

## **Consumers and Animal Welfare**

Sabine Barbara Groß

Vollständiger Abdruck der von der TUM School of Management der Technischen Universität München zur Erlangung einer

Doktorin der Wirtschafts- und Sozialwissenschaften (Dr. rer. pol.)

genehmigten Dissertation.

Vorsitz: Prof. Dr. Michael Suda

Prüfer\*innen der Dissertation:

1. Prof. Dr. Jutta Roosen
2. Prof. Dr. Klaus Menrad

Die Dissertation wurde am 30.05.2023 bei der Technischen Universität München eingereicht und durch die TUM School of Management am 15.09.2023 angenommen.

## Acknowledgments

*Ich werde jedenfalls nicht auf der faulen Haut liegen. Ich bin nämlich ein Sachensucher, und da hat man niemals eine freie Stunde.*

Pippi Langstrumpf

Eine Promotion ist eine aufregende Reise zu einem Meer an neuem Wissen, auf der man vielen Menschen begegnet und mit etwas Glück mit einigen auch ein Stück der Reise gehen darf. Diesen Menschen möchte ich hier ihren Platz geben und von Herzen „Danke“ sagen. Zuerst bedanke ich mich bei meiner Doktormutter Frau Prof. Dr. Jutta Roosen, die mich auf dieser Reise begleitet und unterstützt hat, auch wenn der Weg nicht immer geradeaus ging. Vielen Dank für Ihr Vertrauen in mich und meine Arbeit, die Möglichkeiten neue Dinge zu erkunden, die Diskussionen auf Augenhöhe und dass ich so vieles von Ihnen lernen durfte.

Mein Dank gilt außerdem Herrn Prof. Dr. Michael Suda für die Übernahme des Prüfungsvorsitzes und Herrn Prof. Dr. Klaus Menrad für die Anfertigung des Zweitgutachtens. Vielen Dank, dass Sie den letzten Teil des Weges mit mir gegangen sind.

Die vorliegende Dissertation ist während meiner Zeit am Lehrstuhl für Marketing und Konsumforschung entstanden, wo ich wundervolle Weggefährtinnen gefunden habe. Vielen Dank für die anregenden Diskussionen über Forschung und darüber hinaus, die bereichernden Klausuren und Kolloquien und alle Gespräche zwischen Kaffeemaschine und Bürotür. Sie alle waren sehr lehrreich für mich. Vielen Dank an die besonderen Menschen, die nicht nur das große, sondern auch die kleinen Büros auf beiden Seiten des Flures zu Quellen der Inspiration, Motivation und Freude gemacht haben und mit denen Distanz nur ein Wort war, das aber keinen Platz gefunden hat. Es war mir eine Ehre, dass ich ein Stück des Weges mit euch gemeinsam gehen durfte!

Vielen Dank meinen Eltern, die mir so viel ermöglicht haben und ohne die ich die Reise gar nicht erst begonnen hätte. Danke, dass ihr meine Neugierde immer beflügelt habt. Vielen Dank meiner Familie, der Groß-en und der kleinen. Ich bin dankbar, dass ich euch in meinem Leben habe und euch meine Familie nennen darf! Ihr wart mir immer eine Stütze und mit Rat und Tat zur Stelle, egal ob es die Studienwahl oder Grammatik-Nachhilfe war. Zuallerletzt: Vielen Dank, dass es euch gibt, meine kleine Familie, und ihr mich immer auf dieser Reise begleitet, mir Stärke, Motivation, Inspiration, Rast und wundervolle Zerstreuung gebt. Ich liebe euch!

## Summary

Food consists of many product characteristics, and ethical attributes such as animal welfare are gaining importance in recent years. Consumers cannot evaluate such credence attributes by themselves and need to rely on the trustworthiness of food producers. At the same time, producers need to understand consumers' preferences to provide relevant products.

This dissertation sheds light on the importance of animal welfare for consumers. Therefore, data was collected in two efforts. First, a combination of a sensory and a choice experiment investigates the interplay of different product characteristics and their influence on consumers' willingness to pay. Second, an online experiment was performed to analyze determinants and manipulation of social trust and to examine different values concepts.

Findings prove that the claim animal welfare is a relevant product attribute for consumers. A general animal welfare label and the organic label can increase product expectations and the actual liking of the products. The product with a general animal welfare label can be seen as an intermediate or compromise product for consumers, which provides an increase in quality but does not command a price increase as high as organic products do. Furthermore, results show that the asymmetry principle of trust also holds for social trust in farmers, meaning that negative information yields a larger decrease in trust than positive information's ability to increase trust. The effect of information on trust shows a gender effect and varies depending on the initial level of trust. Further examinations underline the importance of consumers' salient value similarity, which increases social trust and softens message characteristics' impacts. Lastly, comparing two different concepts of values shows that personal value orientations better explain risk perception in the context of food than worldviews.

The results of the presented studies enhance the understanding of the relevance of animal welfare attributes to consumers and give practical guidelines regarding product development and communication with consumers. Future research should further investigate heterogeneous preferences for animal welfare products by including personality traits as values. Furthermore, a measure for worldviews adapted for the European context should be validated and compared again with personal value orientations to confirm the findings of this dissertation.

## **Zusammenfassung**

Lebensmittel bestehen aus vielen Produkteigenschaften, wobei die Bedeutung von ethischen Attributen, wie auch Tierwohl, in den letzten Jahren immer weiter zugenommen hat. Konsumenten können solche Eigenschaften nicht selbst prüfen und müssen sich auf die Vertrauenswürdigkeit von Lebensmittelproduzenten verlassen. Gleichzeitig müssen Produzenten die Vorlieben von Konsumenten verstehen, damit sie passende Produkte anbieten können.

Die vorliegende Dissertation beleuchtet die Bedeutung von Tierwohl für Konsumenten. Hierfür wurden zwei Datenerhebungen durchgeführt. Einerseits wurde ein Sensorik- und ein Choice Experiment kombiniert, um die Wechselwirkung von verschiedenen Produkteigenschaften und deren Einfluss auf die Zahlungsbereitschaft von Konsumenten zu untersuchen. Andererseits wurden die Determinanten und Manipulation von sozialem Vertrauen sowie verschiedene Wertkonzepte mit einem Online-Experiment analysiert.

Die Ergebnisse bestätigen, dass die Botschaft “Tierwohl” für Konsumenten ein relevantes Produktattribut darstellt. Ein generelles Tierwohl-Label und das Bio-Label konnten Produkterwartungen und tatsächliches Gefallen erhöhen. Daher kann ein Produkt mit dem generellen Tierwohl-Label als Zwischen- oder Kompromissprodukt für Konsumenten angesehen werden. Ein solches Produkt bietet höhere Qualität aber zu einem geringeren Preisaufschlag als Bio-Produkte. Weiterhin zeigen die Ergebnisse, dass das Asymmetrie-Prinzip von Vertrauen auch auf das soziale Vertrauen in Landwirte zutrifft. Das führt dazu, dass der Vertrauensverlust durch negative Informationen den Vertrauensgewinn positiver Informationen übersteigt. Der Einfluss von Informationen ist zudem vom Geschlecht sowie dem ursprünglichen Vertrauen beeinflusst. Weitere Untersuchungen unterstreichen die Bedeutung von Wertähnlichkeit, die soziales Vertrauen steigert und den Effekt von Nachrichteneigenschaften abmildert. Zuletzt zeigt der Vergleich zweier Wertkonzepte, dass persönliche Wertorientierungen besser die Risikowahrnehmung im Kontext von Lebensmittel erklären als Weltanschauungen.

Die Ergebnisse der präsentierten Studien erweitern das Verständnis der Bedeutung von Tierwohl für Konsumenten und geben Handlungsanweisungen zu Produktentwicklung und zur Kommunikation mit Konsumenten. Zukünftige Forschung sollte die heterogenen Vorlieben für Tierwohl-Produkte durch das Einbeziehen von Persönlichkeitsmerkmalen wie Werten weiter

untersuchen. Weiterhin sollte eine auf den europäischen Kontext angepasste Weltanschauungs-Skala validiert und erneut mit persönlichen Wertorientierungen verglichen werden, um die Ergebnisse dieser Dissertation zu bestätigen.

# Table of Contents

Acknowledgments .....	ii
Summary .....	iii
Zusammenfassung .....	iv
List of Tables.....	viii
List of Figures .....	ix
List of Abbreviations.....	x
Publication submission records .....	xi
1 Introduction .....	1
2 Background .....	4
2.1 Consumers' decision-making process.....	4
2.2 Importance of different product attributes .....	5
2.3 Trust and its importance for consumers' decisions.....	7
2.4 Influence of values .....	8
3 Material and methods .....	11
3.1 Data Collection 1.....	12
3.1.1 Study protocol of the sensory and choice experiment .....	12
3.1.2 Sample description.....	13
3.1.3 Measurements .....	14
3.2 Data Collection 2.....	17
3.2.1 Study protocol of the online survey.....	18
3.2.2 Information treatment .....	18
3.2.3 Sample description.....	21
3.2.4 Measurements .....	23

4	Results .....	27
4.1	Paper I: How does animal welfare taste? Combining sensory and choice experiments to evaluate willingness to pay for animal welfare pork.....	27
4.2	Paper II: Der Einfluss von Nachrichtentexten über die Tierhaltung auf das soziale Vertrauen in Landwirte .....	28
4.3	Paper III: Effects of information on social trust in farmers regarding animal welfare....	30
4.4	Paper IV: Personal values trump cultural values: Comparing value concepts to explain risk perception of meat consumption .....	31
5	Discussion and conclusion .....	33
5.1	Main findings of the four papers .....	33
5.2	Practical implications .....	35
5.3	Implications for future research .....	36
	References .....	37
	Appendix .....	46

## List of Tables

Table 1. Overview of the papers included in the dissertation. ....	3
Table 2. Summary of data collections. ....	11
Table 3. Descriptive statistics of the sample in Data Collection 1.....	14
Table 4. Translated information treatment within Data Collection 2.....	19
Table 5. Descriptive statistics of the information treatment in Data Collection 2. ....	20
Table 6. Descriptive statistics of the sample of Data Collection 2.....	22
Table 7. Overview of applied measurements in Data Collection 2.....	23



## List of Figures

Figure 1. Overview of the three rounds in Data Collection 1. ....	13
Figure 2. Tasting of the products in Data Collection 1. ....	15
Figure 3. Presentation of a suckling sow without (left) and with piglet protection barn (right), as shown to the participants. ....	16
Figure 4. Flow of questions in Data Collection 2. ....	18

## List of Abbreviations

ANOVA	Analysis of Variance
e.g.	exempli gratia (“for example”)
etc.	et cetera
i.e.	id est (“that is”)

## Publication submission records

The dissertation “*Consumers and Animal Welfare*” is submitted to the Technical University of Munich as a cumulative thesis. It is based on four research papers ordered based on content, of which the first three are published journal articles:

1. Gross, S., Waldrop, M. E., & Roosen, J. (2021). How does animal welfare taste? Combining sensory and choice experiments to evaluate willingness to pay for animal welfare pork. *Food Quality and Preference*, 87. <https://doi.org/10.1016/j.foodqual.2020.104055>
2. Groß, S., & Roosen, J. (2018). Der Einfluss von Nachrichtentexten über die Tierhaltung auf das soziale Vertrauen in Landwirte. *Journal of Consumer Protection and Food Safety*, 13(2), 190–196. <https://doi.org/10.1007/s00003-017-1144-7>
3. Gross, S., & Roosen, J. (2021). Effects of information on social trust in farmers regarding animal welfare. *International Food and Agribusiness Management Review*, 24(1), 121–137. <https://doi.org/10.22434/IFAMR2020.0034>
4. Groß, S. & Haßbauer, C. (2023). Personal values trump cultural values: Comparing value concepts to explain risk perception of meat consumption. Unpublished article.

# 1 Introduction

Sustainability is increasingly important for consumers nowadays and when making food decisions. In a recent survey, 71 % of German respondents indicated to follow a healthy and sustainable diet most of the time, while animal welfare is perceived as the most important characteristic of sustainable food (European Commission, 2020). These results are in line with a study performed in 2005, in which half of the surveyed Germans thought about animal welfare when purchasing meat, and already 54 % had the impression that animal welfare did not receive enough importance in the German food and agricultural policy (European Commission, 2005). About ten years later, 95 % of German respondents found animal welfare to be at least somewhat important, and 83 % saw a need for better protection of the welfare of farm animals in Germany (European Commission, 2016). The wish for higher animal welfare standards is not singular to German consumers as in most countries within the European Union consumers see a need for improvement in animal welfare (European Commission, 2005, 2016).

There are different explanations for why societies in industrialized countries (such as Germany) are increasingly interested in ethical attributes of consumption goods. One potential explanation is that society, especially the younger generations, is increasingly aware of environmental and ethical issues. This explanation is supported by the big movements around “Fridays for Futures”, in which German adolescents are very active (Haynes, 2019) as well as increasing votes for green political parties in Europe (Nevett, 2021). Another explanation is that societies in industrialized countries are relatively wealthy and can thereby fulfill essential needs such as psychological or safety ones, and can afford to aim for higher needs, namely esteem and self-actualization (Maslow, 1943).

The concerns for animal welfare can be categorized into three types according to Fraser et al. (1997), namely natural-living, feelings-based and functioning-based. People with natural-living concerns want animals to live a natural life. In contrast, people with feelings-based concerns emphasize that animals should feel good and not feel pain, fear, hunger, or other negative states. According to the functioning-based concerns, the function of biological processes (for example, reproduction) as intended by nature determines animal welfare. Therefore, animal welfare is given when a cow can get pregnant or a fattening animal gains weight. Farmers often follow the functioning-based approach (e.g., Heise & Theuvsen, 2015), while consumers tend to follow mainly one of the other two approaches (e.g., Vanhonacker et al., 2008). Consumers’ perception of farmers and how they care for their animals depends on the animal species. Least consumers

think that laying hens are treated well, while consumers mainly perceive dairy cows as a species well cared for by farmers (Faletar & Christoph-Schulz, 2022). Consumers are generally more satisfied with organic animal husbandry systems than conventional ones (Faletar & Christoph-Schulz, 2022).

Consumers regularly indicate in studies a willingness to pay a price premium for higher levels of animal welfare (Lagerkvist & Hess, 2011; Yang & Renwick, 2019). But they cannot evaluate agricultural production processes by themselves (Meijboom et al., 2006) and need to rely on food producers' promises about production methods, which is described as information asymmetry. Trust can be crucial in those situations and helps consumers to form purchase decisions even when being confused (Wobker et al., 2015). Trust impacts consumer acceptance via the perception of risk and benefits, increases the perceived benefits and decreases perceived risk, while perceived benefit and risk impact consumer acceptance, as shown in the case of gene technology (Siegrist, 2000). Additionally, Roosen et al. (2015) found trust to increase willingness to pay significantly.

This dissertation aims to explain the importance of animal welfare for consumers through four papers, as can be seen in Table 1. The first paper evaluates the attribute animal welfare and its influence on sensory product characteristics and willingness to pay. The other papers explain the possible manipulation of social trust in farmers with information and examine the role of values. Participants received information about the current state of animal welfare in Paper I, II, and III. Paper IV examines risk perception aroused by a specific aspect of animal welfare and the risk involved in the consumption decision of meat.

The dissertation is structured as follows: After this introduction, the background section describes current literature about consumers' decision-making process, the importance of different product attributes, and the influence of values and trust on consumers' decision-making. Afterward, the material and methods section gives an overview of the two data collections performed for the empirical work of this dissertation. For each data collection, the study protocol, as well as the sample description and the applied measures are explained. Next, a summary of each paper is provided. The dissertation ends with a discussion of the main findings derived from the four papers and their implications.

Table 1. Overview of the papers included in the dissertation.

	<b>Paper I</b>	<b>Paper II</b>	<b>Paper III</b>	<b>Paper IV</b>
<b>Title</b>	How does animal welfare taste? Combining sensory and choice experiments to evaluate willingness to pay for animal welfare pork	Der Einfluss von Nachrichtentexten über die Tierhaltung auf das soziale Vertrauen in Landwirte	Effects of Information on Social Trust in Farmers Regarding Animal Welfare	Personal values trump cultural values: Comparing value concepts in the explanation of risk perception of meat consumption
<b>Topic</b>	Importance of different product characteristics (sensory and animal welfare)	Effect of information on social trust in farmers	Role of salient value similarity on social trust in the context of farmers and animal welfare	Comparison of two different value concepts
<b>Research Question(s)</b>	Does information change the sensory evaluation of a product? Is there a willingness to pay for different animal welfare products?	How does information influence social trust in farmers depending on initial trust level and gender?	What are the determinants of social trust in farmers?	What is a useful value concept to explain risk perception?
<b>Methodology</b>	Within-subject design with three evaluation rounds. Combination of sensory evaluation and willingness to pay estimation. Analyzing data using ANOVA and random parameters logit model.	Between subject design with four different news treatments. Analyzing the difference in social trust using two ANOVAs, one for men and one for women, each distinguishing people with low and high levels of initial trust.	Between subject design with four different news treatments. Analyzing the data with a random effects panel regression.	Two different measures of risk perception. Analyzing the data using an ordinary least square estimation. Comparing different models with Akaike information criterion.
<b>Key findings</b>	Products are similar in the blind evaluation. Information change evaluation, willingness to pay increases in the non-blind evaluations.	News texts influence social trust differently depending on gender and initial trust level.	Salient value similarity moderates the impact of information on social trust.	Personal value orientations are performing better than worldviews in our case studies.

## 2 Background

This chapter gives a short introduction to consumers' decision-making process. The process generally depends on product characteristics, the environment, and consumers' characteristics (Blackwell et al., 2006, pp. 70–85). Therefore, different product attributes are explained. Furthermore, the role of personality traits such as trust and values as examples of individual factors and environmental factors are discussed.

### 2.1 Consumers' decision-making process

Different models exist aiming to explain consumers' decision-making processes. Often, the process is categorized into five steps (Solomon, 2019, pp. 341–346). First, consumers recognize a need or problem they try to solve. Therefore, they search for information about possible solutions (attributes, products, etc.). Afterward, consumers evaluate the alternatives and finally decide on a product or service fulfilling their needs. After the purchase, there is the last step of post-purchase evaluation. The intensity of each step depends on the product and each step is affected by environmental factors and individual differences (Blackwell et al., 2006, pp. 70–85). Environmental influences cover the consumers' (social) surroundings, such as culture or belonging to a social class, while individual differences characterize consumers and can be financial constraints, time constraints, values, attitudes, and involvement (Blackwell et al., 2006, pp. 70–85).

In general, consumers' reaction to a market stimulus covers three effects: cognitive (i.e., thinking), affective (i.e., feeling), and conative (i.e., behaving) (de Pelsmacker et al., 2017, pp. 79–82). The traditional hierarchy of the effects in the decision-making process is that consumers first think, afterward feel, and lastly behave (Ray et al., 1973). According to the authors, this traditional hierarchy does not hold for low-involvement decisions, in which consumers first engage in (limited) thinking, then purchase a product (i.e., behave), and afterward follow affective processes (i.e., feeling). In low-involvement decisions, the process of information search and evaluation of alternatives is relatively short. Food choices are often described as low-involvement decisions (Costa et al., 2004; Fischer & De Vries, 2008). Besides an adapted hierarchy of effects, consumers use in those decisions mental shortcuts (heuristics) to quickly come to a decision, for example purchasing the same product as before (Solomon, 2019, pp. 355–358).

In recent years, the body of literature increased on how to subconsciously change consumers' food purchase behavior into a healthier or more sustainable one using methods from behavioral economics (Just, 2012). To do this, for example, the environment of a decision in which a product is presented is changed (i.e., framing effect, see Solomon (2019, p. 359)). The context can nudge a decision, but also stimuli unrelated to the current decision can subconsciously guide the behavior in a particular direction called "priming effect" (Solomon, 2019, p. 360). For example, using the color red on labels can decrease the consumed amount of food and drinks (Genschow et al., 2012). The examples mentioned earlier describe the environment of a decision and how it is related to a decision. Furthermore, product characteristics, temporality factors, or characteristics of the individual can influence consumers' food choices (Chen & Antonelli, 2020; Dacremont & Sester, 2019).

### **2.2 Importance of different product attributes**

Products consist of different characteristics (attributes) such as price, ingredients, or the production method. Based on the information economy, product attributes can be differentiated into search, experience, and credence attributes (Darby & Karni, 1973). While search and experience attributes can be evaluated before (search attributes) or after the purchase (experience attributes), consumers cannot assess credence attributes before or after the purchase. Thereby, consumers must rely on information others provide about credence attributes and trust the producer. One possibility to guide consumers on which products fulfill their expectations is to send signals, for example, by labels. Labels aim to transform credence attributes into a kind of search attributes (Gottschalk & Leistner, 2013).

Although consumers cannot prove whether credence attributes and the respective labels fulfill promised characteristics, they can evaluate if their subjective expectations regarding the product are met (e.g., the taste a consumer expects of an organic product). When producers succeed in linking credence attributes and search or experience attributes, it can result in market success of the products (Grolleau & Caswell, 2006). Some credence attributes were found to work as halo, meaning consumers use their emotions towards an attribute or product as a base to form objective product characteristics (Demartini et al., 2018). Product attributes can also serve as negative halos, meaning consumers form negative perceptions of the performance of products holding one of these halo attributes (Lähtenmäki et al., 2010). Literature found already different halos, for example, the attributes environmentally-friendly and animal welfare trigger inferences regarding food safety as those products are perceived to be produced under good



hygienic circumstances (Demartini et al., 2018). Halos may also occur in the context of taste perceptions of a product, as healthy products are perceived as not tasty (Loebnitz & Grunert, 2018), or organic products are perceived as tasty (e.g., Nadricka et al., 2020).

Consumers build expectations of a product based on available information or cues. After the purchase, the consumer evaluates the product and has now experiences with the product. Comparing the experiences with the expectations lead to either a positive or negative disconfirmation based on whether the experiences are better or worse than the expectations (Deliza & Macfie, 1996). For food products, taste as a sensory characteristic is very important, especially for the re-purchase of the product (Saeed et al., 2013). Sensory studies examine sensory characteristics and ask consumers to evaluate products in three different ways:

- (1) Perceived liking: consumers use only sensory characteristics for their evaluation and receive no additional information on product (attributes),
- (2) Expectations: consumers form product expectations only on provided information (for example, by an information treatment or label),
- (3) Actual liking: a combination of the two measurements above, in which consumers are confronted with information and use sensory characteristics for their product evaluation.

Using at least two measurements enables to examine the disconfirmation by consumers. Literature found credence attributes to affect taste perceptions and actual liking (Piqueras-Fiszman & Spence, 2015). Information on animal welfare increases perceived liking for a product with a high animal welfare standard, while the effect is reversed for a low animal welfare product (e.g., Napolitano et al., 2010). Furthermore, there occurs an assimilation of actual liking towards perceived liking (Napolitano et al., 2007, 2010). The way the information is presented influences the expectations but not the actual liking (Musto et al., 2015).

This dissertation uses the case of sow husbandry to examine further the effect of animal welfare attributes on sensory characteristics. Furthermore, it compares the impact of different labels with varying specificity and degrees of animal welfare standards. Thereby, the following research question will be answered:

*Research Question 1: Does information change the sensory evaluation of a product?*

Additionally, the effect of information on willingness to pay will be investigated. Thereby, the impact of different labels as well as consumer liking of the product on willingness to pay will be analyzed to answer the following:

*Research Question 2: How do sensory evaluation and information on animal welfare influence willingness to pay?*

### **2.3 Trust and its importance for consumers' decisions**

Ethical credence attributes are important for about a third of German consumers when buying food (European Commission, 2020), but consumers cannot (easily) verify credence attributes. As the distance between food producers (i.e., farmers) and consumers has been growing in recent years, consumers cannot evaluate or monitor the production processes in the food sector by themselves (Meijboom et al., 2006). This situation will potentially expand because consumers are more and more unable to evaluate product attributes as the number of credence attributes increases. Therefore, consumers need to rely on producers' promises and trust them. Trust restores market confidence and reduces concerns regarding new products or technologies (Roosen et al., 2015). Furthermore, research shows that consumers' general and specific trust impacts meat purchase decisions (Drescher et al., 2012; Muringai et al., 2017).

Different researchers from social and economic sciences examined the role of trust, hence many definitions and concepts of trust exist (Poortinga & Pidgeon, 2003). Trust is rooted in a consumer's personality (Rotter, 1971). While general trust is built in childhood and is an identity concept, specific trust is related to a particular situation or group, such as food retailer, and is thereby changeable (Kenning, 2008). However, generalized and specific trust are potentially related (Rothstein & Stolle, 2002). People need to trust in risky situations (Mayer et al., 1995), uncertain environments (Bhattacharya et al., 1998), around complex phenomena (Luhmann, 1989), or conditions characterized by a lack of knowledge (Grabner-Kräuter & Kaluscha, 2003; Hansen et al., 2003; Siegrist & Cvetkovich, 2001).

In general, trust follows the asymmetry principle, meaning trust is easier to destroy than create (Poortinga & Pidgeon, 2004; Slovic, 1993). Negative events clearly impact trust (Poortinga & Pidgeon, 2004). The effect of negative information is crucial because consumers prefer negative information due to higher consumer utility (McCluskey et al., 2015). Furthermore, effects caused by negative information dominate the ones by positive information during willingness

to pay experiments when presented simultaneously (Hayes et al., 2002). Additionally, negative information is perceived as more reliable and stays longer in the mind of consumers (Cvetkovich et al., 2002; Hayes et al., 2002; Poortinga & Pidgeon, 2004; Slovic, 1993). This dissertation aims to shed light on the asymmetric principle of trust and if it influences (social) trust in farmers. Thereby, the following research question will be answered:

*Research Question 3: How does information influence social trust in farmers?*

Even though general trust measures the trust in other persons independent of any specific situation, it is related to a higher trust in the food system and can compensate for negative product perception (Ding et al., 2012). Food value chain members are trustworthy differently, with farmers receiving the highest trust (Frewer et al., 2005). Drescher et al. (2012) found trust in different actors positively correlated. The main dimensions of trust are competence and honesty (Frewer, 1999). Hence, it is problematic that consumers perceive food chain members to protect their vested interests (Frewer et al., 2005). Furthermore, people prefer to trust persons with similar values (Siegrist et al., 2001) and people they know instead of experts (Smith et al., 1999). Thereby, the influencing factors of social trust in farmers are of interest, which leads to the following:

*Research Question 4: What are the determinants of social trust in farmers?*

### **2.4 Influence of values**

As value similarity influences consumers' trust (Siegrist et al., 2001), which has a clear market impact (e.g., Roosen et al., 2015), it is of interest to further examine the concept of "values". Values are defined as superior concepts guiding consumption across different products and being relatively stable over time (e.g., Schwartz & Bilsky, 1987). For example, a consumer aims at a status of good nutrition (value). Different products can reach this status, but not all have the same attributes. Hence, for some products, a high fiber content is essential, while other products need to be low in fat, but they all fulfill the guiding principle of "nutrition". There are two ways to integrate into the explanation of consumer behavior: as a society-related factor with norms or as a personal identity factor (Chen & Antonelli, 2020).

Schwartz (1992, 1994) and his framework of human values build the base for many studies and categorize values as a society-related factor describing how a person believes he or she should behave. There exist ten value domains that span the space from "openness to change" to

“conservation” and from “self-enhancement” to “self-transcendence” (Schwartz, 1994). Value-Belief-Norm Theory, which was invented in environmental economics, argues that values have as a guiding principle an influence on beliefs (generalized and specific), which build the base of norms and lead in the end to (pro-environmental) behavior (Stern et al., 1995, 1999). This theory takes the values from the space from “self-enhancement” to “self-transcendence” of Schwartz's (1992, 1994) framework and divides them into three value orientations: egoistic, altruistic, and biospheric values (e.g., de Groot & Steg, 2008). Personal aspects like the costs and benefits of environmental protection for the individual are related to the values around “self-enhancement” and are described as “egoistic values” (Stern & Dietz, 1994). The “altruistic” and “biospheric” values originate from the value domain “self-transcendence” (Stern & Dietz, 1994). Herein, the outcome of an action will be judged concerning other humans ((social) altruistic values) or non-humans like the environment (biospheric values) (Stern & Dietz, 1994).

In contrast, the cultural cognition approach defines values as an expression of personal identity (Kahan et al., 2007). They are measured as worldviews in a framework with two cultural dimensions, namely the group and grid dimensions, and are based on the work by Douglas (1970) and Douglas and Wildavsky (1983). The group dimension measures how much a person's life depends on group membership, with the poles being individualists, which fend for themselves, and communitarians, which heavily depend on others (Kahan et al., 2007). The grid dimension measures the degree of social differentiation (Douglas, 1970). A person that thinks social classification determines the distribution of things is classified as a hierarchist, while on the other side, an egalitarian believes that nobody should be prevented from participating in any social role (Kahan et al., 2007). Cultural values explain the perception of different risks, for example, related to health (e.g., infection with coronavirus (Savadori & Lauriola, 2021, 2022)), environment (e.g., climate change (Stevenson et al., 2014)) or technology (e.g., nanotechnology (Kahan et al., 2009)). The application in the context of food is scarce (De Witt et al., 2017; Hobbs, 2019) and most frequently in consideration of technologies like genetically modified food (e.g., Yang & Hobbs, 2020).

Risks in the context of food can emerge from credence attributes, being that the product promises are not fulfilled or that the product has not the desired product attributes. A credence attribute that possibly targets different values is “animal welfare”. Caring about animal welfare and how individuals treat other living beings describes how individuals see themselves in society (cultural values) and whether individuals care for others (being altruistic) or not

(following egoistic values). The knowledge of underlying values influencing the decision-making process and acceptance of a credence attribute is essential for understanding and appropriately targeting consumers.

This dissertation further examined the role of values and if they origin individual differences (personal value orientations) or society-related features (cultural values) in the context of meat consumption by answering the following research question:

*Research Question 5: What is a useful value concept to explain risk perception?*

### 3 Material and methods

This chapter describes the materials and methods of the empirical work, which builds this dissertation's base. There were two data collections with different experimental components (see Table 2). The first data collection was performed for Paper I and combined a sensory evaluation with an information treatment and a choice experiment. The second data collection provided input for Paper II, III, and IV. This second data collection used an information treatment with four treatment groups and included several constructs to analyze social trust and different value concepts. This chapter summarizes the two data collections.

Table 2. Summary of data collections.

	<b>Data Collection 1</b>	<b>Data Collection 2</b>
<b>Time</b>	July 2018	October 2016
<b>Number of participants</b>	150	1,600
<b>Experimental component</b>	Sensory evaluation Information treatment Choice experiment	Information treatment
<b>Design</b>	Within-subject design	Between-subject design (4 treatment groups)
<b>Measurements</b>	Hedonic liking	Social trust (Paper II, III, IV) Salient value similarity (Paper III) Personal value orientations (Paper IV) Worldviews (Paper IV)
<b>Objectives of the data collection</b>	Evaluate subjective differences in sensory characteristics Study the effect of information on subjective sensory liking Examine willingness to pay for different animal welfare standards	Study the effect of information (Paper II, III) Identify factors influencing consumers' social trust (Paper III) Apply value systems in the context of food (Paper IV)
<b>Paper</b>	I	II, III, IV

### **3.1 Data Collection 1**

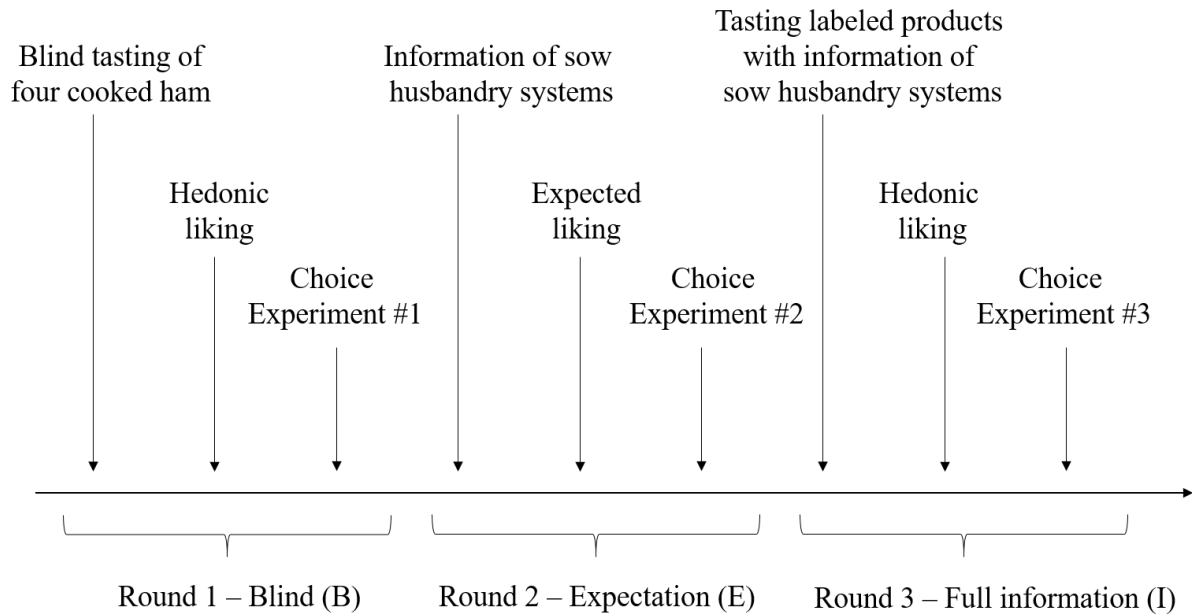
The first data collection took place on the 23<sup>rd</sup> and 24<sup>th</sup> of July 2018 in a sensory laboratory in Munich. The data collection objectives were to evaluate the importance of product attributes for purchasing decisions of animal welfare products. The following section presents the study protocol, describes the sample, and explains the measurements applied in the surveys.

#### **3.1.1 Study protocol of the sensory and choice experiment**

The first data collection combines a sensory and a choice experiment. As product, a 150 g package of sliced, cooked ham was taken with two animal welfare labels, one organic label, and the conventional product as the reference category. The labels differed regarding husbandry practice for the sows during the suckling period. The “without label” referred to the German standard production system with fixation of the sow during the suckling period to reduce piglet mortality. Farmers under the non-marketed label “Inno-pig” resigned from using the fixation of the sow. The second used animal welfare label (“Initiative Tierwohl”) was a general animal welfare label that provided no information regarding the husbandry of the sow but on different measures to increase animal welfare. Lastly, the organic label allowed the fixation only up to 14 days.

The experiment consisted of three rounds, each divided into three parts: first, providing products and/or information to the participants, second, measuring the hedonic or expected liking, and third, conducting the choice experiment (see Figure 1 for a flow chart).

Figure 1. Overview of the three rounds in Data Collection 1.



Source: adapted from Gross et al. (2021).

The rounds differed in the extent of provided information. In the first round, the blind round, participants had no additional information and evaluated the products only using the sensory appearance of the product itself. In the second round, participants only had information on the four labels available for their evaluation. In the third round, participants received four products (like in the first round), but this time they were labeled with either “without label”, one of the two animal welfare labels, or the organic label. After the three rounds, participants had to complete a questionnaire about their consumption behavior and attitudes regarding meat and animal welfare products.

### 3.1.2 Sample description

In total, 155 participants were surveyed, of which one participant was excluded because of incomplete answers. Descriptive statistics of the sample can be found in Table 3. The sample had an almost equal gender distribution and an average age of 42.6 years. Participants had a high level of education with 57.8 % holding at least the entrance qualification for university (of applied sciences). On average, the households consisted of 2.3 persons and 19.2 % of participants had children under the age of 18. Almost a third of the sample had a monthly net household income of over 3,500 €.



Table 3. Descriptive statistics of the sample in Data Collection 1.

<b>Variable</b>	<b>Frequency (%)</b>	<b>Mean</b>	<b>Std. Deviation</b>
<b>Gender</b>			
Male	50.7		
Female	49.4		
<b>Age</b>		42.6	13.4
<b>Education</b>			
Secondary general school-leaving certificate	9.1		
Certificate of the ten-grade school of general education in former GDR	1.3		
Intermediate school-leaving certificate	31.8		
University (of applied sciences) entrance qualification	24.7		
Degree from university (of applied science)	33.1		
<b>Household Size</b>		2.3	1.1
<b>Children (under 18)</b>		19.2	
<b>Net Monthly Household Income</b>			
Below 500 €	7.1		
500 – 999 €	5.2		
1,000 – 1,499 €	13.0		
1,500 – 1,999 €	13.0		
2,000 – 2,499 €	14.9		
2,500 – 2,999 €	7.1		
3,000 – 3,499 €	10.4		
3,500 – 3,999 €	7.8		
4,000 – 4,499 €	5.2		
4,500 – 4,999 €	6.5		
More than 5,000 €	9.7		

Source: Gross et al. (2021).

### 3.1.3 Measurements

The key characteristic of Data Collection 1 is that willingness to pay for animal welfare products was not singularly explained by different labels, but instead, sensory evaluation of the product was included in the investigation of willingness to pay. It is crucial to consider the interplay of sensory evaluation and other product attributes like the level of animal welfare standards because they are important for repurchasing the product. Before trying a product, consumers form an expectation of product performance, for example, based on the provided information, former experiences, or beliefs. After evaluating the product, consumers will create a confirmation or disconfirmation of expectations (Deliza & Macfie, 1996), measured as the

comparison between product perception and experience. If a product performed better than expected, there will be a positive disconfirmation, while a negative disconfirmation occurs when a product experience was worse than expected. In the latter case, consumers feel dissatisfaction and will most likely not purchase the product again. The inclusion of sensory evaluation in the data collection enables to examine

- (1) if there are subjective sensory differences between animal welfare standards,
- (2) whether information influences subjective sensory evaluation, and
- (3) the effect of sensory evaluation on willingness to pay.

Thereby, a nine-point hedonic liking scale as the standard measurement in sensory studies was included in the survey. Participants rated the four products regarding appearance, aroma, texture, taste, and overall liking. For evaluations in the first and third round, participants received two 1/8<sup>th</sup> slices of cooked ham, see Figure 2. The plates were labeled with a four-digit identification number, plus in the third round, the product's name. The order of the samples varied randomly across participants. Furthermore, participants received a paper that reminded them of the order of tasted products and water and unsalted crackers to cleanse palates and minimize carryover.

Figure 2. Tasting of the products in Data Collection 1.



In the second round, participants received only information they could use for product evaluation. The information provided to the participants covered a text about sow husbandry in general and the usage of the piglet protection barn, including pictures of the sow suckling its

piglets without and with the piglet protection barn (see Figure 3 for the images presented to the participants), as well as a short description of the different labels. For the information about sow husbandry in general and the “Inno-Pig” label, the information focused on the piglet protection barn. In contrast, the information was more generic for the general animal welfare label (“Initiative Tierwohl”) and the organic label. The case of sow fixation was chosen because the author assumed the husbandry system of the suckling sow to have no or only minor influence on the sensory quality of the former piglet’s meat. Thereby, the perception difference should be caused mainly by the information provided. Furthermore, the topic seems to interest the consumer as 41 % of German respondents value the non-fixation of the sow to be an important attribute when buying pork (Grunert et al., 2018). To prove if differences in sensory characteristics originate from the production method or the respective information, consumers had to evaluate the products only by their sensory appearance without any additional information before consumers’ expectations and actual liking were measured.

Figure 3. Presentation of a suckling sow without (left) and with piglet protection barn (right), as shown to the participants.



Source: Dr. Onno Burfeind.

It is crucial to know which products and attributes are liked and seen as important by consumers and how products and specific attributes are priced to guide producers’ decisions. There are different ways to measure consumers’ willingness to pay, see Alfnes & Rickertsen (2011) for an overview. While market data enables information on which products are purchased where and at which price, they can only include products available on the market and do not provide information about the consumers to examine why products are purchased (Louviere et al., 2000,

pp. 20–25). On the other hand, stated preference data enables asking about new or unavailable products and can be included in traditional surveys to analyze consumer behavior (Louviere et al., 2000, pp. 20–25). Two commonly used mechanisms are either to use a kind of auction, in which participants must submit a bid with a price for which they would buy a product, or a choice-based approach, in which participants receive several times a product with different prices and have to indicate for which price they would buy the product (Alfnes & Rickertsen, 2011). Choice-based approaches have certain methodological advantages, for example, multiple attributes can be evaluated simultaneously, and contrary to market data, researchers can control the decision-making environment and the available information for participants (Caputo & Scarpa, 2022).

Choice-based approaches are widely used to evaluate farm animal welfare (Lagerkvist & Hess, 2011). Hence, willingness to pay is measured in Data Collection 1 with a choice experiment, which is a choice-based mechanism. A choice experiment simulates a real consumption decision by presenting several products (= choice sets) differing in one or more attributes (e.g., price) and asks participants to repeatedly choose the product from the choice set most favorable (Hensher et al., 2005).

One issue of stated preference data is the hypothetical bias that participants indicated willingness to pay is lower than their real willingness to pay, which literature tries to minimize with several methods (Caputo & Scarpa, 2022). To overcome the hypothetical bias, researchers can point participants to the bias, for example, by using a cheap script (Tonsor & Shupp, 2011). Data Collection 1 addresses the hypothetical bias by using a non-hypothetical choice experiment. Therefore, one choice set is randomly chosen and participants have to purchase the product they decided on in the respective choice set. Participants received a higher incentive to compensate for the non-hypothetical experiment.

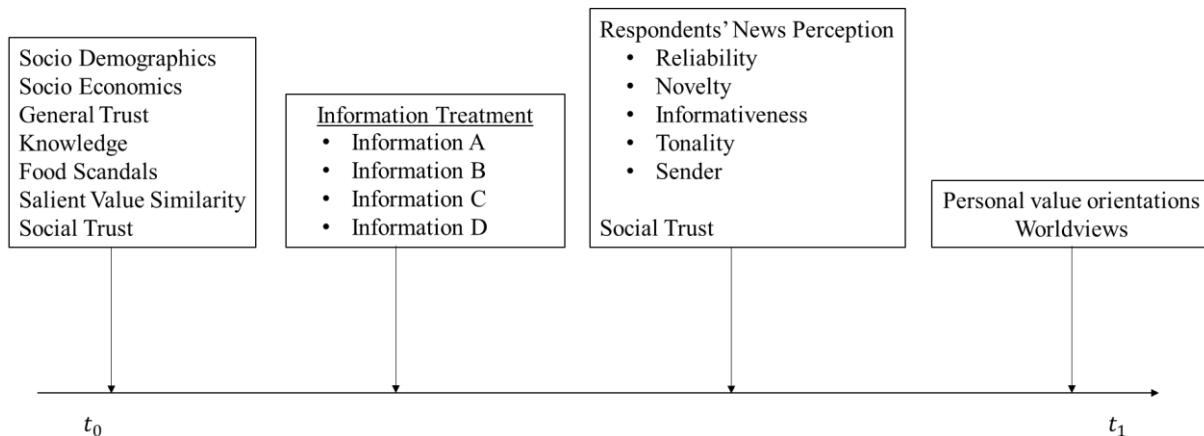
### **3.2 Data Collection 2**

The second data collection was performed in October 2016 with a German-wide online access panel. The objectives of Data Collection 2 were threefold: First, the effect of information was investigated. Second, determinants of consumers social trust were examined and third, two different value systems were applied in the context of food. The following section describes the data collection by presenting the study protocol and the information treatment used. Furthermore, the sample will be described as well as the applied measurements.

### 3.2.1 Study protocol of the online survey

For the second data collection, an online questionnaire was used with an information treatment and repeated questions of the construct “social trust” and two different measures of values, as shown in Figure 4.

Figure 4. Flow of questions in Data Collection 2.



Source: adapted from Gross & Roosen (2021).

Before the information treatment, participants completed questions regarding their socio-demographic and socio-economic characteristics as well as questions on general trust, knowledge of animal welfare, food scandals, and social value similarity. Right before the information treatment, participants were asked to indicate their level of social trust towards farmers and received then one out of four messages with information regarding animal welfare in Germany. Participants rated the text in terms of reliability, novelty, informativeness, and tonality and indicated the perceived sender of the information. Afterward, participants repeated the questions on social trust toward farmers. The questionnaire continued with the constructs of personal value orientations and worldviews.

### 3.2.2 Information treatment

The information treatment consisted of four news texts, which can be categorized based on the tonality (i.e., positive or negative) and the sender of the information (i.e., government or consumer association), see Table 4.

Table 4. Translated information treatment within Data Collection 2.

	<b>Positive</b>	<b>Negative</b>
<b>Government</b>	<p><b>Information A:</b>  <i>Germany as a pioneer in the matter of animal welfare</i>                      Germany takes a leading role regarding animal welfare in Europe. The modern techniques of animal husbandry employed in German agriculture allow animals to be kept in a more animal-friendly manner than ever before. For example, ideally composed feed rations and bright barns foster animal welfare. Moreover, husbandry systems have fundamentally changed and improved over the last years. Already today, 86 percent of all laying hens in Germany live in a barn, free range or organic laying systems. In other EU-states still significantly more laying hens are kept in enriched cage systems.                      The German government wants to stay a pioneer in the matter of animal welfare in the future as well and is working on new ways to further improve animal husbandry together with German agriculture.</p>	<p><b>Information B:</b>  <i>The attitude towards animal welfare has to change</i>                      Christian Schmidt, Federal Minister of Food and Agriculture, wants animals to be better off at the end of his term in office than they are today. Since 2002, animal welfare is embodied as a national goal in the German constitution. “It’s time that we agree on a common understanding of what this concretely means, for example for animal husbandry”, says Schmidt. He aims to further strengthen animal protection, as well as to take legislative action where necessary. Dealing with animal welfare can’t stay a matter of fine words, as it unfortunately has frequently been the case so far. Policy makers want to develop assessable and clear indicators that set goals for agriculture and make the success of voluntary initiatives measurable.                      For Schmidt, “Everyone has to take responsibility – the state by providing framework conditions that foster animal welfare, the farmers that put those conditions into practice and we as consumers that participate in decision-making at the counter.”</p>
<b>Consumer Association</b>	<p><b>Information C:</b>  <i>Chairman of the Federation of German Consumer Organizations stresses advancements in animal husbandry</i>                      Modern agriculture, animal husbandry in large stocks and industrial processing of animals is “not bad in itself”, emphasized the Chairman of the Federation of German Consumer Organizations (vzbv) last week at the consumer policy forum of his federation in Berlin. He added that agriculture in Germany “thank God [was] no longer at 1800 levels”. Farm animals are substantially better off than they were in the past. The chairman advocated that communication conveyed a more realistic image of today’s agriculture to consumers. He argued that it was misleading for the consumer if, particularly with regard to animal husbandry, “an outdated image of agriculture that doesn’t exist anymore” was drawn. The chairman stressed that this should be avoided.</p>	<p><b>Information D:</b>  <i>The myth of animal-friendly husbandry</i>                      The meat industry increasingly advertises “animal-friendly” husbandry – but what does that actually mean for the welfare of animals? Even though alternative animal husbandry systems, such as free range or organic systems for laying hens, seem to be more animal-friendly at first sight, they don’t guarantee that animals are actually better off. Behavioral disorders, diseases and pain are very common in husbandry of agricultural livestock. Pigs nibble off each other’s tails as a result of stress, cows have their milk pumped out of ill udders, and in poultry houses cannibalism is “normal”. Lack of care and bad management cause a great number of avoidable illnesses and deaths of animals – this is true for all animal husbandry systems, whether organic or conventional.                      This is why we demand legal objectives for animal health: Husbandry systems adapted to animals’ needs must become the general legal standard. All inspection results about husbandry conditions and medical data must be published. Violations must be penalized consistently.</p>

Source: Gross & Roosen (2021).

The news texts were generated based on press releases and newspaper articles. In the news text with positive tonality, the agricultural sector is described as acting responsibly regarding animal welfare. The news text with negative tonality stressed the need for coercive regulatory action and highlighted Germany's unsatisfactory animal welfare situation. The sender of the information was not made explicit but was the protagonist of the information. Tonality was used as a characteristic of the news text to prove the asymmetry of trust (Cvetkovich et al., 2002; Slovic, 1993) for the case of animal welfare and social trust in farmers. Frewer et al. (1996) found the government and its representatives to be a somewhat distrusted source with vested interests, while consumer associations are perceived as trustworthy. Thereby, the two were used as senders in the information treatment.

As a manipulation check, participants were asked to evaluate the information in terms of perceived reliability, novelty, informativeness, and tonality and indicate the perceived sender of the information. Thereby, it was tested if the intended categorization of tonality and sender equaled participants' perception. Participants perceived the tonality of the four information texts differently, but none was perceived negatively (see Table 5). While the sender was perceived for the news text by the government as intended, the sender of the other two information texts was difficult to discern for participants. However, the majority perceived one of the two non-governmental organizations as the sender of the information.

Table 5. Descriptive statistics of the information treatment in Data Collection 2.

	<b>Information</b>			
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
	<b>Government positive</b>	<b>Government negative</b>	<b>Consumer association positive</b>	<b>Consumer association negative</b>
<b>Perceived Tonality</b>				
from positive (1) to negative (7)	2.649 (0.069)	2.901 (0.069)	3.400 (0.067)	3.950 (0.090)
<b>Recognized Sender</b>				
Farmers	7.4 %	3.7 %	17.7 %	6.0 %
Government	<b>49.4 %</b>	<b>60.8 %</b>	28.3 %	4.5 %
Animal rights group	9.6 %	12.1 %	9.3 %	56.3 %
Consumer association	10.9 %	7.1 %	<b>28.7 %</b>	<b>12.3 %</b>
Media	17.0 %	13.3 %	12.8 %	14.1 %
Research	5.7 %	3.0 %	3.2 %	6.8 %
<b>Participants</b>	405	406	407	382

*Notes:* The letters in bold indicate the percentage of participants that recognized the actual sender of the information.

Source: adapted from Gross & Roosen (2021).

### **3.2.3 Sample description**

In total, 1 600 participants were reached with an online survey. The sample was quota-sampled, assuring representativeness for education, gender, age, household income, and the Federal State of Germany.

The sample's descriptive statistics can be found in Table 6. There were slightly more women than men who participated in the survey. Participants were on average 49 years old and 32 % held at least a degree from a (specialized) grammar school. The households consisted of an average of 2.23 persons, and the monthly household income was between 2,000 € and 4,500 € for 43 % of the participants. Compared to the German citizens in the European Social Survey (ESS Round 8: European Social Survey Round 8 Data, 2016), participants' general trust was at a relatively low level (5.667) but similar to the population (6.284). 8.8 % of the participants followed a vegetarian or vegan diet. About a quarter of the sample remembered seeing, hearing, or reading about a food scandal in the media over the past six months. In general, the sample was comparable to the German population.



Table 6. Descriptive statistics of the sample of Data Collection 2.

Variable	Definition	Mean	Std. Deviation	German population <sup>1</sup>
Female	1 = Female, 0 = Male	0.506		0.507
Age		48.658	15.610	44.3
Education	Measured in 6 categories			
	No degree/Not yet a degree	1.6 %		4.0 %
	Secondary general school	31.7 %		31.4 %
	Polytechnic secondary school	7.3 %		6.7 %
	Intermediate secondary school	27.3 %		22.7 %
	(Specialized) Grammar school	15.2 %		30.8 % <sup>2</sup>
	University (of applied sciences)	16.9 %		
Household Size	Persons in the household	2.230	1.097	2.01
Household Income	Measured as net-household income per month			
	than 500 Euro	2.1 %		1.6 %
	500 to 899 Euro	7.1 %		8.2 %
	900 to 1,299 Euro	13.0 %		11.8 %
	1,300 to 1,499 Euro	8.9 %		6.6 %
	1,500 to 1,699 Euro	7.2 %		6.5 %
	1,700 to 1,999 Euro	9.6 %		8.8 %
	2,000 to 2,599 Euro	16.4 %		15.1 %
	2,600 to 3,199 Euro	12.3 %		11.0 %
	3,200 to 4,499 Euro	14.8 %		15.1 %
	4,500 to 5,999 Euro	6.1 %		12.4% <sup>3</sup>
	More than 6,000 Euro	2.5 %		
General Trust	<i>In general: Do you think most people can be trusted, or do you think one cannot be careful enough when dealing with other people?</i> Measured from <i>You cannot be careful enough</i> (1) to <i>You can trust most people</i> (11)	5.667	2.440	6.284 <sup>4</sup>
Vegetarian	1 = vegetarian or vegan; 0 = not	0.088		
Food Scandal	<i>Have you seen, heard, or read any new reports in the media over the past six months about a current food scandal?</i> 1 = Yes; 0 = No	0.284		

<sup>1</sup> If available, own calculations based on Statistisches Bundesamt (2017a, 2017b, 2019).

<sup>2</sup> Persons holding at least the degree of a (specialized) grammar school, which is also true for persons in our sample owing a degree of university (of applied science).

<sup>3</sup> In official statistics, no further differentiation is above 4,500 Euro (Statistisches Bundesamt, 2017a).

<sup>4</sup> European Social Survey (ESS Round 8: European Social Survey Round 8 Data, 2016).

Source: adapted from Gross & Roosen (2021).

### 3.2.4 Measurements

Different validated scales from the literature were applied to analyze determinants and manipulation of social trust and examine values. Confirmatory factor analysis was performed to verify the assumed factor structure by the literature. Furthermore, reliability of the scales was tested using Cronbach's Alpha. In line with the literature (Tabachnick & Fidell, 2014), items with factor loadings below 0.4 were excluded. Afterward, factor scores were created by taking the mean of all relevant items. Table 7 provides an overview of applied measurements with descriptive statistics.

Table 7. Overview of applied measurements in Data Collection 2.

<b>Scale</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Number of Items</b>	<b>Cronbach's Alpha</b>
<b><i>Social Trust</i></b>				
Before Information Treatment	3.518	1.144	3	0.875
After Information Treatment	3.499	1.158	3	0.921
<b><i>Salient Value Similarity</i></b>				
	3.853	1.426	5	0.936
<b><i>Risk</i></b>				
Perceived risk of antibiotics	4.890	1.188	2	0.895
Risk probability of meat consumption	2.951	1.256	3	0.697
<b><i>Worldviews</i></b>				
Hierarchical	2.308	0.675	6	0.825
Egalitarian	3.040	0.530	6	0.715
Communitarian	2.806	0.476	5	0.595
Individualistic	2.704	0.540	9	0.838
<b><i>Values</i></b>				
Egoistic	2.936	1.066	4	0.870
Altruistic	4.523	0.997	4	0.883
Biospheric	4.629	1.041	4	0.922
<b><i>Other scales</i></b>				
Pessimistic confidence	2.906	1.022	4	0.871

First, a measurement of social trust was included in the survey. Social trust forms the dependent variable in Paper II and Paper III. It was measured twice, before and after the information treatment. Social trust was defined by Earle & Cvetkovich (1995) as a construct of non-personal trust, meaning that the trusting person does not know the trusted person or institution. This measure was applied because, at the time of data collection, 71 % of Germans build their perception of farmers on information provided by television, while 56 % base their perceptions on talks with farmers (Kantar Emnid, 2017). Like Siegrist et al. (2000), four items were used to measure social trust on a six-point Likert scale, indicating how much people are willing to rely on others responsible for decision-making, etc. The items were adapted for the case of farmers

and asked for agreement on how far farmers are interested in producing under animal welfare standards, having a responsible treatment of animals, taking care of the welfare of animals, and one reversed coded item (“*profit is more important to farmers than the interests of consumers and animals*”). The first three items formed one reliable factor before (Cronbach’s Alpha = 0.875) and after the information treatment (Cronbach’s Alpha = 0.921). The reverse coded item had insufficient factor loading, decreased scale reliability on both occasions and was therefore excluded from further analysis. In general, social trust decreased after the information treatment, but participant rated their social trust at the midpoint of the scale for both measures.

Next, salient value similarity was integrated into the survey. While values are generalizations and describe an individual’s goals valid in most situations, salient values represent the values valid in specific conditions, which can apply in more than one situation, especially in similar situations but could differ in situations with different inferred meanings (Siegrist et al., 2000). Furthermore, salient values can be changeable, for example, when gaining new information or personal experiences. To evaluate salient value similarity, individuals conclude which values are salient for the person to trust and compare these resulting values to those held by the individual (Siegrist et al., 2000). Salient value similarity is an important determinant of trust (Earle & Cvetkovich, 1995, 1999), especially for topics with little or no familiarity (Poortinga & Pidgeon, 2003), and hence of interest in the context of animal welfare. Like Siegrist et al. (2000), participants were asked how similar or different farmers’ values, goals, actions, thinking, and opinion are compared to their characteristics on a seven-point bipolar scale. The items yielded one reliable factor (Cronbach’s Alpha = 0.936). Participants indicated themselves as slightly different from farmers.

Trust is crucial in risky situations and social trust determines perceived risk (e.g., Siegrist et al., 2000). This dissertation further investigates perceived risk by Paper IV, which examines the role of perceived risk and values. Therein, two kinds of risk perception were used as dependent variable. First, perceived risk of antibiotic treatments in animal husbandry was used, which was adapted from Siegrist et al. (2000). Unlike the literature and because animal husbandry is a broad topic, the four items to measure perceived risk of current animal husbandry covered two issues each measured with two items: the risk of antibiotic treatment in animal husbandry and the risk associated with meat from high and low animal welfare standards, all measured on a six-point Likert scale. When combining both issues, confirmatory factor analysis found low factor loadings for the two items of the risk of current animal husbandry. Cronbach’s Alpha increased when excluding the two items measuring the risk of current animal husbandry

standard. Therefore, only the items measuring risk of antibiotic treatment were taken, yielding in one factor with Cronbach's Alpha = 0.895. Participants are rather aware of the risks caused by antibiotic treatment in farm animal husbandry.

The second risk measurement was taken from the meat involvement scale by Verbeke & Vackier (2004). They found involvement to be determined by five factors: product importance, hedonic value, symbolic value, risk importance, and risk probability. Based on the involvement, participants differed in their extensiveness of decision-making, trust and impact of different information sources, attitudes and behavior (Verbeke & Vackier, 2004). The factor risk probability was taken as the second dependent variable in Paper IV because it measures a more general perception of risk and the probability of making a bad consumption decision. The items from Verbeke & Vackier (2004) build one reliable factor (Cronbach's Alpha = 0.697) with three items in the confirmatory factor analysis. Participants generally perceived a low probability of making a bad consumption decision.

Furthermore, other measurements of values were incorporated into the survey. While salient value similarity measures values specific to a situation and the comparison of the own values to the values of a people to trust, a more general approach to measure values was included in the survey. There is no consensus yet in the literature on which measurement of value is the most suitable and whether values are based on personal orientation or the culture in which an individual was raised. Paper IV aims to investigate which approach is more appropriate to explain risk perception in the context of food consumption. Thereby, two approaches were included in the survey: personal value orientation and worldviews. Personal value orientations as part of the Value-Belief-Norm Theory are well-known in environmental literature, describe leading principles for the action of people and are distinguished in altruistic, biospheric, and egoistic values (e.g., Steg et al., 2005). These three personal value orientations were measured with four items, each on a six-point Likert scale on which participants had to indicate how similar they perceived themselves with a described person. Confirmatory factor analysis confirmed three reliable factors as indicated by the literature: altruistic (Cronbach's Alpha = 0.883), biospheric (Cronbach's Alpha = 0.922), and egoistic (Cronbach's Alpha = 0.870) values. Participants generally perceived themselves as rather different from a person with egoistic values and somewhat similar to a person with altruistic and biospheric values.

The other approach used in the survey follows the cultural cognition theory (e.g., Kahan et al., 2007). Here, the culture an individual is living or was raised in influences values. Different measures for the four dimensions (Hierarchical, Egalitarian, Communitarian, and

Individualistic) are available and are called worldviews. Kahan et al. (2007) used a complete set with 32 items to measure the four worldviews, but a short version with 12 items also exists (e.g., Kahan et al., 2011). Some authors use even only one item per worldview (e.g., Kemper et al., 2018). Here, the complete set of the scale was applied because during the data collection, there were only limited applications of the scale in Germany, and thereby a validated short version of the scale was not available. Some items had to be changed to be suitable for the German culture. Hence, the items covering the conflict between Whites and Blacks were changed to represent the conflict between Germans and migrants instead. The confirmatory factor analysis was unable to retrieve two factors as suggested by the literature (Hierarchical-Egalitarian, Communitarian-Individualistic), instead four factors were found in accordance with the four worldviews with Cronbach's Alpha between 0.595 and 0.838. Furthermore, six items had to be removed from the scale because of factor loadings below 0.4. Participants agreed the most with egalitarian worldviews and the least with hierarchical ones.

Lastly, confidence in food safety was included in the survey as Paper IV aims to explore risk perception. As de Jonge et al. (2008) suggested, consumers rated different statements on a five-point Likert scale of agreement. The factor "pessimistic confidence" consists of four statements forming one reliable factor (Cronbach's Alpha = 0.871). On average, participants indicated themselves around the midpoint of the scale.

## 4 Results

The dissertation is based on four papers, accordingly to which the following chapter is structured. For each paper, a résumé of results is provided. Footnotes provide the publication status and contribution of the authors.

### 4.1 Paper I: How does animal welfare taste? Combining sensory and choice experiments to evaluate willingness to pay for animal welfare pork<sup>1</sup>

In surveys and experiments, consumers indicate an interest in higher animal welfare, but the market share for such products remains low. Among others, a possible explanation could be a too high price premium for consumers and insufficient quality performance of those products. To overcome the first one, de Jonge et al. (2015) suggested to provide an intermediate product alternative for consumers, providing more animal welfare but with only a limited price premium for consumers. We combined a sensory evaluation and a choice experiment to evaluate the influence of quality performance (here: overall liking) and different levels of animal welfare on the choice of and willingness to pay for a product providing higher animal welfare.

The sensory evaluation shows that the four products have no significant differences in all hedonic attributes when evaluating only the product without any additional information (blind round). After receiving information about sow husbandry practices (expectation round), participants evaluated the four products significantly differently, with organic yielding the highest scores, followed by the general animal welfare label, the “Inno-pig” label, and lastly, the product without label. In the full information round, in which participants could use both their senses and the provided information for evaluation, the organic product yielded the highest scores, followed by the animal welfare labels and the product without label. When comparing the blind and the full information round, the ranking for appearance, aroma, texture, and overall liking decreases significantly for the product without label. When providing participants with

---

<sup>1</sup>Published as: Gross, S., Waldrop, M. E., & Roosen, J. (2021). How does animal welfare taste? Combining sensory and choice experiments to evaluate willingness to pay for animal welfare pork. *Food Quality and Preference*, 87. <https://doi.org/10.1016/j.foodqual.2020.104055>

CRediT authorship contribution statement: **Sabine Gross**: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing- Original Draft, Writing – Review & Editing, Visualization. **Megan E. Waldrop**: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing-Original Draft, Writing – Review & Editing, Visualization. **Jutta Roosen**: Conceptualization, Methodology, Resources, Supervision, Project administration, Funding acquisition.

information, the general animal welfare label and the organic label improve their hedonic liking scores. The provided information does not affect the evaluation of the “Inno-pig” label.

A random parameters logit model was performed for the three rounds independently to analyze the choice experiment. In all rounds, price significantly decreases the likelihood of a product being chosen, while the overall liking of a product increases the likelihood for the product to be chosen. In all rounds, there are heterogeneous preferences for different ham samples, as can be seen by significant estimates for standard deviation. In the expectation and full information round, the general animal welfare label (“Initiative Tierwohl”) and the organic label increase the likelihood of a product being chosen.

In the blind round, the willingness to pay values follow a different pattern than in the other two rounds, with the product “without label” yielding the highest willingness to pay. The difference in willingness to pay is caused by the slight but nonsignificant differences in mean scores in the overall liking and the numerical differences in the label specific estimates in the random parameter logit model. In the expectancy and full information round, the willingness to pay increases as the labels become more comprehensive.

### **4.2 Paper II: Der Einfluss von Nachrichtentexten über die Tierhaltung auf das soziale Vertrauen in Landwirte<sup>2</sup>**

Trust has an important role in economic processes because it can increase willingness to pay and soften the effect of negative news (Roosen et al., 2015). Additionally, negative information is more credible and stays longer in the mind of consumers than positive ones (Cvetkovich et al., 2002). Trust generally follows the asymmetric principle and is easier to destroy than build (Slovic, 1993). Thereby, the paper examined the influence of news texts about animal welfare on the social trust in farmers and whether the effect differs between gender and the previous trust level.

---

<sup>2</sup> English translation of the title: Influence of news texts about animal welfare on social trust in farmers. Published as: Groß, S., & Roosen, J. (2018). Der Einfluss von Nachrichtentexten über die Tierhaltung auf das soziale Vertrauen in Landwirte. *Journal of Consumer Protection and Food Safety*, 13(2), 190–196. <https://doi.org/10.1007/s00003-017-1144-7>

CRediT authorship contribution statement: **Sabine Gross**: Methodology, Validation, Formal analysis, Writing-Original Draft, Writing – Review & Editing, Visualization. **Jutta Roosen**: Conceptualization, Methodology, Resources, Investigation, Writing – Review & Editing, Supervision, Project administration, Funding acquisition.

Comparing the mean difference between the social trust in farmers before and after reading a news text shows that two of the four texts significantly influence social trust. The positive information by the government increases social trust, while the negative information by a consumer association decreases trust. The two incongruent texts (negative information by the government and positive information by a consumer association) cannot significantly influence social trust in farmers.

Two ANOVAs were performed to analyze the influence of news texts, each for men and women and show that all news texts increase the social trust in farmers for initially low trusting participants, equal if men or women. The only exception is the effect of the negative information by a consumer association for women, which decreases social trust for women with low initial trust. Except for the negative information by the government, all news texts influence men with low and high initial trust differently: Trust of men with initially low trust levels increases, while the trust of men with initially high trust levels decreases. Positive news text of a consumer association creates the highest difference in social trust for initially low trusting men, for men with initially high trust levels the negative news text by a consumer association generates the highest change.

For women, only the negative news text by the government and the positive news text by a consumer association influence significantly different women with initially low and high trust levels. The highest changes in social trust are generated for initially low trusting women by the positive news text by the government and for initially high trusting women by the negative news text by a consumer association. In general, the influence of news texts on social trust in farmers was higher for women than for men, except for initially low trusting women who received the news text by a consumer association equal if positive or negative.



### 4.3 Paper III: Effects of information on social trust in farmers regarding animal welfare<sup>3</sup>

The gap between farmers and society is growing and caused, among other things, by little consumer knowledge about agriculture and livestock production as well as consumer concerns about modern animal husbandry. Especially in situations with little knowledge by consumers, trust can play a crucial role (e.g., Grabner-Kräuter & Kaluscha, 2003). In the following, determinants of social trust in farmers are examined, focusing on the salient value similarity. The salient value similarity approach describes that people tend to trust other people who are perceived to share similar values and goals. Furthermore, an information treatment was included to investigate the role of salient value similarity on social trust. We use two models: in the first one, news texts are included as dummy variables, while in the second model, the perceived message characteristics are taken.

In both models, general trust and salient value similarity significantly increase general trust. Additionally, socio-demographic variables influence social trust in both models similar. Females have a lower social trust, while social trust increases with the age of participants. Higher educated participants, as well as those remembering a food scandal in the past six months, and vegetarians have lower social trust in farmers. Subjective knowledge of animal welfare husbandry increases social trust.

In the first model, Information A, a positive news text by the government, increases social trust. Information D, which represents a negative information by a consumer association, decreases social trust in farmers to a higher extent. Information B and C, which are non-congruent combinations of sender and tendency (negative information by the government and positive information by a consumer association), cannot significantly influence social trust in farmers.

Looking at the four perceived message characteristics, only reliability and novelty significantly increase social trust. Additionally, the interaction term with salient value similarity is also

---

<sup>3</sup> Published as: Gross, S., & Roosen, J. (2021). Effects of information on social trust in farmers regarding animal welfare. *International Food and Agribusiness Management Review*, 24(1), 121–137. <https://doi.org/10.22434/IFAMR2020.0034>

CRediT authorship contribution statement: **Sabine Gross**: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing- Original Draft, Writing – Review & Editing, Visualization. **Megan E. Waldrop**: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing-Original Draft, Writing – Review & Editing, Visualization. **Jutta Roosen**: Conceptualization, Methodology, Resources, Supervision, Project administration, Funding acquisition.

significant for reliability. Hence, social trust increases when a participant receives reliable information, but salient value similarity softens this effect. If a participant perceives himself or herself as very similar to farmers, a perceived reliable message can decrease social trust. For perceived tonality, only the interaction but not the main effect significantly influences social trust. The only non-significant perceived sender of information is media as well as the interaction effect with salient value similarity. An animal rights organization as perceived sender creates the highest impact on social trust, but salient value similarity softens the effect for all senders.

#### **4.4 Paper IV: Personal values trump cultural values: Comparing value concepts to explain risk perception of meat consumption<sup>4</sup>**

Consuming meat entails several direct and indirect types of risk for consumers. Consumers differ in their risk perception and individual risk perception is often inconsistent with scientific risk assessment. Thereby, predicting societal concerns and priorities is hard for regulators and researchers. Hence, examining determinants of risk perception is relevant. Literature found hazard characteristics (e.g., Slovic, 1987) as well as characteristics of the questioned person (e.g., Knight & Warland, 2004) and with this value system (Bieberstein & Roosen, 2015) to be relevant determinants of risk perception. This study aims to deliver an application of two different value systems in explaining risk perception in the context of food consumption, without a focus on a specific technology, and compare the explanatory power of the two systems. Therefore, we use two measurements of risk (perceived risk of antibiotics in animal husbandry and perceived risk probability of taking a bad consumption decision regarding meat) and as independent variables the value systems worldviews based on Kahan et al. (2007) and personal value orientations as suggested by Steg et al. (2005). For each case, three models are estimated, namely a model without controlling for any kind of values, second, a model with worldviews, and lastly, a model with personal value orientations.

Socio-demographic characteristics have different effects on each of our two cases but are consistent within each case. Being female increases the risk perception of antibiotic usage in

---

<sup>4</sup> Unpublished article.

CRediT authorship contribution statement: **Sabine Groß**: Methodology, Validation, Formal analysis, Writing-Original Draft, Writing – Review & Editing, Visualization. **Christine Haßauer**: Methodology, Writing-Original Draft, Writing – Review & Editing.

farm animal husbandry, while it does not affect the perceived risk probability of taking a bad consumption decision. For the case of antibiotics, age, income (in two models), and remembering a food safety incident increase risk perception, while the effect is reversed for the risk probability of taking a bad consumption decision. People with higher education perceive more risk regarding antibiotic usage in farm animal husbandry when the model does not control for personal value orientations, but education does not influence risk probability. While general trust increases the probability of taking a bad consumption decision when controlled for any kind of values, it has no significant influence on risk perception of antibiotic treatment. A pessimistic attitude toward food safety increases the risk perception and probability in both cases.

We do not find a significant impact of communitarian worldviews in both cases. Having a hierarchical worldview increases risk perception of antibiotic usage, while egalitarian and individualistic worldviews lead to lower risk perception. The effect of perceived risk probability of taking a bad consumption decision is reversed. The impact of personal value orientations also differs between the two cases. Egoistic values decrease risk perception of antibiotic usage, while people adhering altruistic and biospheric values have a higher risk perception. The effects are reversed in the case of taking a bad consumption decision. Egoistic values increase the perceived risk probability and altruistic values decrease it, while biospheric values have no significant influence.

Comparing the three models within each risk measurement, we see that explained variance of the dependent variable is lowest for the model without any kind of values, while it is the highest for the models with personal value orientations. In the same line, the information loss (measured in Akaike information criterion) is the lowest for the models controlling for personal value orientations. A model with personal value orientations should be favored over a model including worldviews. But a model with worldviews still performs better than a model without any kind of values.

## 5 Discussion and conclusion

The following chapter discusses the main findings of each paper of this dissertation. Furthermore, practical implications and implications for future research will be given.

### 5.1 Main findings of the four papers

This dissertation explained the role of animal welfare in consumers' decision-making process. According to the author's knowledge, the first paper combines as one of the first a sensory experiment with a non-hypothetical choice experiment to examine consumers' preferences for animal welfare labeling. Animal welfare standards regarding the treatment of the sow during the suckling period do not affect consumers' liking when evaluated blind, while it affects liking when providing information regarding the husbandry system to consumers. Overall liking (expectation) is a significant determinant of food choice in each evaluation round. The general animal welfare and the organic label increase the likelihood of food choice in the expectancy and full information round. Furthermore, these two labels significantly increase willingness to pay for cooked ham. For those two labels, an assimilation of the actual liking towards expectations can be seen as discussed in Napolitano et al. (2007, 2010). Interestingly, the assimilation is absent for the product without label and the non-marketed animal welfare label.

It remains unclear why a specific label for the sow treatment during the suckling period does not significantly influence consumer liking and willingness to pay. One explanation is that the label is not marketed yet and is thereby unknown to consumers. But it could also be that, contrary to the results of Grunert et al. (2018), consumers do not care about the fixation of the sow when purchasing pork or that they value the advantage for the piglets and farmers higher than the disadvantages for the sow. As can be seen by non-significant differences in the blind round evaluation, the sow treatment does not influence the meat quality of the former piglets. But there are heterogeneous preferences for the different labels. Thereby, it is of interest to further examine differences between consumers. That is supported by Vanhonacker & Verbeke (2014), which concluded that personality traits are more important for the evaluation of animal welfare than only socio-demographic characteristics, which both were not incorporated to the willingness to pay analysis yet.

A vital personality trait was investigated with Data Collection 2, namely social trust (in farmers), and how it is affected by news texts. Before social trust can be incorporated into a

willingness to pay analysis, it is crucial to understand the determinants of social trust. The results of Paper II confirmed the trust asymmetry regarding farmers and animal welfare as the impact of negative information exceeds the impact of a positive information. Furthermore, there is a gender effect as women's trust was more affected by reading a news text than men's. This gender difference was also found in previous literature (e.g., Kjærnes, 2006). But news texts with non-congruent combinations of sender and tonality do not change trust.

Paper III analyzed the effects of information in more detail to further understand the determinants and behavior of trust. Socio-demographic variables influence social trust in farmers, but only being vegetarian has a higher influence than salient value similarity. The importance of salient value similarity stresses the need for understanding consumers' perspectives and guiding principles and confirms the literature that shared values are important determinants of trust (e.g., Poortinga & Pidgeon, 2003; Siegrist et al., 2001). Results confirmed again that negatively perceived information has a higher magnitude of change in social trust than positively perceived information. The salient value similarity with farmers softens the negative influence of the perceived sender. But it is insufficient to create more positive and reliable messages because negative information is perceived as more reliable and persists longer than positive information (e.g., Cvetkovich et al., 2002; Hayes et al., 2002). Therefore, the challenge for stakeholders in the agricultural sector is, besides creating more positive and reliable messages, to strengthen the perception that farmers have the same values as consumers because salient value similarity can soften the impact of information.

Paper IV further analyzed the importance of values. The aim was to contribute to the literature methodologically by comparing two value systems regarding explained variance and information loss. Findings recommend using personal value orientations to explain risk perception in the context of food. Results further strengthen that the values, equal if personal value orientations or worldviews, are a relevant determinant of risk perception. Different values drive consumers, depending on the case. But communitarian values, which describe individuals to find themselves frequently dependent on others, do not significantly impact risk perception in any case and seem unimportant for German consumers. Personal value orientations are more appropriate than worldviews when explaining food risk perception in a European context. An important conclusion of the research is that there is a need for a validated worldviews scale for European culture, as the confirmatory factor analysis could not yield the same reliable factors as Kahan et al. (2007). Douglas & Wildavsky (1983) also used a four-factor scale and Johnson et al. (2020) found that factor loadings are as expected when comparing a two-factor and a four-

factor solution. Furthermore, recoding items are probably not appropriate for defining reverse worldviews (Johnson et al., 2020), which underlines the need to revise the worldview scale by Kahan et al. (2007) and validate it for the European culture.

The research in this dissertation underlines that consumers generally value animal welfare, but there are heterogeneous preferences. Values might cause this heterogeneity, as this research further emphasizes the importance of considering values when trying to understand consumers and their decision-making process. Whether specific (as salient value similarity) or generalized (as personal value orientations and worldviews), values strongly influence social trust and risk perception. Furthermore, even though worldviews are the worse value concept examined in Paper IV, a model containing worldviews performs better than the base model without including any value concept.

## **5.2 Practical implications**

This dissertation yields important practical implications. First, results confirmed that an animal welfare label, namely the general animal welfare label, can function as a compromise good between conventional and more costly organic products following the suggestion of de Jonge et al. (2015). Furthermore, confirming the literature (Napolitano et al., 2007, 2010), well-known labels promising higher animal welfare can assimilate the actual liking towards expectations. Therefore, producers should create high consumer expectations to increase actual liking and the likelihood of re-purchasing caused by the disconfirmation paradigm.

The second practical implication stresses the need to increase social trust in farmers as trust can restore confidence in the market (e.g., Roosen et al., 2015). It is crucial that negative news is likely to prevail (McCluskey et al., 2015) while the effect of negative information exceeds the impact of positive information. Therefore, practitioners need to apply strategies to soften the effect of negative news. That can be done by salient value similarity, meaning that consumers need to perceive that the same values guide farmers and consumers. Yet, the average consumer sees itself as rather unsimilar with farmers. Therefore, the guiding principles of consumers need to be examined, in general and specific to the purchase situations in order to inform communication efforts.

### **5.3 Implications for future research**

Future research should investigate the target consumer of animal welfare labels, as the first paper showed heterogeneous consumer preferences. Besides prominent individual characteristics, such as gender, age, or socio-economic status, also less easily accessible personality traits should be included as also suggested by Vanhonacker & Verbeke (2014). These personality traits should include values, specific to the situation (as salient value similarity) as well as general values (personal value orientations) as guiding principles for consumers' decisions.

As animal welfare is a broad topic, future research should investigate other risks in the context of food without and with a connection to animal welfare. Thereby, a deeper understanding of consumers can be achieved. Furthermore, an adapted scale to the European culture should be performed and validated to compare the performance of worldviews (suitable to European culture) and personal value orientations.

Besides the importance of values, the findings also indicated a gender difference in social trust. The different reactions of men and women to news texts should be further investigated and determinants should be examined. It is of further interest whether the gender effect originates from the biological gender of a participant or the societal role given to women, as proposed by Kjærnes (2006), especially because gender identity gains more importance in research (Palan, 2001).

As the number of credence attributes rises and literature indicates a higher interest in sustainable topics, future research should investigate if the relation of product attributes and personality traits found for animal welfare in this dissertation is transferable to other credence attributes.

## References

- Alfnes, F., & Rickertsen, K. (2011). Non-Market Valuation: Experimental Methods. In J. L. Lusk, J. Roosen, & J. F. Shogren (Eds.), *The Oxford Handbook of the Economics of Food Consumption and Policy* (1st ed., pp. 215–242). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199569441.013.0009>
- Bhattacharya, R., Devinney, T. M., & Pillutla, M. M. (1998). A Formal Model of Trust Based on Outcomes. *The Academy of Management Review*, 23(3), 459–472.
- Bieberstein, A., & Roosen, J. (2015). Gender differences in the meanings associated with food hazards: A means-end chain analysis. *Food Quality and Preference*, 42, 165–176. <https://doi.org/10.1016/j.foodqual.2014.11.003>
- Blackwell, R. D., Miniard, P. W., & Engel, J. F. (2006). *Consumer Behavior* (10th ed.). Thomson.
- Caputo, V., & Scarpa, R. (2022). Methodological Advances in Food Choice Experiments and Modeling: Current Practices, Challenges, and Future Research Directions. *Annual Review of Resource Economics*, 14, 63–90. <https://doi.org/10.1146/annurev-resource-111820-023242>
- Chen, P. J., & Antonelli, M. (2020). Conceptual models of food choice: influential factors related to foods, individual differences, and society. *Foods*, 9(12), 1–21. <https://doi.org/10.3390/foods9121898>
- Costa, A. I. A., Dekker, M., & Jongen, W. M. F. (2004). An overview of means-end theory: Potential application in consumer-oriented food product design. *Trends in Food Science and Technology*, 15(7–8), 403–415. <https://doi.org/10.1016/j.tifs.2004.02.005>
- Cvetkovich, G. T., Siegrist, M., Murray, R., & Tragesser, S. (2002). New information and social trust: Asymmetry and perseverance of attributions about hazard managers. *Risk Analysis*, 22(2), 359–367. <https://doi.org/10.1111/0272-4332.00030>
- Dacremont, C., & Sester, C. (2019). Context in food behavior and product experience – a review. *Current Opinion in Food Science*, 27, 115–122. <https://doi.org/10.1016/j.cofs.2019.07.007>
- Darby, M. R., & Karni, E. (1973). Free Competition and the Optimal Amount of Fraud. *The Journal of Law & Economics*, 16(1), 67–88. <http://www.jstor.org/stable/724826>
- de Groot, J. I. M., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior: How to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior*, 40(3), 330–354. <https://doi.org/10.1177/0013916506297831>
- de Jonge, J., van der Lans, I. A., & van Trijp, H. C. M. (2015). Different shades of grey: Compromise products to encourage animal friendly consumption. *Food Quality and Preference*, 45, 87–99. <https://doi.org/10.1016/j.foodqual.2015.06.001>



- de Pelsmacker, P., Geuens, M., & van den Bergh, J. (2017). *Marketing Communications. A European Perspective* (6th ed.). Pearson Education Limited.
- De Witt, A., Osseweijer, P., & Pierce, R. (2017). Understanding public perceptions of biotechnology through the “Integrative Worldview Framework.” *Public Understanding of Science*, 26(1), 70–88. <https://doi.org/10.1177/0963662515592364>
- Deliza, R., & Macfie, H. J. H. (1996). The generation of sensory expectation by external cues and its effect on sensory perception and hedonic ratings: A review. *Journal of Sensory Studies*, 11(2), 103–128. <https://doi.org/10.1111/j.1745-459X.1996.tb00036.x>
- Demartini, E., Ricci, E. C., Mattavelli, S., Stranieri, S., Gaviglio, A., Banterle, A., Richetin, J., & Perugini, M. (2018). Exploring consumer biased evaluations: Halos effects of local food and of related attributes. *International Journal on Food System Dynamics*, 9(4), 375–389. <https://doi.org/10.18461/ijfsd.v9i4.947>
- Ding, Y., Veeman, M. M., & Adamowicz, W. L. (2012). The Impact of Generalized Trust and Trust in the Food System on Choices of a Functional GM Food. *Agribusiness*, 28(1), 54–66. <https://doi.org/10.1002/agr.20287>
- Douglas, M. (1970). Natural symbols: Explorations in cosmology. In *Natural Symbols: Explorations in Cosmology*. <https://doi.org/10.4324/9780203426623>
- Douglas, M., & Wildavsky, A. B. (1983). *Risk and culture: an essay on the selection of technical and environmental dangers*. University of California Press. <https://www.ucpress.edu/book.php?isbn=9780520050631>
- Drescher, L. S., de Jonge, J., Goddard, E., & Herzfeld, T. (2012). Consumer’s stated trust in the food industry and meat purchases. *Agriculture and Human Values*, 29(4), 507–517. <https://doi.org/10.1007/s10460-012-9375-9>
- Earle, T. C., & Cvetkovich, G. T. (1995). *Social Trust: Toward a Cosmopolitan Society* (1. publ.). Praeger.
- Earle, T. C., & Cvetkovich, G. T. (1999). Social Trust and Culture in Risk Management. In G. T. Cvetkovich & R. E. Lofstedt (Eds.), *Social Trust and the Management of Risk* (1st ed., pp. 9–22). Routledge. <https://doi.org/10.4324/9781315071350>
- ESS Round 8: European Social Survey Round 8 Data. (2016). *Data file edition 2.1. NSD - Norwegian Centre for Research Data, Norway – Data Archive and distributor of ESS data for ESS ERIC*. <https://doi.org/10.21338/NSD-ESS8-2016>
- European Commission. (2005). *Special Eurobarometer 229 “Attitudes of consumers towards the welfare of farmed animals.”* [http://ec.europa.eu/public\\_opinion/archives/ebs/ebs\\_229\\_en.pdf](http://ec.europa.eu/public_opinion/archives/ebs/ebs_229_en.pdf)
- European Commission. (2016). *Special Eurobarometer 442 Report Attitudes of Europeans towards Animal Welfare* (Issue March). <https://doi.org/10.2875/884639>
- European Commission. (2020). *Special Eurobarometer 505: Making our food fit for the future - Citizens’ expectations*. <https://doi.org/10.2875/826903>

- Faletar, I., & Christoph-Schulz, I. (2022). The relationship between citizens' perceptions of farmers and the overall assessment of farm animal husbandry in Germany: a case of four animal types and two production systems. *Proceedings of the 16th International European Forum on System Dynamics and Innovation in Food Networks*, 75–95. <https://doi.org/10.18461/pfsd.2022.2207>
- Fischer, A. R. H., & De Vries, P. W. (2008). Everyday behaviour and everyday risk: An approach to study people's responses to frequently encountered food related health risks. *Health, Risk and Society*, 10(4), 385–397. <https://doi.org/10.1080/13698570802166449>
- Fraser, D., Weary, D. M., Pajor, E. A., & Milligan, B. N. (1997). A scientific conception of animal welfare that reflects ethical concerns. *Animal Welfare*, 6(3), 187–205. <https://doi.org/10.1017/s0962728600019795>
- Frewer, L. J. (1999). Risk perception, social trust, and public participation in strategic decision making: Implications for emerging technologies. *Ambio*, 28(6), 569–574. <https://doi.org/10.2307/4314956>
- Frewer, L. J., Howard, C., Hedderley, D., & Shepherd, R. (1996). What Determines Trust in Information About Food-Related Risks? Underlying Psychological Constructs. *Risk Analysis*, 16(4), 473–486. <https://doi.org/10.1111/j.1539-6924.1996.tb01094.x>
- Frewer, L. J., Kole, A., van de Kroon, S. M. A., & de Lauwere, C. (2005). Consumer attitudes towards the development of animal-friendly husbandry systems. *Journal of Agricultural and Environmental Ethics*, 18(4), 345–367. <https://doi.org/10.1007/s10806-005-1489-2>
- Genschow, O., Reutner, L., & Wänke, M. (2012). The color red reduces snack food and soft drink intake. *Appetite*, 58(2), 699–702. <https://doi.org/10.1016/j.appet.2011.12.023>
- Gottschalk, I., & Leistner, T. (2013). Consumer reactions to the availability of organic food in discount supermarkets. *International Journal of Consumer Studies*, 37(2), 136–142. <https://doi.org/10.1111/j.1470-6431.2012.01101.x>
- Grabner-Kräuter, S., & Kaluscha, E. A. (2003). Empirical research in online trust: a review and critical assessment. *International Journal of Human-Computer Studies*, 58(6), 783–812. [https://doi.org/10.1016/S1071-5819\(03\)00043-0](https://doi.org/10.1016/S1071-5819(03)00043-0)
- Grolleau, G., & Caswell, J. A. (2006). Interaction between food attributes in markets: The case of environmental labeling. *Journal of Agricultural and Resource Economics*, 31(3), 471–484. <https://doi.org/10.2139/ssrn.708483>
- Gross, S., & Roosen, J. (2021). Effects of information on social trust in farmers regarding animal welfare. *International Food and Agribusiness Management Review*, 24(1), 121–137. <https://doi.org/10.22434/IFAMR2020.0034>
- Gross, S., Waldrop, M. E., & Roosen, J. (2021). How does animal welfare taste? Combining sensory and choice experiments to evaluate willingness to pay for animal welfare pork. *Food Quality and Preference*, 87. <https://doi.org/10.1016/j.foodqual.2020.104055>
- Grunert, K. G., Sonntag, W. I., Glanz-Chanos, V., & Forum, S. (2018). Consumer interest in environmental impact, safety, health and animal welfare aspects of modern pig production:

- Results of a cross-national choice experiment. *Meat Science*, 137, 123–129. <https://doi.org/10.1016/j.meatsci.2017.11.022>
- Hansen, J., Holm, L., Frewer, L. J., Robinson, P., & Sandøe, P. (2003). Beyond the knowledge deficit: Recent research into lay and expert attitudes to food risks. *Appetite*, 41(2), 111–121. [https://doi.org/10.1016/S0195-6663\(03\)00079-5](https://doi.org/10.1016/S0195-6663(03)00079-5)
- Hayes, D. J., Fox, J. A., & Shogren, J. F. (2002). Experts and activists: How information affects the demand for food irradiation. *Food Policy*, 27(2), 185–193. [https://doi.org/10.1016/S0306-9192\(02\)00011-8](https://doi.org/10.1016/S0306-9192(02)00011-8)
- Haynes, S. (2019, May 24). Students From 1,600 Cities Just Walked Out of School to Protest Climate Change. It Could Be Greta Thunberg’s Biggest Strike Yet. *Time*. <https://time.com/5595365/global-climate-strikes-greta-thunberg/>
- Heise, H., & Theuvsen, L. (2015). Biological Functioning, Natural Living oder Welfare-Quality: Untersuchungen zum Tierwohlverständnis deutscher Landwirte. *Berichte Über Landwirtschaft - Zeitschrift Für Agrarpolitik Und Landwirtschaft*, 93(3).
- Hensher, D. A., Rose, J. M., & Greene, W. H. (2005). Applied Choice Analysis. In *Applied Choice Analysis: A Primer* (3rd ed.). Cambridge University Press. <https://doi.org/10.1017/CBO9780511610356>
- Hobbs, J. E. (2019). Heterogeneous consumers and differentiated food markets: Implications for quality signaling in food supply chains. *Canadian Journal of Agricultural Economics*, 67(3), 237–249. <https://doi.org/10.1111/cjag.12202>
- Johnson, B. B., Swedlow, B., & Mayorga, M. W. (2020). Cultural theory and cultural cognition theory survey measures: confirmatory factoring and predictive validity of factor scores for judged risk. *Journal of Risk Research*, 23(11), 1467–1490. <https://doi.org/10.1080/13669877.2019.1687577>
- Just, D. R. (2012). Behavioral Economics and the Food Consumer. In J. L. Lusk, J. Roosen, & J. F. Shogren (Eds.), *The Oxford Handbook of the Economics of Food Consumption and Policy* (pp. 99–118). Oxford Academic. <https://doi.org/10.1093/oxfordhb/9780199569441.013.0005>
- Kahan, D. M., Braman, D., Gastil, J., Slovic, P., & Mertz, C. K. (2007). Culture and identity-protective cognition: Explaining the white male effect in risk perception. *Journal of Empirical Law Studies*, 4(3), 465–505. <https://doi.org/10.1111/j.1740-1461.2007.00097.x>
- Kahan, D. M., Braman, D., Slovic, P., Gastil, J., & Cohen, G. (2009). Cultural cognition of the risks and benefits of nanotechnology. *Nature Nanotechnology*, 4(2), 87–90. <https://doi.org/10.1038/nnano.2008.341>
- Kahan, D. M., Jenkins-Smith, H., & Braman, D. (2011). Cultural cognition of scientific consensus. *Journal of Risk Research*, 14(2), 147–174. <https://doi.org/10.1080/13669877.2010.511246>
- Kantar Emnid. (2017). *Das Image der deutschen Landwirtschaft*. <https://media.repro-mayr.de/79/668279.pdf>

- Kemper, N. P., Popp, J. S., Nayga, R. M., & Kerr, J. B. (2018). Cultural worldview and genetically modified food policy preferences. *Food Policy*, 80(June), 68–83. <https://doi.org/10.1016/j.foodpol.2018.09.003>
- Kenning, P. (2008). The influence of general trust and specific trust on buying behaviour. *International Journal of Retail & Distribution Management*, 36(6), 461–476. <https://doi.org/10.1108/09590550810873938>
- Kjærnes, U. (2006). Trust and distrust: Cognitive decisions or social relations? *Journal of Risk Research*, 9(8), 911–932. <https://doi.org/10.1080/13669870601065577>
- Knight, A., & Warland, R. (2004). The relationship between sociodemographics and concern about food safety issues. *Journal of Consumer Affairs*, 28(1), 107–120. <https://doi.org/10.1111/j.1745-6606.2004.tb00467.x>
- Lagerkvist, C. J., & Hess, S. (2011). A meta-analysis of consumer willingness to pay for farm animal welfare. *European Review of Agricultural Economics*, 38(1), 55–78. <https://doi.org/10.1093/erae/jbq043>
- Lähteenmäki, L., Lampila, P., Grunert, K., Boztug, Y., Ueland, Ø., Åström, A., & Martinsdóttir, E. (2010). Impact of health-related claims on the perception of other product attributes. *Food Policy*, 35(3), 230–239. <https://doi.org/10.1016/j.foodpol.2009.12.007>
- Loebnitz, N., & Grunert, K. G. (2018). Impact of self-health awareness and perceived product benefits on purchase intentions for hedonic and utilitarian foods with nutrition claims. *Food Quality and Preference*, 64(August 2017), 221–231. <https://doi.org/10.1016/j.foodqual.2017.09.005>
- Louviere, J. J., Hensher, D. A., & Swait, J. D. (2000). *Stated Choice Methods: Analysis and Applications*. Cambridge University Press.
- Luhmann, N. (1989). Trust: A mechanism for the reduction of social complexity. In N. Luhmann (Ed.), *Trust and Power* (pp. 4–103). Wiley.
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370–396. <https://doi.org/10.1037/h0054346>
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An Integrative Model Of Organizational Trust. *Academy of Management Review*, 20(3), 709–734. <https://doi.org/10.5465/amr.1995.9508080335>
- McCluskey, J. J., Swinnen, J., & Vandemoortele, T. (2015). You get what you want: A note on the economics of bad news. *Information Economics and Policy*, 30(November), 1–5. <https://doi.org/10.1016/j.infoecopol.2014.10.003>
- Meijboom, F. L. B., Visak, T., & Brom, F. W. A. (2006). From trust to trustworthiness: Why information is not enough in the food sector. *Journal of Agricultural and Environmental Ethics*, 19(5), 427–442. <https://doi.org/10.1007/s10806-006-9000-2>
- Muringai, V., Goddard, E., Bruce, H., Plastow, G., & Ma, L. (2017). Trust and Consumer Preferences for Pig Production Attributes in Canada. *Canadian Journal of Agricultural*

- Economics*, 65(3), 477–514. <https://doi.org/10.1111/cjag.12138>
- Musto, M., Cardinale, D., Lucia, P., & Faraone, D. (2015). Influence of different information presentation formats on consumer acceptability: The case of goat milk presented as obtained from different rearing systems. *Journal of Sensory Studies*, 30(2), 85–97. <https://doi.org/10.1111/joss.12140>
- Nadricka, K., Millet, K., & Verlegh, P. W. J. (2020). When organic products are tasty: Taste inferences from an Organic = Healthy Association. *Food Quality and Preference*, 83, 103896. <https://doi.org/10.1016/j.foodqual.2020.103896>
- Napolitano, F., Braghieri, A., Caroprese, M., Marino, R., Girolami, A., & Sevi, A. (2007). Effect of information about animal welfare, expressed in terms of rearing conditions, on lamb acceptability. *Meat Science*, 77(3), 431–436. <https://doi.org/10.1016/j.meatsci.2007.04.008>
- Napolitano, F., Girolami, A., & Braghieri, A. (2010). Consumer liking and willingness to pay for high welfare animal-based products. *Trends in Food Science and Technology*, 21(11), 537–543. <https://doi.org/10.1016/j.tifs.2010.07.012>
- Nevett, J. (2021, October 21). How green politics are changing Europe - BBC News. *BBC News*. <https://www.bbc.com/news/world-europe-58910712>
- Palan, K. M. (2001). Gender identity in consumer behavior research: A literature review and research agenda. *Academy of Marketing Science Review*, 2001(10), 1–24.
- Piqueras-Fiszman, B., & Spence, C. (2015). Sensory expectations based on product-extrinsic food cues: An interdisciplinary review of the empirical evidence and theoretical accounts. *Food Quality and Preference*, 40, 165–179. <https://doi.org/10.1016/j.foodqual.2014.09.013>
- Poortinga, W., & Pidgeon, N. F. (2003). Exploring the dimensionality of trust in risk regulation. *Risk Analysis*, 23(5), 961–972. <https://doi.org/10.1111/1539-6924.00373>
- Poortinga, W., & Pidgeon, N. F. (2004). Trust, the asymmetry principle, and the role of prior beliefs. *Risk Analysis*, 24(6), 1475–1486. <https://doi.org/10.1111/j.0272-4332.2004.00543.x>
- Ray, M. L., Rothschild, M. L., Heeler, R. M., Strong, E. C., & Reed, J. B. (1973). *Marketing Communication And The Hierarchy-Of-Effects* (No. 180). <https://www.gsb.stanford.edu/faculty-research/working-papers/marketing-communication-hierarchy-effects>
- Roosen, J., Bieberstein, A., Blanchemanche, S., Goddard, E., Marette, S., & Vandermoere, F. (2015). Trust and willingness to pay for nanotechnology food. *Food Policy*, 52, 75–83. <https://doi.org/10.1016/j.foodpol.2014.12.004>
- Rothstein, B., & Stolle, D. (2002). *How Political Institutions Create and Destroy Social Capital: An Institutional Theory of Generalized Trust: Paper to be presented at Collegium Budapest, Project on Honesty and Trust: January.*

- Rotter, J. B. (1971). Generalized expectancies for interpersonal trust. *American Psychologist*, 26(5), 443–452. <https://doi.org/10.1037/h0031464>
- Saeed, F., Grunert, K. G., & Therkildsen, M. (2013). How product trial changes quality perception of four new processed beef products. *Meat Science*, 93(1), 119–127. <https://doi.org/10.1016/j.meatsci.2012.08.014>
- Savadori, L., & Lauriola, M. (2021). Risk Perception and Protective Behaviors During the Rise of the COVID-19 Outbreak in Italy. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.577331>
- Savadori, L., & Lauriola, M. (2022). Risk perceptions and COVID-19 protective behaviors: A two-wave longitudinal study of epidemic and post-epidemic periods. *Social Science and Medicine*, 301(August 2021), 114949. <https://doi.org/10.1016/j.socscimed.2022.114949>
- Schwartz, S. H. (1992). Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries. *Advances in Experimental Social Psychology*, 25(C), 1–65. [https://doi.org/10.1016/S0065-2601\(08\)60281-6](https://doi.org/10.1016/S0065-2601(08)60281-6)
- Schwartz, S. H. (1994). Are There Universal Aspects in the Structure and Contents of Human Values? *Journal of Social Issues*, 50(4), 19–45.
- Schwartz, S. H., & Bilsky, W. (1987). Toward A Universal Psychological Structure of Human Values. *Journal of Personality and Social Psychology*, 53(3), 550–562. <https://doi.org/10.1037/0022-3514.53.3.550>
- Siegrist, M. (2000). The influence of trust and perceptions of risks and benefits on the acceptance of gene technology. *Risk Analysis*, 20(2), 195–204. <https://doi.org/10.1111/0272-4332.202020>
- Siegrist, M., Cvetkovich, G., & Roth, C. (2000). Salient Value Similarity, Social Trust, and Risk/Benefit Perception. *Risk Analysis*, 20(3), 353–362. <https://doi.org/10.1111/0272-4332.203034>
- Siegrist, M., & Cvetkovich, G. T. (2001). Better negative than positive? Evidence of a bias for negative information about possible health dangers. *Risk Analysis*, 21(1), 199–206. <https://doi.org/10.1111/0272-4332.211102>
- Siegrist, M., Cvetkovich, G. T., & Gutscher, H. (2001). Shared values, social trust, and the perception of geographic cancer clusters. *Risk Analysis*, 21(6), 1047–1053. <https://doi.org/10.1111/0272-4332.216173>
- Slovic, P. (1987). Perception of risk. *Science*, 236(4799), 280–285.
- Slovic, P. (1993). Perceived Risk, Trust, and Democracy. *Risk Analysis*, 13(6), 675–682. <https://doi.org/10.1111/j.1539-6924.1993.tb01329.x>
- Smith, A. P., Young, J. A., & Gibson, J. (1999). How now, mad-cow? Consumer confidence and source credibility during the 1996 BSE scare. *European Journal of Marketing*, 33(11/12), 1107–1122. <https://doi.org/10.1108/03090569910292294>

- Solomon, M. (2019). *Consumer Behavior Buying, Having, and Being* (13th ed.). Pearson International. <https://elibrary.pearson.de/book/99.150005/9781292318202>
- Statistisches Bundesamt. (2017a). *Bevölkerung und Erwerbstätigkeit. Haushalte und Familien. Ergebnisse des Mikrozensus* (Vol. 49, Issue 0).
- Statistisches Bundesamt. (2017b). Statistisches Jahrbuch - Deutschland und Internationales 2017. In *Statistisches Jahrbuch*.
- Statistisches Bundesamt. (2019). *Durchschnittsalter auf Grundlage des Zensus 2011 nach Geschlecht und Staatsangehörigkeit - Statistisches Bundesamt*. <https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Bevoelkerungsstand/Tabellen/durchschnittsalter-zensus.html>
- Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology*, 25(4), 415–425. <https://doi.org/10.1016/j.jenvp.2005.08.003>
- Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, 50(3), 65–84.
- Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review*, 6(2), 81–97. [https://cedar.wvu.edu/hcop\\_facpubs](https://cedar.wvu.edu/hcop_facpubs)
- Stern, P. C., Dietz, T., & Guagnano, G. A. (1995). The New Ecological Paradigm in Social-Psychological Context. *Environment and Behavior*, 27(6), 723–743. <https://doi.org/10.1177/0013916595276001>
- Stevenson, K. T., Peterson, M. N., Bondell, H. D., Moore, S. E., & Carrier, S. J. (2014). Overcoming skepticism with education: interacting influences of worldview and climate change knowledge on perceived climate change risk among adolescents. *Climatic Change*, 126(3–4), 293–304. <https://doi.org/10.1007/s10584-014-1228-7>
- Tabachnick, B. G., & Fidell, L. S. (2014). *Using Multivariate Statistics* (6th ed.). Pearson. <https://lcn.loc.gov/2017040173>
- Tonsor, G. T., & Shupp, R. S. (2011). Cheap talk scripts and online choice experiments: “Looking beyond the mean.” *American Journal of Agricultural Economics*, 93(4), 1015–1031. <https://doi.org/10.1093/ajae/aar036>
- Vanhonacker, F., & Verbeke, W. (2014). Public and Consumer Policies for Higher Welfare Food Products: Challenges and Opportunities. *Journal of Agricultural and Environmental Ethics*, 27(1), 153–171. <https://doi.org/10.1007/s10806-013-9479-2>
- Vanhonacker, F., Verbeke, W., Van Poucke, E., & Tuytens, F. A. M. (2008). Do citizens and farmers interpret the concept of farm animal welfare differently? *Livestock Science*, 116(1–3), 126–136. <https://doi.org/10.1016/j.livsci.2007.09.017>
- Verbeke, W., & Vackier, I. (2004). Profile and effects of consumer involvement in fresh meat. *Meat Science*, 67(1), 159–168. <https://doi.org/10.1016/j.meatsci.2003.09.017>

- Wobker, I., Eberhardt, T., & Kenning, P. (2015). Consumer confusion in German food retailing: The moderating role of trust. *International Journal of Retail and Distribution Management*, 43(8), 752–774. <https://doi.org/10.1108/IJRDM-07-2012-0061>
- Yang, W., & Renwick, A. (2019). Consumer Willingness to Pay Price Premiums for Credence Attributes of Livestock Products – A Meta-Analysis. *Journal of Agricultural Economics*, 70(3), 618–639. <https://doi.org/10.1111/1477-9552.12323>
- Yang, Y., & Hobbs, J. E. (2020). How Do Cultural Worldviews Shape Food Technology Perceptions? Evidence from a Discrete Choice Experiment. *Journal of Agricultural Economics*, 71(2), 465–492. <https://doi.org/10.1111/1477-9552.12364>



**Appendix**

Appendix 1. Paper I..... 47

Appendix 2. Paper II. .... 57

Appendix 3. Paper III..... 64

Appendix 4. Paper IV..... 81