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Eliciting consumer preferences for credence attributes in a fine-dining restaurant

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Abstract

Design/methodology/approach – A menu-labelling experiment was conducted in a fine-dining restaurant during ordinary opening hours over a period of two weeks. The menu description of an organic veal entrée was altered repeatedly and the effect of these changes on the sales of this entrée was investigated.

Purpose – The objectives of this paper are to (1) illustrate and discuss methodology issues in menu-labelling experiments in commercial full-service restaurants, and (2) to investigate how the menu description and price affects customers' choice of an organic veal entrée in a Norwegian restaurant.

Findings – Adding words to the menu description, such as “organic”, or describing animal welfare had a very limited effect on customers' choices in the restaurant.

Research implications/implications – The research illustrate the use of a natural field experiment in a commercial full-service restaurant, and discuss strengths and weaknesses of the methodology.

Originality/value – Few experiments have been performed on the effect on credence attributes in commercial full-service restaurants and there is little knowledge about research challenges in menu-labelling experiments. This paper contributes to the knowledge on both issues by conducting a natural field experiment in a fine-dining restaurant.

Keywords – Animal welfare; Consumer preferences; Fine-dining restaurant; Natural field experiment; Organic

Paper type – Research paper

1. Introduction

The restaurant sector is a large and growing food sector that experiences tough competition. Knowledge about consumer preferences is needed for restaurants to survive. To date, most consumer studies on commercial full-service restaurants have been survey based (Harrington *et al.*, 2011; Heung, 2002; Hwang *et al.*, 2012; Jin *et al.*, 2015; Longart, 2010; Ryu and Jang, 2007; Upadhyay *et al.*, 2007; Wu and Liang, 2009) or focused on calorie labelling (see Long *et al.* (2015) for a review and meta-analysis). This paper presents a menu-labelling experiment conducted in a fine-dining restaurant in Norway. In manipulating the menu description and price of an organic veal entrée, this paper investigates how information about credence attributes and price affects customers' choice in a commercial full-service restaurant.

According to the U.S. National Restaurant Association, almost one in 10 U.S. workers work in a restaurant, 47 per cent of food dollars are spent in restaurants, and the U.S. restaurant industry's sales were projected to exceed \$783 billion in 2016 (National Restaurant Association, 2016; Steward, 2011). Europeans eat less food away from home than Americans do; in Norway, 25 per cent of food dollars are spent in restaurants, cafés, bars, and cantinas (Statistics Norway, 2010). Even though Europeans spend less on eating at restaurants than Americans do, the restaurant industry is a large and important part of the food industry on both sides of the Atlantic.

Consumers cannot accurately evaluate credence cues, such as healthiness, organic production, animal welfare, and origin (Darby and Karni, 1973), but research has shown that they generate expectations that affect consumers' perceived quality and sensory experiences (see Fernqvist and Ekelund (2014) for a review). The effect of credence cues on sensory evaluations and sales has been studied in a small number of cafeteria and restaurant experiments. For example, Wansink *et al.* (2004) found that health labels influenced taste perceptions in a cafeteria experiment, and Alfnes and Sharma (2010) found that local origin in combination with price had an effect on sales in a university restaurant.

Long *et al.* (2015) conducted a literature review and meta-analysis on the impact of restaurant menu calorie labelling, and found a statistically significant reduction in menu calorie labelling of approximately 60 calories per purchased meal in the studies conducted in non-restaurant environments (i.e. laboratory, Internet, health care, and street corner interviews). By contrast, studies conducted in restaurant settings did not show an association between menu calorie labelling and calories purchased per meal. This highlights the need to conduct studies in the setting that one wants to study.

In marketing research, a continuously debated issue is the relationship between action and attitude (e.g. Gabor *et al.*, 1970; Lusk and Fox, 2002). The choice of methodology is important in this discussion. A survey may conclude that a product has a certain success, but when the product moves on to the market, sales are lack-lustre. This may be because surveys measure attitudes, but not actions. Experiments with real economic consequences that seek to imitate real-world purchase situations may reduce

this mismatch. However, in most experiments conducted within food economics (Lusk and Shogren, 2007), respondents are aware that they are participating in an experiment, which may lead them to behave differently compared with their behaviour in other settings.

The experiment conducted in this paper was set in a commercial full-service restaurant that was open to the public and participants were ordinary customers walking in from the street. The participants did not receive any information about the experiment and made their selections from the menu, as they would have done on any other day that they might have visited the restaurant. The menu items, their descriptions, and prices were in line with those normally presented by the restaurant. In Harrison and List's (2004) typology, this experiment was then a *natural field experiment* including a field context in all factors.

Fine-dining restaurants often use niche products that are hard to find or are highly priced in ordinary grocery stores; therefore, consumers do not commonly purchase these products for home consumption. Many of these products rely on credence attributes to signal their uniqueness. In Norway, only 1.6 per cent of the food eaten is organic, and organic meat comprises only 0.3 per cent of the meat category (Norwegian Agriculture Agency, 2016). Norwegian restaurants can exploit the scarcity of organic meat in grocery stores by using a product such as organic veal to provide customers with something they would seldom eat at home.

The objectives of this paper are to (1) illustrate and discuss methodology issues in restaurant experiments in commercial full-service restaurants, and (2) to investigate how

the menu description and price affects the customers' choice of an organic veal entrée in a Norwegian restaurant. Thus, this paper includes a brief literature review of restaurant experiments, an illustrative case with a menu-labelling experiment in a fine-dining restaurant experiment, a discussion of the pros and cons of natural field experiments in restaurants and six restaurant specific design issues, and finally, concluding remarks are presented.

2. Literature review of restaurant experiments

Most of the recent studies that used some kind of restaurant experiment focused on nutritional labelling (e.g. Howlett *et al.*, 2009; Long *et al.*, 2015; Roberto *et al.*, 2010). Few researchers have studied the effect of other types of credence attributes, such as origin, organic, animal welfare, sustainability, and fair trade. Furthermore, no study has performed a natural field experiment in a fine-dining restaurant. Most restaurant experiments were conducted in restaurants associated with universities. In most of these studies, the customers were fully aware that they are part of a study even though they usually did not know the purpose of the study. This review includes experimental papers that manipulated their menus in other ways than calorie labelling.

Menu descriptions are important in themselves. McCall and Lynn (2008) showed how more complex menu descriptions increase perceptions of quality, the chance of liking the menu item, and its price expectation. Whether they priced the menu item or not did not affect these results. Therefore, it seems that menu descriptions have a signalling effect regardless of the ingredients in the dish or its price. Another way to alter the

description without altering the dish is to use words with positive food associations. Wansink *et al.* (2001) studied the influence of descriptive labels like “Grandma’s zucchini cookies” or “succulent Italian seafood filet”. Such labels increased sales and improved restaurant evaluations.

Few studies have investigated the effect of inserting words into the menu description to inform customers about credence attributes. One example is Alfnes and Sharma (2010), who studied consumers’ willingness to pay for local food in restaurants. Their study was conducted at a university training restaurant and they manipulated the price of a local food set menu relative to the price of a non-local food set menu. They found a non-linear pricing effect and concluded that a price premium is important in strengthening the quality signal sent by the local origin.

Cai *et al.* (2009) tested social learning through experiments in several restaurants serving traditional Chinese food in Beijing. These medium-scale restaurants may include around 60 hot dishes on the menu; therefore, selecting what to eat can be quite challenging. Cai *et al.* (2009) tested for “observational learning”, i.e. herd instinct by providing a plaque displaying the five bestselling dishes. The results show that information about the five bestselling dishes increased the chance of customers selecting one of these five dishes by 13-18 per cent. In other words, people’s choices are influenced by the choices of other restaurant customers.

3. Natural field experiment in restaurants: Illustrative case

3.1 Description of the menu-labelling experiment

The menu-labelling experiment performed in this paper were set in the “34 Restaurant & Bar”, which is located on the 34th floor of Radisson Blu Plaza Hotel in Oslo, Norway, from 11 to 26 June 2010. This Oslo landmark is the tallest hotel in northern Europe and the second tallest building and largest hotel in Norway. The 62-seat restaurant is located at the top of the hotel and offers a magnificent view of the city. The restaurant has a French kitchen with an international touch and a price level that is in line with other fine-dining restaurants (without a listing in the Michelin Guide) in Oslo, and has received favourable reviews in newspapers.

It was very important to the restaurant manager that the experiment did not affect the customers’ restaurant experience. This had several consequences. One was that the manager did not allow customers to be interviewed or complete a survey while they were seated in the restaurant. At the same time, knowing why the customers chose as they did would be relevant to the study. The restaurant compromised by allowing the waiters to hand out a business card with an Internet address for an online questionnaire and customers were asked to visit this website. The waiter handed out this card when the customers were paying so that it would not influence their food choices.

Unfortunately, very few people responded to the Internet survey after leaving the restaurant; therefore, no reliable background information on customers was available beyond the general description provided by the restaurant manager. According to the restaurant manager, a majority of customers were guests at the hotel and around 50 per cent were foreigners. On weekdays, businesspeople constituted most of the customers,

while on weekends they were a mix of locals, businesspeople, and tourists. Thus, weekends were made one of the design attributes.

Table I shows an example of the menu pages for main courses. Prices for all non-veal main courses on the menu were held at a constant NOK 285 (€36)ⁱ during the experimental period. For the main course, in addition to veal, customers could choose from fish, meat, lobster, and a vegetarian alternative. Varying the veal prices was part of the experimental design.

Insert Table I here.

A fractional factorial design was created using the SAS *%MktEx* macro (Kuhfeld, 2010). This design was based on a choice between two alternatives, where alternative 1 was kept constant (the other main courses) and alternative 2 (the veal dish) was varied according to the design.ⁱⁱ The design included four factors. Two two-level credence attributes (dummies for organic and positive animal welfare), a three-level price attribute (NOK 265, 285, and 310), and a two-level factor were used to control for possible customer differences between weekends and other days. The restaurant required that the menu be changed only every second day, starting on a Friday and ending on a Saturday two weeks later. The length of the experiment was determined by the amount of organic veal that the restaurant had bought: two full calves. With the restaurant closed on Sundays, this gave seven two-day periods, with three being Friday and Saturday nights. The SAS software reported a D-efficiency of 94.34 for the design.

Table II describes the four menu descriptions used in the experiment. These texts had to be written in a way that would seem natural for the restaurant. Therefore, the restaurant participated in the discussion of the wording and he had clear views of what he thought would work and what he could accept on his menu. First, only positive descriptions could be on the menu. Second, the wording had to be non-technical. Third, the entry had to be relatively short to be in line with the rest of the menu. This posed no problem for “organic”, which is a well-established concept among consumers and commonly used in restaurant menus. However, there is no standard way of referring to enhanced animal welfare in restaurants. The preferred wording ended up being the phrase “from happy calves that have received much care and exercise”. The veal dish in itself was the same regardless of the price and menu description.

Insert Table II here.

The waiters were informed that they should not affect the choice of their customers. They were asked to refrain from saying anything more about the dishes than what was available on the menu. To ensure that the experiment was conducted as planned, the authors visited the restaurant on two random occasions as regular customers. The authors had not met the waiters before (only the restaurant manager) so they were unfamiliar to the waiters on those evenings. On both evenings, the experiment went as planned.

3.2 Econometric model

This study assumes a random utility model where a consumer chooses the one product that maximizes his or her utility, and the probability to choose a veal entrée equals the probability that a veal entrée yields greater utility than all other available entrées. From this assumption, a logit model naturally follows (Train, 2009).

In contrast to most survey-based choice experiments, the participants in the menu-labelling experiment made only one choice; therefore, the 462 participants provided only 462 choice observations. Among these choices, 180 (39 per cent) were for the veal entrée dish. Because of the relatively low number of choice observations and the lack of panel features, the binary logit model was employed to analyze the choice data. The dependent variable in this logit model was the veal purchase. The three veal attributes were independent variables.

With only seven profiles in the design and one choice per respondent, models were estimated with as few parameters as possible. However, to test if the estimated effects of organic production and animal welfare are robust to different specifications of the price effect, three price specifications were included. Hence, three binary logit models were estimated, which only differed in their price specification. The random utility functions of the three models are specified as:

$$U_i = \beta_0 + \beta_1 AW_i + \beta_2 Org_i + \beta_3 P_i + \varepsilon_i \quad (1)$$

$$U_i = \beta_0 + \beta_1 AW_i + \beta_2 Org_i + \beta_3 PW_i + \beta_3 PS_i + \varepsilon_i \quad (2)$$

$$U_i = \beta_0 + \beta_1 AW_i + \beta_2 Org_i + \beta_3 PL_i + \beta_3 PH_i + \varepsilon_i \quad (3)$$

The U_i is customer i 's utility from choosing the veal alternative on the menu. The constant term β_0 captures the utility of the veal dish sold without any information about its characteristics. AW_i is a dummy indicating that the description of the veal dish included an animal welfare statement. Org_i is a dummy indicating that the description of the veal dish included the word "organic". P_i is an ordinal variable indicating the price level. In Model 2, PW_i measures the price level on weekdays (Monday-Friday). PS_i measures the price level on weekends (Saturday). In Model 3, PH_i and PL_i are dummies indicating the high (NOK 310) and the low (NOK 265) price for the veal dish, respectively. The reference point for all three models, with utility normalized to zero, is the utility of choosing something other than veal from the menu.

The β s are the respective parameters indicating how the variables affect the likelihood of choosing the veal over the other alternatives on the menu. Finally, ε_i is an independently and identically distributed extreme value error term. The model was estimated using Stata.

The rationale behind the three different price specifications are as follows: Model 1 is the standard main effect model assuming a linear price effect, Model 2 opens for variation in the price sensitivity between weekdays and Saturdays based on the restaurant manager's comments about fewer businesspeople on Saturdays, and Model 3 opens for ideal-point pricing. The aim is not to test which of these three price specifications best describe the observed choice, but to show that the relative size of the effect of organic and animal welfare is robust to the price specification used in the model.

3.3 Estimation results

Table III presents the estimation results from the three models. The production attributes in the models have only a weak influence on customer choice. In all three models, both animal welfare and organic attributes have the expected positive signs. The effect of animal welfare is larger than the effect of organic. The latter finding is somewhat surprising, given that animal welfare is one of the attributes associated with organic farming. The results for organic and animal welfare are also relatively stable over the various price specifications in the three models.

Insert Table III here.

As can be seen from the p values, organic and animal welfare statements were not important drivers of choice in the experiment. Hence, other factors determined what customers ate at this restaurant. For example, if they want seafood, they will choose fish or lobster independently of the description of the meat dish. Similarly, if they are vegetarians, the description of the meat dish has no effect on their choices. The inclusion of organic and animal welfare seems to affect customers' choice only to a very limited degree.

For the price parameters, the expected negative signs in Models 1 and 2 were obtained, but only the Saturday price parameter in Model 2 was significant at the 10 per cent level. Model 3 had significant negative coefficients for both low and high prices. Compared with the medium price level, a low price seems to be unappreciated. This probably shows a price signalling effect. A low listed price on the menu may indicate an

inferior item, or if the customer is part of a group, it can signal that the customer thinks that the higher priced menu items are too expensive. This may not be something that the customer would like to show in front of their date or business partner, so they might select a more expensive main course. This result is consistent with Alfnes and Sharma (2010), who found that when they gave their local dish an equal price to their regular dishes, there was no preference for the local dish. However, when the local menu item is the highest priced, it is also preferred as long as it is not too highly priced. In general, Kiefer *et al.* (1994) found low price elasticity for some menu items. Thus, increasing the price of a menu item does not necessarily mean a reduced demand for that menu item.

As mentioned in the introduction, the sales of organic food in Norway are very small; hence, the result for organic in the experiment is consistent with the sales of organic products in stores. However, even though the sales of organic products are small, the concept of “organic” is familiar to Norwegians. For example, a survey by Kvakkestad *et al.* (2011) found that 60 per cent of Norwegians want that the government seek to increase the sales of organic food. The main reason stated by Norwegians for eating organic food is to avoid pesticide remnants in the food (Kvakkestad *et al.*, 2011). Animal welfare related to food in general and veal in particular is not a big issue in Norway, and receives very limited media coverage. Even though we had expected larger impacts of the menu alterations, the results are not surprising given the position of organic food in Norway.

4. Discussion

4.1 Why conduct a natural field restaurant experiment?

A natural field experiment has as its advantage that the setting is as natural as it can be. There are no instructors telling subjects that they are part of an experiment or focusing their attention on specific things. Subjects are not paid to take part in the experiment, and if the experiment is ideal, they will have no knowledge that they are taking part in an experiment or that their behaviour will be analysed. As a result, the behaviour in a natural field experiment should be no different than the real world behaviour we want to study.

There are several reasons why this study was conducted as a natural-field experiment in a fine-dining restaurant. First, the product of interest in this project is organic veal, which is a typical restaurant product in Norway. One of the largest Norwegian producers of organic veal stated that the restaurant market is their main sales channel, which is consistent with observations of meat sold in grocery stores in Oslo, where organic veal is rarely found.

Second, in incentive-aligned experiments it is in the participants' best interest to follow and thereby reveal their true preferences (Alfnes and Rickertsen, 2011). Revealed preferences refer to real decisions in real markets, unlike survey preferences, which concern hypothetical decisions (Jaeger and Rose, 2008). Ding *et al.* (2005) compared the predictive abilities of an incentive-aligned and a hypothetical choice experiment in a Chinese dinner restaurant, and found that the incentive-aligned choice experiment outperformed the hypothetical choice experiment. Ding *et al.* (2005) argued that the problem with the hypothetical choice experiment was a too low price sensitivity, too

much risk taking, too high willingness to test new things, and a tendency to suffer from social desirability bias.

Third, the knowledge of being observed and that researchers will analyse their behaviour often make study participants behave differently than they would in a similar situation without monitoring. For credence attributes with ethical dimensions, such as fair trade and animal welfare, social desirability bias should be a concern in any method where the participants know they are observed (Fisher, 1993; Norwood and Lusk, 2011). Social desirability bias means that respondents are more likely to make ethically correct choices in an observed setting than in daily life. Laboratory experiments with economic incentives can reduce the social desirability bias to some extent by making it costly to choose the socially correct product (Norwood and Lusk, 2011). However, economic incentives alone are not likely to alleviate completely the effect of researchers observing the participants' choices (Levitt and List, 2007). In a natural field experiment, the social desirability bias is alleviated by economic incentives combined with customers not knowing that they are part of an experiment.

Fourth, previous studies show that context is very important when studying human behaviour. Therefore, an issue when interpreting results is in what context the decisions were made. For example, Benkahla *et al.* (2005) show that benefits of protected-designation-of-origin labelling varied greatly between sales channels. Because context matters and point-of-purchase realism was desired, it was natural to test the product in the restaurant context in which it would most likely be sold.

The main disadvantage of conducting experiments in the field is the lack of control over many factors that can affect the results. For example, it is standard procedure in experimental auctions that the participants are not allowed to talk to each other. A similarly “sterile” environment is not possible in a natural field experiment and many uncontrollable factors will likely affect the results. The lack of control and additional noise will lead to a reduction in internal validity, and will typically widen the confidence intervals of parameters, and reduce the goodness of fit and predictive power of the models. In the economics literature, this lack of control has long been seen as too big a hurdle to overcome; therefore, few field experiments have been conducted. Nevertheless, in recent years, there has been a rapid increase in field experiments in many areas within economics. For a good overview of the use of field experiments in other parts of the economic literature, see John List’s website (www.fieldexperiments.com).

As in other natural field experiments, the lack of control of external factors is the main concern in natural field experiments conducted in restaurants. A second disadvantage of a natural field experiment in restaurants and other contexts where the researchers do not seek out the participants, but the participants self-select into the experiment, is the inability to screen, match, or randomize participants into the different treatments without revealing that an experiment is in progress. These internal validity problems might also affect the external validity of the results to some degree.

The restaurant setting also has its own special limitations. In particular, people do not come to restaurants to be tested; they come to enjoy a dining experience. Therefore, the disturbance of the customers must be minimized so as not to destroy the dining

experience and to elicit their preferences without informing them of the experiment. Otherwise, it would be hard to generalize the results to non-monitored restaurants. This fact makes it difficult to collect good background information about subjects' motivations for their choices and other segmentation variables.

With these pros and cons in mind, it is easy to see that field experiments in restaurants can be a valuable addition to the surveys and laboratory experiments conducted to elicit consumer preference for food.

4.2 Six design issues in restaurant experiments

In reflecting on the design process of restaurant experiments, some important differences in the design process were noticed relative to previous work in laboratory, field, and online experiments. Here, six design issues are pointed out that are important to consider when designing restaurant experiments.

4.2.1 Choice of restaurant is also choice of sample

Conducting a natural field experiment in a restaurant means that the sample will be comprised of the customers that walk into the restaurant. By choosing a restaurant, the type of sample is also chosen. For example, conducting the experiment at a restaurant close to a university campus means that the sample will mainly be from the university. Most restaurants target a specific part of the population. In order to get something resembling a representative sample, multiple restaurants are needed.

4.2.2 Choice of restaurant is also choice of restaurant reputation

Restaurants cultivate their reputation using factors like the location, name, atmosphere, service, menu, and promotions. Consumer expectations about the menu items are likely

affected by the reputation of the restaurant. For example, if a restaurant has a reputation for offering organic produce, it would make very little difference what is written on the menu. People would expect everything to be organic. In a fine-dining restaurant, people would expect every ingredient to be of top quality. Hence, credence quality cues would likely be of less impact in such a restaurant than in restaurants with a less clear reputation. To draw a general conclusion about the effect of quality credence clues, multiple and different types of restaurants are needed.

4.2.3 Restaurants seldom sell two products that differ only in credence attributes

Restaurants usually sell a relative small number of dishes and it is very rare to find two dishes on a menu that only differ in credence attributes. Hence, if one wants to see how introducing credence attributes such as organic affects the sale of a dish, one should compare the sales for the dish on days where the dish is described as organic with the days it is not, as done in this paper. Alternatively, Alfnes and Sharma's (2010) method could be followed. Their menu included two set menus, one local and one non-local, and was changed daily. One day the local food was a chicken dish and the non-local a pork dish, the next day the local was pork and the non-local chicken, and so on.

One reason for having dishes only differing in credence attributes on the menu on the same day is if one wants to study how including several close substitutes will affect sales. For example, would a restaurant sell more of a beef dish if the customers could choose between several countries of origins for the beef?

4.2.4 Time is an important factor in field experiments, which may take several weeks to complete

Since restaurant customers typically make only one choice out of an often rather large choice set, many respondents are needed to document changes in the purchase frequency of a specific dish. As a result, restaurant experiments usually need several weeks to obtain enough data. A longer experiment period is likely to give both more participants and a more representative sample of the restaurant's customers.

Over the time it takes to run the experiment, products might change due to seasonality, external factors such as weather or media events can change consumer preferences, or the customer base for the restaurant might change. For example, in the study restaurant, the restaurant manager told the authors that they significantly changed the menu during the summer holiday because international tourists wanted more Norwegian specialties. Therefore, it is important to ensure that time differences are controlled for in the design. This can either be done by using a diff-in-diff approach with treatment and control restaurants, or if several attributes change, by making time one of the attributes in the design so that there is no correlation between time and treatment attributes. Alternatively, both of the above can be done.

4.2.5 Keeping other factors in the restaurant constant

Many factors not related to those studied in the experiment can affect the choice probability of a menu item. Waiter recommendations, special offers on other products, and anything that changes the atmosphere of the restaurant may affect customer choices (Bell *et al.*, 1994; Bouwen and Morris, 1995). For example, a special offer on a specific type of wine can mean that more products that go well with it are sold. Therefore,

researchers must be careful while instructing the restaurant manager and waiters to avoid unnecessary noise from factors not included in the experimental design.

4.2.6 Restaurant jargon

Restaurant jargon differs from the language typically used to elicit preferences in surveys. In surveys, researchers usually use objective descriptions of the attributes of interest. For example, the differences in animal welfare may be explained as the use of two different production methods. In restaurants, the focus is on selling the products; therefore, the product descriptions are all positive, such as “Mamma’s juicy Italian roasted chicken”. Furthermore, restaurants use almost no labels and only a limited use of brands to describe their dishes, which makes it very challenging to describe the production process attributes of the dishes. In this study, organic was a well-established menu word, but long discussions with the restaurant manager were held about how to add animal welfare to the menu.

5. Concluding remarks

The restaurant market is a very important market for agricultural goods; however, only a very small portion of the very extensive literature on consumer preference for food products attributes focus on this market. The exception is the relative new literature on nutritional labelling in restaurants. This paper described a menu-labelling experiment in a commercial full-service restaurant where the participants were ordinary customers walking in from the street and did not know that they were participating in an experiment. Standard choice methodology was used in both design (fractional factorial design for

attributes) and analysis (logit models). The pros and cons of natural field experiments in restaurants and some design challenges were also discussed.

The main advantage of natural field experiments is to observe the participant in the context of interest without affecting their choices by letting them know that they are part of a study. This points in the direction of high external validity. However, the lack of control and lack of background information is a serious problem for the internal validity. As seen in the illustrative case study in this paper, the very limited amount of data coming out of the menu-labelling natural field experiment is clearly a disadvantage. A similarly stated choice experiment conducted in an online survey would have produced multiple answers per respondent, and therefore a much richer data set.

In the natural field experiment described in this paper, the menu description and price of an organic veal dish in a fine-dinning restaurant was manipulated. The wording about animal welfare and organic had very limited effect on the choices customers made. This is in line with the very low share of organic meat in Norwegian grocery stores, and indicates that most restaurants should emphasize other aspects of their products. However, there might be room for niche restaurants focusing entirely on organic food, and thereby recruiting customers specially interested in organic food.

As discussed under the design issues, several factors are likely to affect the results of a menu-labelling experiment. Some factors, such as the sample and reputation of the restaurant, are restaurant specific. Therefore, drawing conclusions for the whole population should be carefully performed based on this paper's illustrative case example. Seen together with the low market shares for organic in ordinary food stores, the results

indicate a limited effect of organic and animal-friendly wording on restaurant menus in Norway.

On the one hand, it is unfortunate that few variables are significant. The results suggest that a larger data set might be needed to identify the effect of altering menu descriptions and price on consumer choice. On the other hand, something can be learned about conducting restaurant experiments and what to expect as results. The data were collected over a period of time that is typical of restaurant interventions studies. The lack of significance is an important finding for researchers considering similar restaurant experiments in which only a small fraction of the population may care deeply about the product attributes under study.

The experiences with this experiment calls for further research into the possibilities of using natural field experiments in restaurants to complement other methods used in food economics. There is currently very limited knowledge about what influences customers' choices in restaurants. Hence, more research on this topic seems essential. Thus, natural field experiments in restaurants as illustrated in this paper can be an important contribution to the toolbox for investigating consumer preferences for food products.

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Table I

Example of menu pages with the main courses

Today's fish	
Arctic char with chorizo lentils and fig sauce	NOK 285
Today's meat	
Trio of veal from Grøndalen farm	NOK 285
Lobster natural	
½ lobster served on a bed of toast	NOK 285
Lobster gratinated	
½ lobster served with aioli on a bed of salad	NOK 285
Today's vegetarian	
Potato ravioli filled with mushrooms. Served with spinach and sweet pepper sauce	NOK 285

Table II

Menu descriptions used in the experiment for the organic and animal welfare attributes

Organic	Animal welfare	Menu description
No	No	Trio of veal from Grøndalen farm.
Yes	No	Trio of organic veal from Grøndalen farm.
No	Yes	Trio of veal from Grøndalen farm from happy calves that have received much care and exercise.
Yes	Yes	Trio of organic veal from Grøndalen farm from happy calves that have received much care and exercise.

Table III

Logit regressions for purchase of veal

Independent variables	Model 1		Model 2		Model 3	
	Coef.	<i>p</i> value	Coef.	<i>p</i> value	Coef.	<i>p</i> value
Constant	-0.49	0.07	-0.50	0.07	-0.35	0.11
Animal welfare	0.31	0.14	0.38	0.07	0.34	0.11
Organic	0.23	0.27	0.16	0.47	0.10	0.64
Price	-0.13	0.28				
PriceW			-0.96	0.47		
PriceS			-0.33	0.07		
PriceL					-0.38	0.09
PriceH					-0.78	0.00
N	462		462		462	
Log likelihood	-305.95		-304.63		-302.29	
<i>Pseudo R</i> ²	0.01		0.01		0.02	
<i>p</i> value, χ^2	0.12		0.07		0.03	

Endnotes:

ⁱ At the time of the experiment, NOK 100 was equal to €12.75.

ⁱⁱ This is not a typical choice design because only one of the alternatives was altered; therefore, only one alternative is included in the design. If several courses on the menu can be changed, an efficient choice design can be created using the design software *Ngene* or the SAS macro *%choiceeff*.