; e.g., von Meyer-Höfer et al. 2013). However, the false assumptions are highly problematic and reveal the high risk of disappointment when consumers become aware that their expectations are not met. Trust is of high importance for credence attributes, such as organic production processes (Pivato et al. 2008; Spiller and Cordts 2010; Ilchmann et al. 2013; Nuttavuthisit and Thøgersen 2017). Thus, we identify this finding as a potential risk for the organic sector.

Attitude towards the different or equal slaughter of organic animals

The results of the factor analysis and the mean values of the respective statements (Table 3) reveal several interesting findings. In total, consumers agree more that all animals should be slaughtered the same way. However, there is also a tendency for consumers to want organic animals to be slaughtered differently, revealing an ambivalent attitude. The wish for uniform slaughter methods for all animals is probably related to the desire that no animal should suffer for meat consumption, and as for many consumers, this is the only way to justify eating meat (Bastian and Loughnan 2017; Hölker et al. 2019). In addition, it is possible that consumers, at least subconsciously, transfer the idea from the constitution that all people should be treated the same as animals. This would be in line with the argumentation outlined by Singer (2008).

The opinion that there should be specific regulations for the slaughter of organic animals, in turn, can have two reasons. It might be motivated by the assumption that current regulations are not sufficient and therewith emerges the wish that at least organic animals should be slaughtered in a more animal-friendly manner. However, a preference for differentiation does not seem to be completely detached from the expected effects of slaughter on the quality of organic meat. This correlation may result from the fact that organic meat is sold at higher prices, leading to the expectation that meat quality should therefore...
be better, which has also been reported by existing literature (McEachern and Willock 2004; Padel and Foster 2005). This is confirmed by our finding that consumers who buy organic meat more often tend to agree that organically raised animals should be slaughtered differently than conventional livestock to ensure higher meat quality.

Nevertheless, the correlations between organic consumption and expectations regarding specific regulations on how to slaughter organic animals are low, indicating that there is no clear opinion within the group of organic meat consumers.

Cluster analysis

The results of the cluster analysis reveal that consumer attitudes towards the question of whether organic animals should be slaughtered with higher standards and give insights into the underlying drivers.

Respondents in cluster A, the *ambivalent meat eaters*, have the highest agreement to both factors but particularly agree that there should be specific regulations for the slaughter of organic animals. This may be due to the high consumption of organic meat in this cluster—a characteristic that is positively correlated with the attitude that organic animals should be slaughtered differently. Additionally, consumers in this cluster are aware of the importance of and their responsibility for animal welfare when buying meat, and are quite critical about existing regulations and husbandry conditions for farm animals. Nevertheless, they justify meat consumption mainly with the need to have meat for a healthy diet and their satisfaction resulting from meat consumption. Purchasing more expensive animal welfare meat is one way how meat consumers cope with the moral dilemma of meat consumption (Bastian and Loughnan 2017; Simons et al. 2018) and might explain the attitudes and consumption behavior in this cluster. This group is of interest for the organic sector, as these consumers are susceptible to differentiation strategies related to specific slaughtering methods for organic animals. It might be a further justification for buying meat, but they also perceive positive impacts on meat quality from improved slaughter. Additionally, studies have shown that consumers might even be willing to pay more for alternative slaughtering methods (Schnettler et al. 2009; Hoeksma et al. 2017). Nevertheless, the fact that respondents in this group slightly agree that they try not to think about slaughterhouses when buying meat would challenge potential marketing approaches that focus on and therewith highlight more animal-friendly slaughter methods. However, concerning this group, keeping the status quo without specific regulations is a risk, as these consumers have the highest expectations and trust levels towards the slaughter process for organic animals.

Animal welfare is also an important aspect for consumers in cluster B (*critical animal welfare supporters*) when buying meat. In contrast to cluster A, these consumers refuse the different treatment of animals at slaughter, show lower agreement with the justification arguments, and especially have fewer problems thinking about the slaughter process. This might explain why this group contains the highest percentage of flexitarians. It suggests that consumers in this cluster react with a reduction in meat consumption to the moral dilemma of slaughtering and eating meat (Simons et al. 2018; Mathur et al. 2020). Considering that consumers in this group are most critical regarding current regulations for (organic) agriculture and show the lowest share of organic meat consumption, specific regulations for a small part of farm animals, such as organic animals, presumably are not sufficient for this group. Nevertheless, respondents in this cluster still eat meat. Their attitude that meat is important for a healthy diet might explain this result. Recent studies also determined that it is difficult for consumers to change their consumption behavior based on ethics and sustainability aspects, such as animal welfare concerns (e.g., Rees et al. 2018; Stubbs et al. 2018). In summary, we can hypothesize that this cluster contains consumers that may further reduce their meat consumption in the future and/or consume alternative products, but further research is needed to prove this. Nevertheless, the focus on improved meat quality would not be convincing to these consumers, as meat quality is the least important for this cluster.

Consumers in cluster C agree, comparatively, much less that all animals should be slaughtered equally; their attitude is in the medium to neutral range. Their overall low interest in animal welfare may explain this finding. Additionally, consumers in this cluster are the ones with the highest agreement that current regulations are sufficient. Compared to the other clusters, they see no need for change and do not feel responsible when buying meat. Marinova and Bogueva (2019) named such consumers “meat

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lovers,” with a low willingness to change their meat consumption. Cluster C also shows the highest price sensitivity and has the lowest income, which could also be one reason for their attitude, because financial reasons limit the options for action (Verbeke 2009; Aschemann-Witzel and Zielke 2015).

Conclusion

Consumers’ expectations of and trust in organic animal production increase with the consumption frequency of organic meat. Additionally, the demand for specific regulations for the slaughter of organic animals correlates positively with organic meat consumption. Thus, there is the risk that organic consumers feel betrayed when they become aware that there are no specific regulations for the slaughter of organic animals. This might lead consumers to question the purpose of consuming organic meat as this is a justification strategy for meat consumption for some consumers (meat paradox; Bastian and Loughnan 2017; Simons et al. 2018). At least for those consumers who mainly consume organic meat due to more animal welfare reasons, the fact that organic animals are slaughtered the same as organic animals might be lacking the reason to buy more expensive meat. However, the likelihood of these scenarios should be focused in further research. Nevertheless, there seems to be a need for European law adjustments regarding organic animal production in order to maintain consumer trust — especially as research has already shown that there are needs and opportunities to improve slaughterhouses in terms of animal welfare (Dalmau et al. 2009).

Therefore, the linkage of the organic certification of a slaughterhouse to higher animal welfare standards during slaughter should be considered. Such regulations would meet the expectations of the main target group for organic meat and provide opportunities to further differentiate organic meat from conventional meat, which is increasingly adapting to organic standards, especially regarding husbandry conditions. Additionally, an expansion of organic slaughterhouses could also reduce the often long transport times of organic animals, which is also in line with consumer expectations and would improve the perception of the organic meat industry (Wille et al. 2017). However, the implementation of stricter regulations comes along with increased investment in (special organic) slaughterhouses, which has been almost non-existent up to now. These additional costs might be at least partially offset by consumer prices, but it is known that consumers repress the topic of killing animals when they buy meat, which requires careful consideration when aspects of slaughtering are communicated and used for potential marketing strategies — even in a positive way of improved welfare.

Limitations

The study is limited by its focus on German consumers and the usage of new statements regarding the consumers’ attitudes towards the equal or different slaughtering of organic and conventional animals. Based on these statements, this study is the first that shows the ambivalence concerning specific regulations for the organic animal sector and reveals that there is no clear preference for whether organic animals should be treated differently or the same way. Further research is needed to prove this ambivalence for further regulations and standards in (organic) livestock farming and examine the underlying constructs that might be responsible for the respective attitudes. However, the results give a first insight into a very important topic and provide a sound basis for further research.

Author contribution Conceptualization: S.K., E.B., G.B.; data curation: S.K.; formal analysis: S.K.; methodology: S.K., E.B., G.B.; project administration: S.K.; supervision: S.K., G.B.; visualization: S.K.; writing — original draft preparation: S.K., G.B., E.B.; writing — review and editing: S.K., G.B., E.B.

Funding Open Access funding enabled and organized by Projekt DEAL. We are grateful to the Federal Office for Agriculture and Food (BLE) and Federal Programme for Organic Farming and Other Forms of Sustainable Agriculture (BÖLN) for financing this study in the project: “Improving social acceptance of organic livestock systems – Analysis of public expectations and development of trust marketing concepts” (grant number: 2818OE097).

Declarations

Competing interests The authors declare no competing interests.

Consent to participate All survey participants were informed about the topic of the survey (“Slaughtering of animals”) and that they can end the survey at any time without any consequences or saving of their statements.
Appendix

Table 5  Results of factor analysis for statements concerning the meat paradox and item values (mean and standard deviation) for the different segments

| Factor loading | Cluster values | A (n=583) | B (n=513) | C (n=488) | Total (1,584) |
|----------------|---------------|-----------|-----------|-----------|---------------|
| Not responsible for animal welfare; Cronbach’s alpha: 0.789 | 0.19<sup>a</sup> (0.913) | 0.08<sup>a</sup> (0.1072) | −0.33<sup>b</sup> (0.942) | 0.00 (1.000) |
| The topic of animal welfare in agriculture is very important to me | −0.824 | 1.84<sup>a</sup> (0.857) | 2.01<sup>c</sup> (1.061) | 2.37<sup>b</sup> (0.988) | 2.06 (0.991) |
| When buying meat I try to make sure that animals were kept well | −0.819 | 2.26<sup>a</sup> (1.051) | 2.37<sup>a</sup> (1.074) | 2.66<sup>b</sup> (1.026) | 2.42 (1.064) |
| To be honest, other aspects are more important for me when buying meat | 0.802 | 3.41<sup>a</sup> (1.124) | 3.41<sup>a</sup> (1.262) | 3.01<sup>b</sup> (1.071) | 3.29 (1.169) |
| I am not responsible for the welfare of farm animals | 0.627 | 3.29<sup>a</sup> (1.250) | 3.41<sup>a</sup> (1.236) | 3.06<sup>b</sup> (1.092) | 3.26 (1.236) |
| Justification of meat consumption; Cronbach’s alpha: 0.678 | −0.20<sup>a</sup> (0.976) | 0.13<sup>c</sup> (1.036) | 0.12<sup>b</sup> (0.958) | 0.00 (1.000) |
| Meat is important for a healthy and balanced diet | 0.759 | 2.14<sup>a</sup> (1.044) | 2.34<sup>b</sup> (1.164) | 2.43<sup>b</sup> (1.028) | 2.29 (1.086) |
| When buying meat I assume that animals were slaughtered without suffering | 0.717 | 2.29<sup>a</sup> (1.135) | 2.55<sup>b</sup> (1.234) | 2.66<sup>b</sup> (1.114) | 2.49 (1.172) |
| No food satisfies me more than tasty meat | 0.693 | 3.12<sup>a</sup> (1.191) | 3.46<sup>b</sup> (1.319) | 3.22<sup>a</sup> (1.120) | 3.26 (1.221) |
| All in all, farm animals in Germany are doing well | 0.632 | 3.05<sup>ab</sup> (1.010) | 3.19<sup>b</sup> (1.010) | 2.98<sup>a</sup> (0.951) | 3.08 (0.995) |
| Repression of the slaughter of animals; Cronbach’s alpha: 0.627 | −0.10<sup>a</sup> (1.023) | 0.13<sup>b</sup> (1.074) | −0.02<sup>ab</sup> (0.88) | 0.0 (1.000) |
| I try not to think about what happens in a slaughterhouse | 0.843 | 2.60<sup>a</sup> (1.224) | 2.87<sup>b</sup> (1.374) | 2.70<sup>b</sup> (1.148) | 2.72 (1.257) |
| Information about the slaughter of an animal whose meat I buy would make me uncomfortable | 0.839 | 3.24<sup>a</sup> (1.295) | 3.43<sup>b</sup> (1.238) | 3.21<sup>a</sup> (1.148) | 3.29 (1.236) |

Explained variance: 61.87%, KMO: 0.774, Bartlett’s test: p-value < 0.001
Displayed are means and standard deviations in brackets. Scale: 1 (totally agree) to 5 (totally disagree). <sup>a</sup><sup>c</sup>according to post hoc tests, clusters with different letters do differ significantly (p ≤ 0.05)
Conflict of interest The authors declare no competing interests.

Research involving human participants and/or animals The research involved only the participation of subjects in the survey, but did not involve research on animals or humans.

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