

# Do Danish consumers prefer an organic vegetarian meal or a non-organic meaty alternative? Evidence from a choice experiment

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## Abstract:

### Purpose

The paper aimed to analyse how different segments of consumers make trade-offs between the content of vegetables and meat in a meal and between organic and non-organic ingredients.

### Background

Earlier studies have shown that concern about one's own health and the health of one's family emerges as one of the most important motives for buying organic food (e.g. Aertens, Verbeke, Mondelaers & Huylenbroeck, 2009; Schleenbecker & Hamm, 2013). Qualitative as well as quantitative studies have demonstrated a relation between organic purchases and healthy diet compositions (Lund & Jensen, 2008; Pelletier, Laska, Neumark-Sztainer & Story, 2013). In particular, a study by Denver and Christensen (2015) based on purchase data found Danish households with higher organic consumption to spend larger parts of their food budgets on fruits and vegetables and smaller parts on meat and fat/confectionary than households with lower organic budget shares. Thereby, the diets of organic consumers tended to be more in accordance with the official Danish Dietary Recommendations than non-organic consumers (Danish Veterinary and Food Administration, 2018a). This indicates that, whether or not organic products are intrinsically healthier than their conventional counterparts, there is a positive correlation between organic consumption and a healthy diet in terms of conforming with official dietary guidelines. The vast majority of economic analyses of consumers' preferences and willingness to pay for healthy food have focused on the healthiness of individual products just as most economic studies of organic food have been product oriented. At the same time, we know that most food products are included as components of a meal. The official guidelines concerning the composition of healthy meals recommend that a dinner plate should consist of 1/5 of animal products, 2/5 of vegetables and fruits, and 2/5 of bread, pasta, rice and potatoes (Danish Veterinary and Food Administration, 2018b). Thereby, the share of a dinner plate that is devoted to fruits and vegetables should be twice as large as the share devoted to meat. The dietary

habits in a Danish context were investigated in Pedersen et al. (2015), who concluded that the Danish diet is too fatty and too sweet compared to the official guidelines and that an effective promotion of diets that accord with official guidelines is a challenging task. While previous studies indicate that there is a positive correlation between organic consumption and eating more fruits and vegetables and less meat products, we do not know whether such a positive correlation extends to preferences for composing a healthy meal. This apparent gap of knowledge led to our research question.

## **Methodology**

The study was based on an online consumer survey conducted in Userneeds' Danish web panel. The first part of the survey consisted of a series of behavioral questions concerning stated consumption of fruits/vegetables and meat as well as stated organic purchasing habits. In the second part of the survey, consumers' preferences for the composition of an everyday meal were tested in a choice experiment. Here, respondents were asked to choose repeatedly between dishes of pasta and tomato sauce that differed from each other with respect to three attributes: 1) organic or non-organic ingredients, 2) contents of vegetables and meat, and 3) price. Prior to the survey, a pilot study involving 100 panel members was used to test the questionnaire. Firstly, the respondents' choices of meal in the pilot study provided priors for the marginal value of each attribute which were used to refine the design of the choice experiment. Secondly, an open question to the respondents in the pilot study provided valuable input concerning the understandability of the questions. The main survey was carried out in August 2017 among a sample that was representative for the Danish population according to gender, region, age and education. In total 505 respondents participated in the survey and the response rate was approximately 20 %. Two types of behavioural variables were used to categorize consumers in the analysis of their meal choices: The first type of variables addressed self-reported organic purchases of four categories of food (meat, fruit, vegetables, milk) while the second concerned the self-reported level of compliance with the dietary recommendations – i.e. consumption of fruits, vegetables and meat. Based on these six variables, we were able to test to what extent organic consumption as well as adherence to the official dietary advices could be used to explain consumers' preferences for meals in the choice experiment. As the variables concerning purchases of organics and dietary habits were suspected to be mutually correlated, a principal component analysis (PCA) was used to aggregate these variables into a smaller number of orthogonal components. Based on correlations between component loadings and individual respondents' answers, component scores were assigned to each respondent and included in the statistical model. The underlying economic behavioural model for the study was the attribute-based utility model suggested by Lancaster (1966) where the utility of a good can be described as a function of its characteristics. The RUT was introduced by Luce (1959) and re-invented in a statistical modelling context by Mcfadden (1974). Inclusion of the price enabled us to estimate the willingness to pay (WTP) for the meal being organic and for different combinations of meat and vegetables in the meal. In order to capture

heterogeneity between consumers' preferences for the meal attributes, a latent class analysis (LCA) was used to allow estimation of marginal utilities of the meal attributes for different segments of consumers. More specifically, we used the LCA to group respondents into three segments with homogenous preferences for the meals and homogenous scores on the components identified in the PCA. This allowed for the estimation of class-specific consumer WTP for the composition of the meal and whether the meal was organic.

### **Findings**

One component was identified in the PCA based on six behavioural variables. The component had high component loadings on self-reported purchases of organic products as well as on compliance with dietary recommendations. Hence, this component represented a dimension characterized by covariation between eating organic food and having a high consumption of fruits and vegetables but a low consumption of meat. Three consumer segments were identified in the LCA and found meaningful to interpret. The segments differed in the following ways with respect to components scores and/or preferences for different combinations of the meals:

- *Committed consumers*: This segment was the smallest of the three segments. The committed consumers distinguished themselves by having relatively high WTP in the choice experiment for the meal being organic and for a healthy meal in terms of many vegetables and little meat. Respondents with high component scores were likely to belong to this segment.
- *Indifferent consumers*: Respondents in this segment were characterized by having low WTP for the meals being organic and for meals with many vegetables whereas an average consumer in this segment had the highest WTP for meaty meals of the three segments. Component scores were highly negative compared to scores in the *committed* segment. This indicated that *indifferent* consumers on average had a lower consumption of organics and lower degree of compliance with dietary guidelines. Thereby, this segment revealed itself to be rather indifferent to organic as well as to healthy consumption.
- *Ordinary consumers*: This segment was the largest of the three segments. Their WTP for the meal attributes that were offered in the choice experiments were situated between those of the *committed* and the *indifferent*. Hence, the *ordinary* respondents had low, but positive, WTP for organic production. They preferred meals with more vegetables and less meat compared to the *indifferent* but less so than the *committed*. Looking at the component scores, the *ordinary* segment was also situated between the other two segments.

### **Contribution to Theory and Practice**

Overall, our study supported earlier findings – but also added new details to the understanding of organic consumption and dietary preferences by focusing on context of a meal. The results were obtained in a concrete setting of choosing a dish of pasta and tomato sauce. Consequently, more studies are needed to increase the robustness of the findings. Our findings supported the prevailing knowledge

of a positive relation between consumption of organic and compliance with dietary guidelines. The three segments of consumers that were identified provided valuable input to a discussion of the size of different consumer segments as well as differences in consumers' trade-offs between the content of vegetables and meat in the meal and between organic and non-organic ingredients.

Firstly, the segment of *committed* consumers distinguished itself by finding it almost just as important that the ingredients were organic as the combination of meat and vegetables. For the other groups, the combinations of vegetables and meat were far more important than whether the meal was organic or not. Secondly, the segment of *committed* consumers had high WTP for meals with high proportions of vegetables whereas the *indifferent* consumers distinguished themselves by being very reluctant to consume a vegetarian meal. In particular, when the consumers had to choose between a vegetarian meal and a 100 % meaty meal, only the segment of *committed* consumers would prefer the vegetarian meal. At the same time, an average consumer in all three segments preferred that a pasta-and-tomato-sauce dish contained some portion of vegetables compared to a meat-only meal. Thirdly, the results indicated that the majority of the consumers belonged to the segment of *ordinary* consumers and thereby had preferences in between the other two segments. Hence, the average respondent in the survey had positive preferences for organic meals over a non-organic meal and he/she preferred meals with a fairly equal combination of meat and vegetables over a vegetarian or 100% meaty meal. Moreover, we found that the majority of the Danish respondents seem to prefer a non-organic meal that includes meat instead of an organic vegetarian meal – but not all consumers.

We suggest that this knowledge can advantageously be used in the creation and marketing of new organic products. Our results indicate that if there is an overall aim to improve the diets of Danish consumers then a strategy to attract the segment of *committed* consumers could be to market new types of prepared meals with many vegetables (possibly vegetarian) and preferably organic. Another outcome of our results would be that if the aim is to improve the diets of *ordinary* or *indifferent* consumers, then aiming for less ambitious substitutions of meat for vegetables might be a good marketing strategy as these consumers seem to prefer that the meal includes some vegetables – but also meat.

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