

Running Head: MEAT LABEL INFORMATION

Meat Label Information:

Effects of Separate versus Conjoint Presentation on Product Evaluation

Jutta Mata\*<sup>1,2</sup>, Sonia Lippke<sup>3</sup>, Anja Dieckmann<sup>1,4</sup>, & Peter M. Todd<sup>1,5</sup>

<sup>1</sup> Center for Adaptive Behavior and Cognition  
Max Planck Institute for Human Development  
Lentzeallee 94  
14195 Berlin, Germany

<sup>2</sup> International Max Planck Research School "The Life Course: Evolutionary and Ontogenetic Dynamics (LIFE)"

<sup>3</sup>Department of Health Psychology  
Freie Universität Berlin, Germany  
Habelschwerdter Allee 45  
14195 Berlin, Germany

<sup>4</sup> Gesellschaft für Konsumforschung e.V.  
Nordwestring 101  
90319 Nürnberg, Germany

<sup>5</sup> Cognitive Science Program  
Indiana University  
1101 E. 10<sup>th</sup> Street  
Bloomington, IN 47405, USA

\* Corresponding author:  
E-mail: jumata@stanford.edu

### Abstract

Consumers want more information about the food they consider buying. One way to provide such information is via food labeling—but not all label information can be used effectively. We tested how information on actual meat labels from a supermarket environment analysis was evaluated against a realistic new label when labels were seen separately versus in a conjoint (simultaneous) presentation. Seventy participants ( $M=24$  years, 49% women) evaluated how much money they would pay for identical meat products with different label information. Conjoint assessment of labels led to opposite product rankings compared to separate evaluations in some conditions ('preference reversal effect'). We discuss the importance of food labels that provide transparent, evaluable information for supporting informed and responsible meat product decisions.

Keywords: food label, meat label, preference reversal, food decisions

## Introduction

Meat consumers are worried by food scandals such as meat and bone meal in feed, antibiotics given to cows so they can live on corn instead of grass (Pollan, 2006), and pigs kept in small barns, leading to an easier spread of disease and consequent higher amounts of medication (Berke & Grosse Beilage, 2003). The problems are numerous and make frequent news headlines. Consumers are alarmed (e.g., Köhler & Wildner, 1998)—after all, toxins, growth promoters, and physical treatment of farm animals can eventually affect the health and well-being of people (e.g. Walker, Rhubart-Berg, McKenzie, Kelling, & Lawrence, 2005).

Many consumers associate animal-friendly husbandry and feed that is free of additives with positive health (Harper & Makatouni, 2002) and thus want to know where their meat comes from, what the animals were fed, and under what conditions the animals were raised (e.g., Bjørner, Hansen, & Russell, 2004; Imkamp, 2000). Information is an indispensable prerequisite of an individual's behavior. It is the base of knowledge and personal risk perception, which in turn can lead to behavior change (e.g., Schwarzer, 1992), and it affects food choice in the supermarket (Anderson et al., 1997; Levy, Mathews, Stephenson, Tenney, & Schucker, 1985). However, meat in supermarkets, if packaged at all, is usually sparsely labeled (Bredahl, 2003), displaying no more information than price, weight, and best-used-before date.

Our goal was to study ways to make the conditions under which animals were raised transparent to consumers and to look at how this information affects consumers' evaluation of a meat product and their purchasing intention. In particular, we investigated whether consumers are affected by having access to relevant comparison standards when judging a meat product (such as having other competing products nearby to compare with)—so-called *conjoint* versus *separate evaluation* of product information.

Becoming aware that food consumption and health are related is the first step toward conscious eating and shopping behavior. Many consumers pay attention to information about sugar or fat content (Higginson, Rayner, Draper, & Kirk, 2002) as provided by nutrition labels, but information about such issues as how animals are fed and kept and their effects on health is typically scarce. A recent topic linking animal feed and health that was extensively covered by the media is bovine spongiform encephalopathy (BSE, also known as “mad cow disease”). It is assumed that cows get infected with BSE via meat and bone meal in their feed (e.g., Taylor, Woodgate, & Atkinson, 1995). The human health risk of consuming BSE-tainted meat (i.e., developing a form of Creutzfeldt–Jakob disease) has been widely reported (Nestle, 2003). However, this scandal has not led to clearer descriptions of feed ingredients on meat packages. Similarly, consumers are developing an increasing awareness of the possible effects of antibiotics in animal feed on their health (e.g., Harper & Makatouni, 2002). Regular antibiotic administration to animals increases the chance that bacteria will develop resistance to the drugs, thus decreasing their effectiveness in treating human illnesses (Walker et al., 2005).

#### *Information environment and the preference reversal effect*

To make an informed purchasing decision based on a food label, the information on the label has to be evaluable, that is, interpretable, by the consumer. There is extensive evidence from both basic and applied social psychological research that the same information presented in different modes or formats can result in dissimilar evaluations of a product (for reviews, see e.g., Bettman, 1979; Johnson & Busemeyer, 2005, Tanner, 2008). Two widely studied presentation modes are separate and conjoint presentation. *Separate presentation* means a product or a product attribute is evaluated by itself, whereas in *conjoint presentation* mode, it is assessed at the same time as another product or attribute, providing a comparison standard. Evaluating a product in these two different modes can result in a so-called

*preference reversal effect* (Hsee, 1996): Product A is preferred over B if both products are evaluated separately, while seeing both products conjointly leads to the reverse, a preference for Product B over A.

This effect usually occurs when one of the product attributes is difficult to judge by itself, and another attribute can be easily evaluated alone. For example, Hsee (1996) showed his participants two dictionaries: One had a damaged cover (easy to evaluate by itself) and 20,000 entries (difficult to evaluate without comparison). The other one had an intact cover but only 10,000 entries. In separate presentation, participants were willing to pay more for the intact cover dictionary. However, in conjoint mode, where number of entries could be directly compared, the dictionary with more entries was judged to be more valuable. Can a similar effect be found for food labels?

### *Hypothesis*

We propose that how label information is evaluated depends on the presentation mode. If the same food label is shown in different information contexts, that is, in separate or conjoint mode, a preference reversal effect occurs. We wanted to test whether people can use information about a particular choice-relevant feature (here, barn size) on its own or only when assessed in the context of a comparison standard, which could for example be found on labels on other similar products.

### *Method*

*Participants and Procedure.* Participants were 70 individuals recruited through the subject pool at the Max Planck Institute for Human Development. They were on average 24 years old (range: 18–34 years), 49% were women. None of the participants were vegetarian; they bought on average two cutlets per month in a supermarket. Participants were randomly assigned to one of seven conditions. All questions and stimuli were presented in a brief questionnaire. At the end participants received €0.50 for their participation.

*Experimental Design.* This study was a between-subjects design with seven conditions. Conditions varied in two aspects: content of the meat label, and presentation mode (separate vs. conjoint evaluation). There were four different labels: The target label (1.3m<sup>2</sup> barn area per pig, no additional attributes) and three other labels (all 0.65 m<sup>2</sup> barn area per pig and one of three additional attributes). All labels were evaluated in separate presentation mode, resulting in four conditions. Additionally, in conjoint presentation mode, the target label was compared to each of the other three labels, resulting in another three conditions. Barn area was used as a non-evaluable cue (difficult to interpret without comparison standard), while the additional attributes presented on the other three labels were chosen to be individually evaluable: “from the region,” “with freshness guarantee,” and “tender and lean.” To make the task as ecologically valid as possible, these additional attributes had been selected from an environment analysis in five different supermarkets. We analyzed all pork cutlet products in these stores for what additional attributes (beyond price and weight) were described on the package. From these collected attributes we selected the three mentioned above because they added further positive value to the cutlet without interfering with the independent variable barn area (as “controlled upbringing” would have done) or with the dependent variable, willingness to pay (as “on sale” would have).

Each screen, with cutlets displayed in separate or conjoint presentation mode, was evaluated by 10 participants (see Figure 1 for examples of the screens presented for separate evaluation). Each participant saw only one of the conditions and was asked how much he or she would pay for the cutlet(s) presented. Participants were additionally asked for their age, gender, and how often they bought pork cutlets per month. The data of two participants in the separate and one in the conjoint evaluation condition were excluded because they answered they wanted to pay €0.00 for the cutlet or both cutlets, respectively.

## Results

To calculate whether the evaluation of the two options was significantly different in the conjoint versus the separate presentation mode, and if a preference reversal effect had occurred, we used the formula suggested by Hsee (1996, p. 248)<sup>1</sup>. Figure 2 shows the overall results. In the conditions with “tender and lean” and with “from the region” on the label, there was a significant preference reversal effect between separate and conjoint evaluation,  $t(27)=3.28, p=.002$ , and  $t(25)=3.70, p=.001$ . When the options with the attribute “tender and lean” were evaluated separately, the label with the smaller barn area but the additional positive attribute was evaluated higher (in terms of willingness to pay) than the cutlet’s label with a bigger barn area,  $t(18)=-2.15, p=.05$ ; Cohen’s  $d=0.96$ , whereas the opposite was found when the two options were evaluated conjointly,  $t(9)=3.78, p<.01$ ; Cohen’s  $d=0.65$ . The same evaluation pattern was found for the attribute “from the region”, with marginally significant differences between the two barn size levels:  $t(11)=-1.45, p=.17$ ; Cohen’s  $d=0.72$ , for the separate evaluation mode, and  $t(8)=1.95, p=.09$ ; Cohen’s  $d=0.50$ , for the conjoint.

Finally, there was no significant preference reversal effect for the label with the additional attribute “freshness guarantee,”  $t(26)=1.15, p=.26$ , which is reflected in the finding that there was almost no difference between the cutlet labels in the separate evaluation mode,  $t(17)=0.16, p=.88$ ; Cohen’s  $d=0.07$ . This suggests that the freshness guarantee was not as attractive an attribute as those above. In the conjoint evaluation, however, participants again were willing to pay significantly more for the cutlet with the large barn area,  $t(9)=2.45, p=.04$ ; Cohen’s  $d=0.45$ .

## Discussion

The present experiment extends previous research on the effect of food labels on consumer product evaluation: Instead of relying on artificially constructed attributes as in previous studies, we tested whether a preference reversal effect regarding a realistic new label about

animal husbandry conditions occurs in the context of an actual set of attributes determined by an environment analysis . We showed that the context influences whether additional information on animal keeping is transparent to the consumer, and therefore whether it can be taken into account when evaluating the product. We found a preference reversal effect for the situation of multiple labels, showing that transparency of information can be increased by providing an external comparison standard to facilitate consumers' evaluation of different product attributes. Other possible ways of increasing transparency that should be explored include providing a comparative scale for attributes of interest on each label directly, or displaying a qualitative indication of a product's attributes relative to its category (as for instance via a traffic light label symbol—Jones & Richardson, 2007), or creating an in-store list of all comparable products and their characteristics (Bettman et al., 1987).

Overall, participants' preference judgments were not affected by barn area when labels were presented separately. Participants even preferred the cutlet from pigs raised in a smaller barn area in the separate evaluation condition, when “from the region” and “tender and lean” were added to labels, indicating that both of these characteristics add additional value to the product. These findings also tell us that, “from the region” and “tender and lean” seem to be perceived as important evaluation factors when presented separately. This is in line with the findings of Savell and colleagues (1989), who reported that leanness was one of the predominant selection criteria for beef. Participants did take barn area into account, however, in the conjoint evaluation, resulting in a clear preference for cutlets from pigs raised under more animal friendly conditions in terms of space.

Our results suggest that to achieve transparent communication in the field of meat consumption and to enable consumers to make informed choices in line with their preferences it is necessary to provide relevant information in a way that can be easily interpreted by consumers. Specifically, if new information is added, such as barn area or other quantitative information including percentage of recommended daily amount of kcal or fat, a comparison



standard or a qualitative comparison statement (e.g., traffic light symbol) should be provided to allow consumers to actually interpret this information. These considerations are especially relevant in light of recently implemented EU regulation emphasizing that nutrition and health claims on food will only be permitted if the average consumer can be expected to understand the beneficial effects (Leathwood, MacFie & van Trijp, 2007), as well as extensive research indicating that such understanding will be challenging to achieve (Leathwood, Richardson, Straeter, Todd, & van Trijp, 2007). Food manufacturers will need to develop representation formats that are immediately understood even when the product is presented in isolation.

Another interesting question that should be considered in future research is the effect that presentation of new information on a food label has on consumers' motivation to purchase a product. For example, if consumers were not previously motivated to buy pork cutlets from animals raised with a larger barn area because they were not aware of this issue, reading such a label (given its information is transparent) might influence their intention to consider this aspect for their food choice and eventually influence their decisions. Based on the stage of behavior change paradigm, label information could lead to a change in subjective risk or benefit perceptions of (previous) non-intenders, which could be the first step toward modifying purchase behavior (Lippke, Ziegelmann, & Schwarzer, 2005).

This work has some limitations: The sample size is rather small and despite considerable effect sizes, some of the results are only marginally significant. Given the sample size the results should be generalized cautiously and followed up with larger samples. Also, despite the usage of ecologically valid actual meat labels, future research has to test the effects in a real-life supermarket environment. Studies have shown that consumers pay at least some attention to labels (Higginson et al., 2002). However, the lab situation makes it more likely that participants pay attention to all information provided whereas they might ignore information in the supermarket situation. Additionally, willingness to pay more for animal-friendly husbandry may decrease when people actually have to pay for the cutlets out of their

own budget. Therefore, the preference reversal effect should be replicated in a real-life setting.

### *Conclusion*

Food labels could be a promising means to make the production chain of meat more transparent. The implication of our study is straightforward: Meat labels should be designed such that they provide an evaluation standard allowing consumers to draw informed conclusions from new quantitative information for which they do not have any previous judgment yardsticks . This research is likely to also have further application to other types of food labels, such as health claims (Leathwood, Richardson, Straeter, Todd, & van Trijp, 2007; Wansink, Sonka, & Hasler, 2004) and nutrition information.

## References

- Anderson, E. S., Winett, R. A., Bickley, P. G., Walberg-Rankin, J., Moore, J. F., Leahy, M., Harris, C. E., & Gerkin, R. E. (1997). The effects of a multimedia system in supermarkets to alter shoppers' food purchases. *Journal of Health Psychology, 2*, 209-223.
- Bettman, J. R. (1979). An information processing theory of consumer choice. Reading, MA: Addison-Wesley.
- Berke, O., & Grosse Beilage, E. (2003). Spatial relative risk mapping of pseudorabies-seropositive pig herds in an animal-dense region. *Journal of Veterinary Medicine, Series B, 50*, 322–325.
- Bjørner, , T. B., Hansen, L. G., & Russell, C. S. (2004). Environmental labeling and consumers' choice—an empirical analysis of the effect of the Nordic Swan. *Journal of Environmental Economics and Management, 47*, 411-434.
- Bredahl, L. (2003). Cue utilization and quality perception with regard to branded beef. *Food Quality and Preference, 15*, 65-75.
- Harper, G. C., & Makatouni, A. (2002). Consumer perception of organic food production and farm animal welfare. *British Food Journal, 104*(3–5), 287-299.
- Higginson, C. S., Rayner, M. J., Draper, S., & Kirk, T. R. (2002). The nutrition label—which information is looked at? *Nutrition and Food Science, 32*(3), 92-99.
- Hsee, C. K. (1996). The evaluability hypothesis: An explanation for preference reversals between joint and separate evaluations of alternatives. *Organizational Behavior and Human Decision Processes, 67*(3), 247-257.
- Imkamp, H. (2000). The interest of consumers in ecological product information is growing—evidence from two German surveys. *Journal of Consumer Policy, 23*, 193-202.

- Johnson, J. G., & Busemeyer, J. R. (2005). A dynamic, stochastic, computational model of preference reversal phenomena. *Psychological Review*, *112*, 841-861.
- Jones, G. & Richardson, M. (2007). An objective examination of consumer perception of nutrition information based on healthiness ratings and eye movements. *Public Health Nutrition*, *10*, 238-244.
- Köhler, F., & Wildner, S. (1998). *Consumer concerns about animal welfare and the impact on food choice. A review of the German literature*. Review Report. University of Kiel, Germany. EU-Project CT98 3678.
- Leathwood, P. D., MacFie, H., & Trijp, H. C. M. van (2007). Consumer understanding of health claims. *ILSI Europe Report Series 2007*, 1-23.
- Leathwood, P. D., Richardson, D. P., Straeter, P., Todd, P. M., & Trijp, H. C. M. van. (2007). Consumer understanding of nutrition and health claims: Sources of evidence. *British Journal of Nutrition*, *98*, 474-484.
- Levy, A., Mathews, O., Stephenson, M., Tenney, J., & Schucker, R. (1985). The impact of a nutrition information program on food purchases. *Journal of Public Policy and Marketing*, *4*(1), 1-13.
- Lippke, S., Ziegelmann, J. P., & Schwarzer, R. (2005). Stage-specific adoption and maintenance of physical activity: Testing a three-stage model. *Psychology of Sport and Exercise*, *6*, 585-603.
- Nestle, M. (2003). *Safe food. Bacteria, biotechnology and bioterrorism*. Berkeley, CA: University of California Press.
- Pollan, M. (2006). *The omnivore's dilemma*. New York: Penguin Press.
- Savell, J. W., Cross, H. R., Francis, J. J., Wise, J. W., Hale, D. S., Wilkes, D. L., & Smith, G. C. (1989). National consumer retail beef study: Interaction of trim level, price and grade on consumer acceptance of beef steaks and roasts. *Journal of Food Quality*, *12*, 251-274.

- Schwarzer, R. (1992). Self-efficacy in the adoption and maintenance of health behaviors: Theoretical approaches and a new model. In R. Schwarzer (Ed.), *Self-efficacy: Thought control of action* (pp. 217–243). Washington, DC: Hemisphere.
- Tanner, C. (2008). Context effects in environmental judgments: Assimilation and contrast effects in separate and joint evaluation mode. *Journal of Applied Social Psychology*, 38, 2759-2786.
- Taylor, D. M., Woodgate, S. L., & Atkinson, M. L. (1995). Inactivation of the bovine spongiform encephalopathy agent by rendering procedures. *The Veterinary Record*, 137, 605-610.
- Walker, P., Rhubart-Berg, P., McKenzie, S., Kelling, K., & Lawrence, R. S. (2005). Public health implications of meat production and consumption. *Public Health Nutrition*, 8(4), 348-356.
- Wansink, B., Sonka, S. T., & Hasler, C. M. (2004). Front-label health claims: When less is more. *Food Policy*, 29(6), 659-667.

Author Note

The authors thank Thilo Bode and Matthias Wolfschmidt for their suggestions and feedback regarding the study design and material, Berit Hoerner, Linda Miesler, and Markus Wettstein for their help in the preparation and conduction of this study, as well as Mirta Galesic and Bettina von Helversen for their comments on a previous version of this manuscript.

## Footnote

<sup>1</sup>  $t = [(M_{J1} - M_{J2}) - (M_{S1} - M_{S2})] / [(S_J^2/N_J + S_1^2/N_1 + S_2^2/N_2)]^{1/2}$ ; where  $M_{J1}$ ,  $M_{J2}$ ,  $M_{S1}$ , and  $M_{S2}$  are the means for Options 1 and 2 in conjoint (j) and separate (s) evaluation,  $S_J^2$ ,  $S_1^2$ , and  $S_2^2$  are the respective variances, and  $N$  is the number of participants per condition. Note that the separate evaluation is between subjects, the conjoint evaluation within subjects.

## Figure Captions

### Figure 1.

Examples of screens shown in the experiment. Screen A and B were shown individually in the separate evaluation condition and simultaneously in the conjoint evaluation condition.

### Figure 2.


Results. Shown on the left side are product evaluations in separate mode, on the right those from conjoint mode, for all three conditions. The white bars represent evaluations for the larger barn area; the grey bars those for the smaller area.



Figure 1

Screen A

**How much would you pay for this pork cutlet?**




- Tender and lean
- Barn area 0.65m<sup>2</sup> per animal
- 250g

I would pay \_\_\_\_\_ Euros for this pork cutlet.

Screen B

**How much would you pay for this pork cutlet?**



- Barn area 1.3m<sup>2</sup> per animal
- 250g

I would pay \_\_\_\_\_ Euros for this pork cutlet.