Multi-level labelling: too complex for consumers?

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Abstract

As more food labels enter the retail market, it is becoming increasingly difficult for consumers to review the underlying standards of products. The most common labels communicating ethical values tend to be binary. However, many attributes, such as animal welfare, are of a continuous nature and are not binary. One solution to communicate differentiated information about the process or product standards is through the use of multi-level labels, which indicate various levels of standards. This way, consumers might realize the differences in the production or process qualities more easily. However, since multi-level labels are more complex, the impact on consumers' comprehension is not clear. The objective of this paper is to test whether a multi-level labelling approach is comprehensible for consumers and could therefore be an effective tool to communicate information about standards and thus enhancing willingness to pay. The results show that when an explanation about the levels of the label is provided, there is an increasing willingness to pay for products with higher standards of animal welfare. Hence, a multi-level label can work if information is provided.

Introduction

Labelling can serve as an important information vehicle for consumers. In the Codex Alimentarius, a collection of internationally recognised standards and guidelines, a food label is defined as, "any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to, a container of food" (WHO & FAO, 2010). Labels may be used to help firms or producers to effectively communicate information about the production or product quality, especially for credence attributes. By providing information, labels serve to reduce information asymmetry (Akerlof, 1970; Antle, 2001; Darby & Karni, 1973; Nelson, 1970) as producers usually have more information about their products than consumers. Thus, labels are used as signals by transforming credence qualities, such as production or product attributes, into search goods (Caswell & Mojduszka, 1996; Caswell & Padberg, 1992, Jahn *et al.*, 2005).

Today, the majority of food labels found in grocery product categories present binary cues. For example, some items have labels that indicate that an animal was held to high welfare production standards; with the absence of the labels indicating that the product was not.

However, animal welfare and other ethical aspects, such as the environmental impact, fairtrade, are not binary but are continuous variables. Thus, a binary label might not be appropriate to communicate those production or product qualities. If different standards are sold under the same binary label, which cannot be discriminated by consumers, consumers might tend to buy the cheaper product that could be of lower quality. Thus, in the long run, if no price premium is achieved for the higher-value products then these products might disappear from the food market. This would result in a market failure (Akerlof, 1970). Currently, other labelling strategies, such as detailed information or metric labels (e.g. carbon footprint labels that indicate the total greenhouse gas emissions caused by a product [Carbon Trust, n.d.]) emerge. However, metric labels are not possible for many attributes due to the multi-dimensionality of the underlying problem. In most cases an aggregation of complex topics towards one figure is not adequate.

Recently, a new kind of labelling system emerged in the food market as an intermediate form: multi-level labelling systems. In the present paper the term multi-level label is used to mean a label that transparently shows that there are different standards of producing a product on an ordinal scale. Outside the food labelling market there are established multi-level labelling systems like the hotel star classification, which is recognised worldwide. Once understood, a multi-level labelling system could be used to rapidly provide information about a product and thus indicate different product qualities to consumers. Therefore, a multi-level labelling system might prevent market failure by showing different standards transparently.

The key to establishing such a labelling system is to ensure consumers can understand the labels easily. Yet, there is no consumer research dealing with multi-level labels in the food sector. It should be noted, that while a multi-level labelling system could provide more information and show standards more transparently to consumers, it is also more complex. Therefore, the overall impact of such a labelling system on consumers is not clear. Hence, the focal question of this paper is to determine if a multi-level label is an effective tool to communicate standards. After showing the possible types of labelling on food packages, including binary labels, multi-level labels, detailed information and metric labels, and the current state of research of multi-level labelling, two consumer studies will be presented. The consumer studies aim to test a multi-level labelling system for high welfare meat. By high welfare meat we mean meat that is produced to higher standards than the legal requirements. In these surveys the willingness to pay (WTP) for a two-level animal welfare label, with and without explanation about the animal welfare label system, is determined. This will provide

insight into how intuitive and comprehensible multi-levels of the labels are and if there are differentiated WTP values for different qualities. Finally, there is a discussion of the results and a conclusion. The article provides important information regarding labelling strategies and therefore makes a contribution for improving food labelling strategies.

Food labelling strategies

Food labels are used by companies to signal special qualities or features, usually for credence goods. Consumers cannot control credence attributes, such as animal welfare, in the final product, neither before nor after their purchase (Darby & Karni, 1973). In contrast to credence goods, the quality of search goods, such as marbling in meat, can be controlled before the purchase and experience attributes, such as taste, can be evaluated after the purchase(Nelson, 1970). Hence, for credence goods, the information asymmetry is much stronger than for search or experience goods. With the help of labels, credence attributes are transferred into search attributes (Caswell & Padberg, 1992) in order to reduce information asymmetry and prevent market failure (Jahn *et al.*, 2005). As mentioned in the introduction, there are different types of labelling strategies used in food packaging that communicate underlying standards and features of a product. The following sections give an overview of those strategies with a focus on ethical labelling aspects that usually communicate credence attributes (Annunziata *et al.*, 2011).

Different types of labelling

Binary labels are the most commonly used labels. However, binary labels provide only a rough indication of product quality. These labels suggest that there is good and bad in products: fair trade versus conventional, animal welfare versus factory farming or organic versus conventional. Such a binary classification might be less appropriate to communicate animal welfare or environmental pollution standards since they are continuous variables from a scientific point of view. Indeed, recent studies confirm that binary labels do not communicate information appropriately (Dantas & Minim, 2004; Langer *et al.*, 2008; Which?, 2013). There is research suggesting that labelling results in insecurity, rather than in confidence, for consumers in terms of them understanding the underlying standards (Aarset *et al.*, 2004; Harbaugh *et al.*, 2011). In particular, Harbaugh *et al.* (2011) found that consumers are often not sure about what standards are implied by a binary label.

Additionally, Annunziata *et al.* (2011) found in their study analysing ethical product labelling, that just 7 % of their study participants did not consult ethical labels at all. However, consumer who used labels were not satisfied with the labelling. The participants reported

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having difficulties in correctly interpreting the information on the package and also lacked confidence in the underlying standards implied by the labels.

Moreover, although a label should be an orientation for consumers while shopping, consumers have been shown to perceive the increasing number of labels as confusing (Harbaugh *et al.*, 2011). One reason for a high number of labels could be found in binary standards: There is a low level of differentiation which leads companies and stakeholders to introduce an additional label for their purpose. This supports the argument that consumers are confronted with an information overload (Kolodinsky, 2012; Kroeber-Riel & Esch, 2004; van Kleef *et al.*, 2008). These tendencies and results of consumer research lead to further developments in food labelling, which are explained below.

Detailed information can also be given on food packages. For instance, detailed information can be provided in text form, alone or in addition to using other labels. Besides the difficulties that consumers have in comprehending complex information on the package (Harper *et al.*, 2007), packaging can often appear overloaded with illustrations, trademarks, labels and text (Orth & Malkewitz, 2008), which makes it difficult for consumers to distinguish important information. The presence of information on the packaging is therefore limited by the capability of the consumer to process (Verbeke, 2005) and comprehend it (Sørensen *et al.*, 2012). This is especially true for complex attributes like animal welfare. Typically, consumers are fare away from animal husbandry practices. Thus, it is likely that only some consumers are able to use detailed information on food packages.

Presenting metric variables on a label, as done with nutritional labels, is a third opportunity to provide information to consumers about a product. In the case of nutritional labels, the package displays e. g. the number of calories that a product contains per 100 g, per portion or the quantitative portion of certain ingredients. Yet, consumers draw different inferences from nutrients depending on the presentation of the information (Grunert & Wills, 2007). Additionally, there is a lack of research on how consumers use metric variables that communicate nutritional information in a realistic shopping situation (ibid.) that is characterized by time pressure (Procher & Vance, 2013). It might be difficult for consumers to evaluate numbers on food packaging without having references. This is verified by different consumer studies that suggest that consumers prefer simpler binary nutrition labels (Andrews *et al.*, 2011). However, consumers can make more informed decisions concerning the overall product healthiness when more complex nutrition labelling systems are used, like

the traffic light food labelling system (Andrews *et al.*, 2011; Kelly *et al.*, 2009; Roberto *et al.*, 2012).

Traffic light food labels are a good example of a multi-level labelling system as they use green, amber and red circles to indicate the levels of fat, saturated fat, sugar and salt content in products (National Health Service, n.d.). Hence, this labelling system provides references for consumers as it evaluates the nutritional values in the products. However, compared to ethical labelling, different compositions of nutrients do not necessarily result in price difference and are thus rather a means to prevent unhealthy food choices.

To summarize the different types of labelling presented, Table 1 gives an overview of the four possible labelling strategies.

Labelling strategy	Binary label	Multi-level label	Detailed information	Metric label
Examples	Organic label Fair trade label	Two-level animal welfare label (cf. hotel classification)	Information about cultivation method, e.g. use of fertilizer	CO_2 equivalent of a product Energy in kw/h
Scale	Dichotom	Ordinal	Nominal	Metric

Table 1: Types of labelling strategies

Multi-level labelling of product and process standards

A multi-level label can be used to classify the gradation of a product's social impact or standard of animal welfare. Moreover, wider price differentiation and market segmentation can be realized with different levels of standards: the higher the standard a product has or is produced to, the higher might be the price premium.

There has been little consumer research carried out on the impact of multi-level labelling strategies that are used to indicate underlying production or process standards of food products. Batte *et al.* (2007) found that consumers are not only willing to pay a premium for products containing 100 % organic ingredients but also less than 100 %. However, using a multi-level label indicating the proportion of organic ingredients, such as 95% organic ingredients, may allow retailers to capture a price premium from consumers. In 2002, the United States introduced a new labelling system through their National Organic Program (NOP) showing the gradations of organic content. The labelling system uses four levels: "100 percent organic", "Organic", "Made with" organic ingredients and "Specific organic ingredients" (United States Department of Agricultural: Agricultural Marketing Service, 2012).

Another example in the food sector is restaurant labelling in the Michelin Guide. In this multinational restaurant guide, up to three stars can be awarded to restaurants to indicate outstanding cuisine. Snyder and Cotter (1998) proved a correlation between changes in restaurant prices and the number of Michelin stars awarded.

Furthermore, Fischer and Lyon (2013 and forthcoming) suggested a multi-level eco label. Either a non-governmental organisation (NGO) or industry can create own standards and a corresponding label. The authors study strategic interactions when both labels co-exist. The results suggest that environmental benefits may be smaller with two labels than with the NGO label alone (Fischer & Lyon, 2013).

There are examples in the non-food sector that demonstrate multi-level labelling works. For instance, in Germany a hotel classification system has been officially running since 1996. The DEHOGA (Deutscher Hotel- und Gaststättenverband e. V.) implements a star classification, ranging from one star for "Tourist" to five stars for "Luxury". There are minimum criteria and a pass mark has to be obtained before a hotel can be classified using this system. Since 2004, 28 European countries have been working on harmonising the hotel classification systems (HOTREC, 2015). Through the star classification system transparency and security is guaranteed for guests (DEHOGA Bundesverband, 2012b), as it signals approved quality standards worldwide (DEHOGA Bundesverband, 2012a). This example shows that a signalling system, like stars, can be globally understandable.

Another example in the non-food sector is the three-level "Natrue" system in the cosmetic sector, which indicates different amounts of organic ingredients and natural raw materials in each level. The products labelled with the first grade do not need to have organic ingredients, but must have natural ingredients and are labelled as "natural cosmetics". Products of the second grade must have a minimum of 70 % share of organic ingredients and are named "natural cosmetics with organic portions". By obtaining the third level, "organic cosmetics", products must have a 95 % share of organic ingredients (NATRUE, 2013).

A last example is the energy class labelling. Harrington (2004) gave an overview of worldwide energy rating systems. He stated three types of label designs: dial labels, bar labels and linear labels. Heinzle and Wüstenhagen (2010) stated that a label scale from A to G is better accepted than the A+++ to D scale as used in the EU for many white goods. With the second scale, the price becomes more important than the aspect of energy consumption. Thus, a clear label scheme increases the WTP with the increasing standard. However, there has been no assessment of the efficacy of each type for energy rating systems.

Considering the gap in consumer research on multi-level labelling systems on food packaging, it is first important to find out if such a labelling system is comprehensible for consumers. This study will aim to fill the gap in the literature by using an example of an animal welfare multi-level labelling system.

Improving animal welfare by multi-level labelling

There is a lot of discussion about the sustainability and ethics of intensive livestock farming (e.g. Busch *et al.*, 2012). Consumer demand for high welfare products is increasing as indicated by a lot of studies (Elbakidze *et al*., 2013; Grimsrud *et al.*, 2013; Harper & Makatouni, 2002; Lee *et al.,* 2012). Currently, in many countries there are two kinds of meat and meat product regulations: products produced under the legal minimum conditions and products produced under organic conditions. However, there is an intermediate stage between conventional and organic farming, namely conventional livestock farming with higher animal welfare standards than the legal minimum. In Germany, consumer surveys estimate a potential market share of high welfare meat products to be up to 20 % (Schulze *et al.*, 2008). However, up to now only small niches are covered and no well known animal welfare label exists.

High welfare products are already available in the Swiss market, with the use of the commercial labels "Naturafarm" and "TerraSuisse", and in the United Kingdom, with labels like "Freedom Food" and "Specially Selected Pork". Those labels are of binary nature. As animal welfare is a metric variable from a scientific point of view (cf Kehlbacher *et al.*, 2012), it is advantageous for producers to use a multi-level labelling system to communicate the different stages of housing conditions in order to market their products at appropriate graded prices. Consequently, market segmentation could be extended: consumer surplus of those consumers who are not willing or able to pay the price premium for organic meat but have a willingness to pay for high welfare meat could be captured. Moreover, the overall animal welfare might be improved as well.

The differentiation in WTP for different quality levels for products has been supported by various trials (e. g. Stolz, 2009; Zander & Hamm, 2009). Also, WTP further increases when eco- and socio-political benefits are obvious to the consumer (Plassmann *et al.*, 2009). Janssen *et al.* (2009) confirmed that when product packaging displays aspects of higher or premium quality attributes it results in consumers having a higher WTP. Thus, having products with different price levels for different standards of animal welfare means that consumers can be segmented according to their WTP (cf. Gil *et al.*, 2000; Owusu & Owusu,

2013). Another study conducted by Tonsor and Wolf (2011) showed that consumers are willing to pay a surplus of 20 % for pork and eggs labelled as produced without using gestation crates for sows or cages for laying hens. Kehlbacher *et al.* (2012) provided further evidence that the WTP rises when the standards of the animal welfare improve. In their hypothetical study, the WTP is £ 19.36 for 60 welfare scores and £ 21.20 for 90 welfare scores. The results of the presented literature indicate that a multi-level labelling system might be successful regarding the differentiated WTP for the different levels.

Such a multi-level label already exists in the Netherlands, called "Beter Leven" which contains three levels. Another example can be found in the United States: the "Global Animal Partnership", which has a five-step program. The steps contain two bronze labels (no crowding; enriched environment), one silver label (pasture centred) and two golden labels (no physical alteration; entire life on the same farm) (Global Animal Partnership, 2013). Further, since 2008 eggs have had to be labelled in the EU with 0 (= organically produced eggs), 1 (= free range eggs), 2 (= barn eggs) and 3 (= eggs from caged hens) in Europe (EU VO 589/2008). Moreover, in January 2013 two animal welfare labels with two levels each, "Für mehr Tierschutz" ("For more animal welfare") and "Tierschutz-Kontrolliert" ("Animal welfare controlled"), were introduced in Germany.

Possible disadvantages of a multi-level label

As shown in the previous sections a multi-level label is appropriate to communicate metric variables, such as animal welfare. However, a multi-level labelling system is more complex, even if it is more transparent when communicating the underlying standards, and thus could enhance the information overload problem. Maybe, consumers do not understand the differences between the respective levels. It is also possible that they do not recognize the underlying complexity of an attribute like animal welfare und consider a problem as black or bad. Hence, the impact of a multi-level label on consumers is not clear. As there is nearly no research about multi-level labelling systems concerning the identification of production or process standards, this paper delivers an important contribution to the literature by introducing evidence of the impacts of multi-level labels on consumer preferences. Therefore, the aim of this article is to find whether a multi-level labelling strategy is an appropriate information tool to communicate different standards.

Consumer surveys

Two consumer surveys were carried out in order to answer the research question. The consumer studies differ in their methodology. In the first consumer study, the respondents had

information about the meaning of the two-stage animal welfare label. In the second study, the participants did not receive any information. The following two sections describe the approach and the results in detail.

The exemplary two-level animal welfare label used in the consumer surveys was introduced by the leading German Animal Protection Association ("Deutscher Tierschutzbund e. V.") in January 2013. Initially, the animal welfare label was introduced for pigs and poultry, but as it develops there are plans to extend it to other species. There are two different levels of the label (Figure 1). The access level requires producers to meet higher standards than the German legislation regarding animal husbandry, transport and slaughtering, and is characterised with one yellow star (Fig. 1, left hand side). The premium level has higher standards and is marked with two yellow stars (Fig.1, right hand side). The final design is complemented by textual information of the level and a reference to a webpage. At the time of the consumer surveys, the label had not yet been introduced to the retail market. The guidelines for this label were developed by a group initiated by the University of Goettingen consisting of representatives from research, agriculture, the processing industry, retail and the German Animal Protection Association (Deutscher Tierschutzbund e. V., 2012).

Figure 1: Animal welfare label of the German Animal Protection Association used in the questionnaires (Translation: "For more animal welfare – certified according to standards of the German Animal Welfare Association")

The following two consumer studies aim to test the research question of whether a multi-level labelling system can work in the food market.

Study 1: Willingness to pay with additional information about the label

Method and materials

The first consumer survey took place between August and September 2011 with 306 respondents. It was an exploratory study with household decision makers concerning food purchases all over Germany and was used to inform the design decisions for the presented animal welfare label. Respondents were recruited with the help of an online access panel. The sample consisted of 69.9 % women and 30.1 % men, which approximately matches the real gender distribution of the household decision makers in Germany. A quota was set to achieve this distribution. The average age of participants was 41 years and 55.5 % held a university

degree which is more than the national average of 26.0 % (Federal Statistical Office, 2011). In section 4.2, the results for the socio-demographics are depicted in detail.

Besides the socio-demographic details, the structure of the questionnaire is as follows:

- Questions regarding buying behaviour
- Questions concerning the logo of the German Animal Protection Association
- Investigation of the optimal label design
- Inquiry of the WTP for products with the animal welfare label

Due to the aim of this research, the focus of the questionnaire is on the label in order to determine the feasibility of a multi-level labelling system. In the first survey, the participants were informed about the meaning of the animal welfare label. They were asked to state their WTP for pork. The WTP questions were designed as open-ended questions. The respondents also had a reference price so that they knew how much the conventionally produced product was. In order to avoid overestimation of the WTP a cheap-talk-script was used.

All respondents were shown photographs of the products of access and premium levels in pairs with the corresponding labels each. The price of the product without a label served as a reference price. On the left was the product without a label and on the right was the label with one star (one yellow star and one colourless star to indicate the absence of the second star) or two yellow stars (cf. appendix). The products were pork neck steak (250 g) and bacon (150 g), each product with one or two yellow stars. For each product, the WTP was solicited twice: once for the product with the one yellow star label and again for the same product but with a two yellow star label. The participants also had the opportunity to state that they would not buy high welfare products (no choice option).

Results

The participants of the survey are the household decision makers, and thus are more likely to be the potential buyers of high welfare products. The gender of the household decision maker is therefore approximately representative of the German population (Federal Statistical Office, 2011). Table 2 shows detailed description of the socio-demographic variables.

Variable	Share sample	Share GER
Sample size	306	-
Sex		
Male	30.1 %	33.0 %
Female	69.9 %	67.0 %
Age		
18 to 30 years	28.1 %	-
31 to 50 years	45.1 %	-
Older than 50 years	26.8 %	-
Income		
Net income < 2500 €/month	54.4 %	-
Net income > 2500 €/month	29.2 %	-
No information	16.4 %	-
Education		
University degree	55.5 %	-

Table 2: Characterization of the sample and the corresponding set quotas

Source: Authors' calculations; Federal Statistical Office (2011)

At the second part of the questionnaire the respondents were asked about the meaning of the stars in the label. Of the respondents, 16.1 % associated the label with a ranking, categorization or grading system; 12.6 % could not think of any meaning of the stars; 11.0 % ascribed importance to the stars of the European Union or an international meaning; 7.0 % thought that the stars stand for quality and 6.8 % thought they indicated an award. All other statements had a share of less than 5.0 % or could not be categorized. While 65.0 % of the participants did not trust the label without information, after receiving of an explanation of the label, this share reduced to 35.0 %. Afterwards, the respondents were requested to state their WTP for the high welfare products unsupported. They were also given a reference price so that they could know how much the product is without a label.

Tables 3 and 4 show the standard of the product in the left column. The provided reference price is the price of the product without an additional value for animal welfare and without any label. The middle columns contain the average WTP and the price premium calculated in percentage compared to the reference price for the products with the animal welfare label.

Table 3 shows the WTP for bacon. The WTP is 25.7 % higher when the product is labelled with the access label and 47.5 % higher when it is labelled with the premium label.

Standard	Average WTP	Price premium in %	Standard deviation
1 Star	2.25 €	25.7	0.55
2 Stars	2.64 €	47.5	0.83

Table 3: WTP Bacon (Reference price: 1.79 € / 150 g)

The next table contains the WTP for pork neck steak (Table 4). The accepted price premium is higher in comparison to bacon: 39.4 % for the label with one star and 66.7 % for two stars.

Standard	Average WTP	Price premium in %	Standard deviation
1 Star	3.47 €	39.4	1.14
2 Stars	4.15 €	66.7	1.72

Table 4: WTP Pork Neck Steak (Reference price: 2.49 € / 250 g)

The results of the first consumer survey show that consumers stated a higher WTP for the premium level compared to the access level. The price premium for the second star is nearly twice as high as for the one star level. Consequently, the different levels of the label are comprehensible for consumers in case they receive information.

Study 2: Willingness to pay before an explanation about the label

Method and materials

The second survey was conducted as an online-survey with the help of an online access panel in August 2012[1]. The sample was split into two groups to address the original aim of the survey; one group was asked about fresh meat, the other about processed meat. The processed meat sub-sample had 318 and the meat sub-sample had 324 participants. The survey is approximately representative of the German population in regards to the gender of the household decision maker concerning food purchases, income and age (Federal Statistical Office, 2011). To achieve this, quotas were set for sex, age and income. Regarding the household decision maker, the target was 33.0 % men (fresh meat survey: 28.9 %, processed meat survey: 29.6 %) and 67.0 % women (fresh meat survey: 71.1 %, processed meat survey: 70.4 %). The average age was 46 years in the fresh meat survey and 45 years in the processed meat survey. The regional distribution of the respondents' residence corresponds to the distribution in Germany. Section 5.2 provides more detailed information about the socio-demographic variables. The structure of the questionnaire was as follows:

- Questions regarding purchase behaviour regarding meat / processed meat
- Attitudes concerning food labelling and animal welfare
- Attitudes regarding the purchase behaviour at service counters / self-service counters
- Inquiry of the WTP for products with the animal welfare label

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[1] The participants are not the same as in the first consumer study.

In this study the participants received no explanation about the meaning of the label, in contrast to the first consumer survey where the participants received information. However, the focus is again on label questions in order to analyse whether the multi-level label can be understood without explanation. Before stating the WTP the respondents received a cheap-talk-script to inform them that the hypothetical WTP is often overestimated. Therefore, they were encouraged to imagine a realistic shopping behaviour and state the price they would really pay. For each product, both one and two stars were tested. In each survey, the WTP questions were designed as open questions.

All participants were shown photographs of different high welfare products in pairs. On the left was the product with one star or two stars, on the right was the product without a label (cf. appendix). The respondents had either to state their WTP for the one star product or for the two star product (split-sampling). The products were fresh pork and processed pork. The price of the product without a label served as a reference price. In the meat sub-sample, the WTP for pork cutlet (250 g) and gyros (400 g) was asked. In the processed meat sub-sample, low fat ham (150 g) and liver sausage (125 g) were used. Again, the respondents also had the opportunity to state that they would not buy high welfare products.

Results

Tables 5 gives detailed information about the socio-demographics. The survey is approximately representative of the German population in regards to the gender of the household decision maker, income and age (Federal Statistical Office, 2011), the corresponding quotas are also reported in Table 5.

Variable	Share (fresh meat sample)	Share GER	Share (processed meat)	Share GER
Sample size	318	-	324	-
Sex (household decision maker)				
Male	28.9 %	33.0 %	29.6 %	33.0 %
Female	71.1 %	67.0 %	70.4 %	67.0 %
Age				
18 to 20 years	2.4 %	4.0 %	5.2 %	4.0 %
21 to 39 years	31.3 %	29.0 %	32.9 %	29.0 %
41 to 59 years	42.6 %	35.0 %	35.3 %	35.0 %
60 years or older	23.7 %	32.0 %	26.6 %	32.0 %
Income				
Net income < 900 €/month	11.9 %	13.0 %	14.8 %	13.0 %
901 to 1500 €/month	24.8 %	24.0 %	22.5 %	24.0 %
1501 to 2600 €/month	32.8 %	32.0 %	30.9 %	32.0 %
2601 to 4500 €/month	22.5 %	23.0 %	23.8 %	23.0 %
Net income > 4500 €/month	8.0 %	8.0 %	8.0 %	8.0 %
Children under 18 years	75 %	-	79 %	-
Firm relationship / married	64 %	-	67 %	-
Education				
University degree	27.6 %	-	25.1 %	-

Table 5: Characterization of the sample and the corresponding set quotas

Source: Authors' calculations; Federal Statistical Office (2011)

About 78 % of both fresh meat and processed meat buyers state that they would purchase products labelled with an animal welfare label. However, it was found that consumer confidence in high welfare products tended to be cautious. On a five-point Likert scale assessing confidence ("I do not trust products that advertise with animal welfare labels") from -2 to +2, the mean in the fresh meat questionnaire is 0.35 and in the processed meat questionnaire 0.46 respectively.

Table 6 shows the average WTP for the cutlet for the one star and the two star label. The WTP even decreases when the standard rises. This is a contrary to the result in the previous survey, where the label system was explained to the consumers. The average WTP is 32.4 % higher in comparison with the reference price. For the label with one star, the price premium is 32.6 % higher and for the label with two stars, the price premium is 32.2 % higher.

Standard	Average WTP	Price premium in %	Standard deviation
1 Star	3.30 €	32.6	0.84
2 Stars	3.29 €	32.2	1.35

Table 6: WTP Cutlet (Reference price: 2.49 € / 250 g)

A similar result can be observed for product gyros (Table 7). The WTP for the premium level is clearly lower than for the access level. The WTP for the one star label is about 16.8 % higher when compared to the reference price, while the hypothetical price premium for the two stars label is 12.7 % higher.

Standard	Average WTP	Price premium in %	Standard deviation
1 Star	5.56 €	16.8	0.86
2 Stars	5.37 €	12.7	0.66

Table 7: WTP Gyros (Reference price: 4.76 € / 400 g)

The WTP for the low fat ham (Table 8) is higher for the premium level than for the access level. The WTP for the premium level is 4.9 percentage points higher than for the access level.

Standard	Average WTP	Price premium in %	Standard deviation
1 Star	2.21 €	23.4	0.40
2 Stars	2.30 €	28.3	0.68

Table 8: WTP Low Fat Ham (Reference price: 1.79 € / 150 g)

The last table (Table 9) shows the WTP for liver sausage. This shows a similar pattern to gyros and cutlet, viz. the WTP for the premium level is lower than for the one star label (14.4 %).

Standard	Average WTP	Price premium in %	Standard deviation
1 Star	2.12 €	14.4	0.26
2 Stars	2.11 €	13.9	0.35

Table 9: WTP Liver Sausage (Reference price: 1.85 € / 125 g)

As a first preliminary conclusion it can be seen that in the second consumer survey the small differences between the WTP for both levels are not systematically significant. Thus, the multi-level label might not be successful in the food market without explanation.

Discussion

The following sections will discuss the results for the first and then for the second consumer study. The discussion ends with final observations.

When the respondents of the first consumer study were asked what they associated the stars in the label with, only 16 % stated that they associated the stars with a ranking or a category. The others had unclear associations, such as a European or international meaning, a quality signal or they stated that they did not know what the meaning of the stars was. This leads to the conclusion that the design of the label should be carefully prepared and tested in advance.

It is also necessary to give an explanation about the display of the ranking in the label design. It has to be clear to the consumers that there are two different types of labels, one signalling the access level and the other one signifying the premium level. The results concerning the WTP show that a multi-level labelling system can work if information is provided. Given detailed information about the two levels of the label in the first consumer survey, the average price premium for processed products was 25.7 % higher for the access level compared to the reference price and 47.5 % higher for the premium level. For fresh meat the average price premium is 39.4 % higher for a product with one star and 66.7 % higher for a product with two stars, which signals the premium level. Thus, the WTP for high welfare processed meat products is 21.8 percentage points higher for the premium level than for the access level. For the fresh meat products the difference is 27.3 percentage points higher for one star in comparison to a product with two stars. The higher price premiums for the unprocessed fresh meat could be explained by the closer proximity to the animal.

The findings are in line with Kehlbacher *et al*. (2012): the higher the standards of animal welfare, the higher the WTP. Consequently, different WTPs can be achieved indicating that a multi-level labelling system is comprehensible. Thus, such a labelling system might be appropriate to prevent market failure if it assures different WTPs for different qualities.

However, without providing an explanation of the levels (the second consumer survey) there is still a higher WTP for high welfare meat and high welfare meat products, but there are no systematic differences concerning the WTP between the access and the premium levels. This confirms the assumption that a multi-level label enhances information overload and a multi-level label is not comprehensible without additional information provided. This is in line with the results by Andrews *et al.* (2011) who found that consumers prefer simpler labels. Hence, information overload is the basic underlying issue of food packaging labelling systems (cf. Harper, *et al.*, 2007; Orth & Malkewitz, 2008; Sørensen *et al*., 2012). Nevertheless, consumer choices can be better informed with multi-level label systems as results by Andrews *et al.* (2011), Kelly *et al.* (2009) and Roberto *et al.* (2012) confirm. Furthermore, it is important to boost consumer confidence in the label. The survey showed that the confidence in the animal welfare label is relatively low. The higher the confidence, the higher probability those products with the label will be bought.

It should also be pointed out that the two consumer surveys used in this study are the simulation of two extremes of consumer information: very detailed information (first consumer survey) against no explanation (second consumer survey). In reality, there will be

situations in between regarding quantity and quality of consumer knowledge about a particular label. For this reason, the information has to be better targeted at consumers as well as effectively disseminated using various media outlets to ensure that the labelling system introduced is successful.

Conclusions

Consumers are often overloaded by information provided on food packaging (Kolodinsky, 2012; Kroeber-Riel & Esch, 2004; van Kleef *et al.*, 2008). Thus, offering detailed descriptive information on packaging might not be the best tool to deliver information about standards to consumers, it might even intensify the information overload problem.

In general, a label is a means to reduce information overload. Yet, a binary label is less appropriate to communicate process or product qualities since many ethical values, such as animal welfare, are not binary but are of a metric nature. However, metric labels like the carbon or the water footprint require unidimensional attributes. Most ethical problems are more complex.

A multi-level labelling system might, therefore, be more suitable in the case of high welfare products as it more adequately reflects the various levels of a certification system. Nevertheless, it is still more complex than a binary label. Thus, it is not clear if a multi-level labelling system is comprehensible for consumers, raising the question of if it can be used to effectively communicate information about processing and production standards of food products. So far, consumer research has not been carried out to analyse if a multi-level labelling system is comprehensible for consumers and thus if it could work in the food market.

The results of the two consumer surveys suggest that communication for multi-level labelling is necessary to ensure the appropriate understanding of a label. Without additional information, it was not clear to the respondents in the second consumer survey that the label with one star means a lower standard than the level with two stars, as there was no significant difference in the WTP for the two levels. Communication is therefore essential to introduce a multi-level labelling system successfully. To confirm this, the first consumer survey showed that when consumers received an explanation about the meaning of the non-binary label, the WTP was significantly higher for premium products with two stars than for products labelled with one star.

In general, it can be concluded that a multi-level labelling system can work in the food market. As the results show, the preparation of the introduction of such a labelling system and an appropriate communication plan is essential for the success of a new labelling strategy. Furthermore, the design should be tested before the label is introduced to the market. Following this, when consumers understand the various components of a multi-level label, then different price premiums for each level can be achieved. A multi-level label might therefore be an appropriate tool to communicate different qualities of products, implying certain process or product attributes such as animal welfare. Such a labelling strategy might be able to prevent market failure, in the sense of Akerlof (1970), if different product qualities are transparent and comprehensible for consumers.

Overall, multi-level labelling is much more complex than a binary label as, for example, the design requirements are relatively high and the system itself is more difficult for consumers to understand. Thus, additional research is recommended before introducing a multi-level label. Furthermore, the certification, processing and distribution system would pose additional challenges.

A limitation of the consumer studies is that the stated WTP was the hypothetical WTP (HWTP) and not the actual WTP. It is not certain that respondents stating a HWTP would actually pay the same amount of money when they face the price in the supermarket and have to pay for it with their restricted budget. A further limitation that restricts the comparability of the two consumer studies is that all respondents in the first study were given products with labels indicting the access and the premium levels whereas the respondents of the second study had either a product labelled with one or two stars. Additionally, the label presented only has two stages, whereas a system like the hotel star classification has five levels. Thus, further research is necessary to improve knowledge about the usage of multi-level labelling on food packaging and the optimal design. A focus group discussion would be useful to acquire information about what consumers think of different attributes of a multi-level labelling for food.

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Appendices

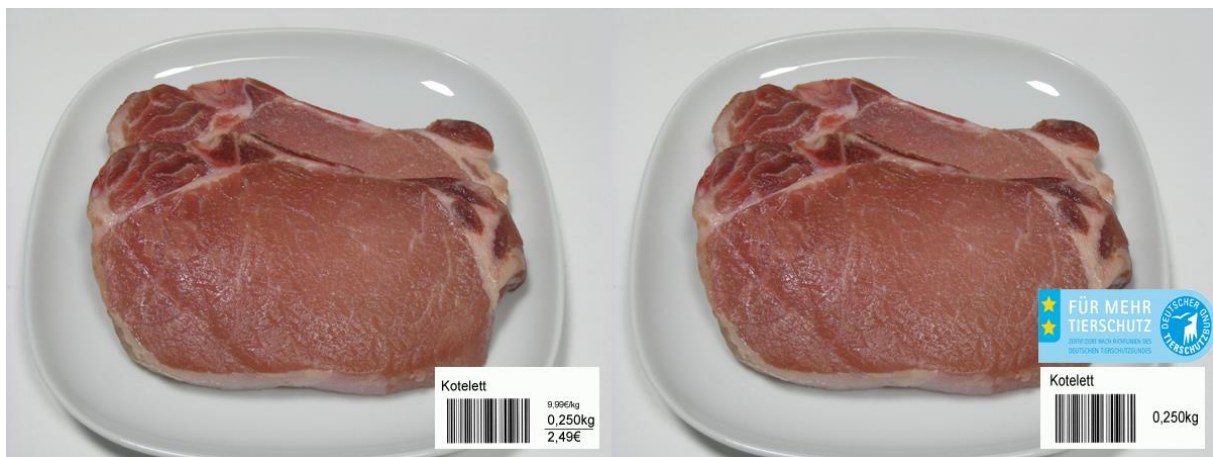**Appendix A:** Photographs used in consumer survey 1

Bacon

Pork neck steak

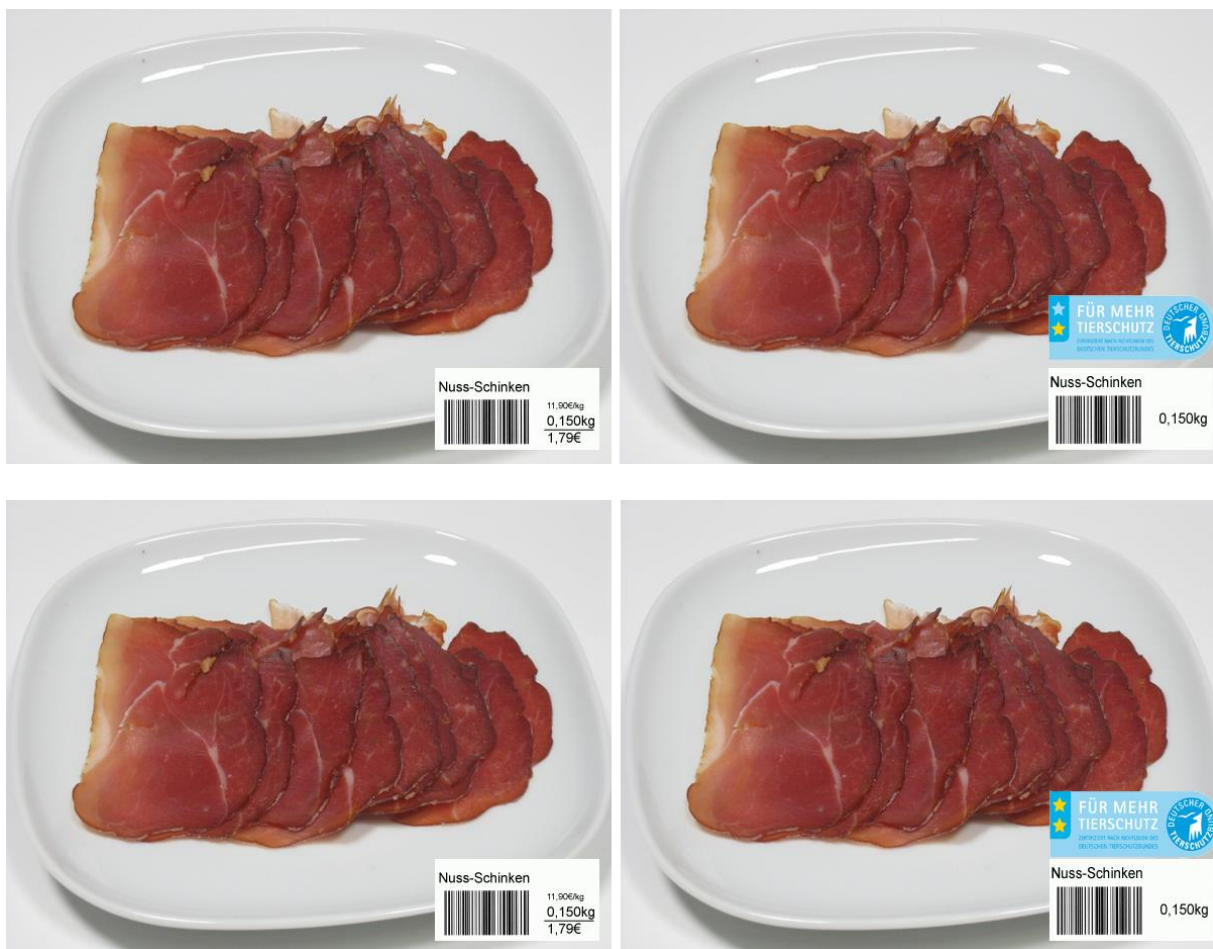**Appendix B**: Photographs used in consumer survey 2

Cutlet

Gyros

Schweinegeschnetzeltes nach Gyros Art
11,90€/kg
0,400kg
4,76€

Schweinegeschnetzeltes nach Gyros Art
0,400kg

Low fat ham

Nuss-Schinken
11,90€/kg
0,150kg
1,79€

Nuss-Schinken
0,150kg

Nuss-Schinken
11,90€/kg
0,150kg
1,79€

Nuss-Schinken
0,150kg

Liver sausage