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Health information and diet choices: Results from a cheese experiment

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ABSTRACT

This study reports results from a choice experiment on semi-hard cheese from Norway. About half of the 408 participants were exposed to diet-related health information before performing either a choice or a ranking task, while a control group did not receive such information. The effects of health information on marginal willingness to pay for low-saturated-fat, low-fat and organic cheese are analyzed using rank-ordered mixed logit models. Cheese preferences are clearly affected by exposure to health information. On average, the health information group is willing to pay a price premium of 27.2% (NOK 24.5 per kg) for low-saturated-fat cheese and 14.4% (NOK 13.0 per kg) for low-fat cheese. This is respectively 1.73 and 2.89 times more than corresponding price premiums in the control group. Non-college, medium–high income, age 50–70 and female participants are more clearly affected by health information than college, low income, age 30–49 and male participants. Subjective statements on diet-health knowledge and awareness are used to discuss these findings. Our results suggest that provision of health information is likely to reduce educational differences in diet-health knowledge and thus dietary behavior. Low income participants seem to be constrained by high food prices, but not by lack of knowledge or awareness. Finally, due to lack of diet-health awareness, reaching out to young people and particularly males through health information policies seems difficult.

Introduction

Increasing prevalence of obesity and related chronic diseases, such as type II diabetes, represent key health challenges in most developed countries and increasingly also in developing countries (Hossain et al., 2007). According to the World Health Organization (2003), excessive energy intakes and poor nutrition have contributed to these trends. Dietary behavior is in turn closely associated with socioeconomic status indicators such as education and income (Commission on Social Determinants of Health, 2008). Therefore, in many countries, including Norway, the reduction of socioeconomic inequalities in health is identified as a key goal for health policy (Norwegian Ministry of Public Health and Care Services, 2006).

Unhealthful diet choices may partly be the result of lack of knowledge and awareness (Blaylock et al., 1999). These constraints may be targeted through health information policies such as nutritional labeling schemes, school education, official dietary guidelines and nutrition information campaigns (Nayga, 2008). The overall effects of nutrition information campaigns, as well as their distributional effects across different socio-demographic groups, are difficult to measure and are thus not well-known (Wakefield et al., 2010). For example, how will different education groups respond to a public media campaign on the importance of following a healthy diet? Due to different a priori levels of diet-health knowledge, it seems reasonable to expect that the marginal effect of health information on preferences for healthy foods is larger in lower than higher education groups. On the other hand, lower and higher education groups may be systematically different in their ability to process and adapt to health information (Grossman, 2000), as well as in their general interest for health information. Thus, the effects of health information may also be positively associated with length of education.

This paper uses Norwegian data from a choice experiment on semi-hard cheese to examine how diet choices are affected by exposure to diet-related health information. By random selection, about half of the 408 participants were exposed to neutral health information related to cheese consumption prior to performing either a choice or a ranking task, while a control group did not receive such information. Thus, the access to and use of information is exogenously determined, which is different from most non-experimental settings. Using rank-ordered mixed logit models, we examine whether exposure to health information affect the participants' marginal willingness to pay (MWTP) for low-saturated-fat,

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low-fat and organic cheese, and to what extent these information effects vary by age, gender, education and income. Finally, the results from the choice experiment are discussed in light of the participants' responses to subjective statements on diet and health issues, including the role of knowledge, awareness and food prices.

To the best of our knowledge, this study is the first to use an experimental approach, with one intervention group and one control group, to examine how exposure to health information affects preferences for semi-hard cheese, a food available with high, moderate and low levels of saturated fat. While there is an ongoing debate about the overall health properties of dairy foods and fats, there is less disagreement in that people would benefit from choosing low-saturated-fat and low-fat variants when consuming dairy foods (World Health Organization, 2003; Norwegian Directorate of Health, 2011). Dairy products represent the leading source of saturated fats in Norwegians' diets. During the period 1989–2008, the annual per capita consumption of fluid milk was reduced by about 39%, while the consumption of cheese increased from 13.3 kg to 16.6 kg (Norwegian Directorate of Health, 2010). Thus, cheese constitutes an increasingly important component in many consumers' diet. Consequently, to study which factors affect cheese consumption is of intrinsic interest. Moreover, choices among healthy and less healthy varieties of cheese are likely to be made with limited knowledge about how these and similar everyday dietary choices may affect our health in the long run. Thus, as a case study, cheese should be well-suited for studying the relationship between health information and diet choices.

Health information and diet choices

Public media campaigns on health behaviors have predominantly focused on tobacco use. Although these campaigns have generally been successful (Wakefield et al., 2010), they have frequently been most efficient in targeting higher socioeconomic status groups (Niederdeppe et al., 2008). Public media campaigns on nutrition have been less common and have usually been combined with other types of nutrition policies, and it has therefore been difficult to isolate the campaign effects themselves (Wakefield et al., 2010).

It is generally difficult to compare how different socio-demographic groups are affected by exposure to diet-related health information using observational data. Typically, there is lack of cross-section variation in the supply of information, and variability over time may be confounded with secular trends in dietary habits (Ippolito and Mathios, 1994). Studies focusing on the role of socio-demographic characteristics have therefore often relied on demand-driven health information indicators such as diet-health knowledge and awareness, and the use of nutrition labels. However, results from studies that account for the likely endogeneity of such variables are mixed (Park and Davis, 2001; Variyam, 2008). And while we might find, for example, that education is positively correlated with diet-health knowledge and awareness, and that education is in turn positively correlated with making healthful diet choices (Wardle et al., 2000), this has few direct policy implications. Instead, policy makers are interested in knowing whether the public provision of diet-related health information can help reduce educational differences in knowledge and awareness, and thereby reduce educational differences in dietary behavior.

Some of the above limitations may be overcome by utilizing properties of controlled experiments (Roosen and Marette, 2011). Experimental studies on health information and food choices have predominantly focused on issues related to food safety and debated food technologies such as hormone treatments and genetic modifications (Alfnes and Rickertsen, 2003; Huffman et al., 2007). Relatively few experimental studies have focused on health information in relation to obesity and diet-related chronic diseases (Nayga, 2008). However, some studies have examined the effects of placing diet-related health information on food items or restaurant menus, such as health claims (Gracia et al., 2009), calorie recommendations (Wisdom et al., 2010) and criteria-based nutrition labels such as the traffic light system in the UK (Balcombe et al., 2010). A few studies have taken a different approach in that they have provided scripts of neutral diet-related health information, either randomly to some of the participants at the beginning of the experiment (Lusk et al., 2008), or by providing more information at increments at different stages of the experiment (Roosen et al., 2009). Lusk et al. (2008) informed some participants about the potential health benefits of eating pasture-grazed meat. This information had a significant effect on the consumers' MWTP for pasture-grazed steak, but not for pasture-grazed ground beef. Studying preferences for sardines and tuna, Roosen et al. (2009) provided information on both the health risks (methylmercury) and health benefits (omega-3) associated with these two fish species, and their findings suggest that people are more responsive to messages of health risks than health benefits.

While most of the above studies found that the consumers' food choices were significantly influenced by health information, relatively little is known about to what extent these effects vary systematically by socio-demographic characteristics. In Roosen et al. (2009), the effects of health information were positively associated with education and negatively associated with income. The health claims effects in Gracia et al. (2009) did not vary significantly by socio-demographic factors, while in Balcombe et al. (2010), female and higher educated respondents were more clearly affected by nutritional traffic light labels than male and lower educated respondents.

The cheese experiment

Data from an online survey is used. A professional survey company (Ipsos Norway) was engaged to collect the data during spring 2009. To participate in the survey, the respondents had to buy groceries and eat cheese on a regular basis. The survey was completed by 426 adults in the age range 30–70 years, but only 408 observations are included in this study due to missing income information on eighteen respondents.

Descriptive statistics about the sample are summarized in Table 1. The variables for age, education and income are dichotomized to facilitate our empirical analyses. A high education level is defined as having attended either college or university. The original survey question on household income included eleven response alternatives, each representing a specific income interval. To construct a semi-continuous household income variable, we set a household's income to the mid-point value of the corresponding income interval, and then adjusted for household size by dividing the resulting income measure by the square root of household size (OECD, 2008). Furthermore, we divided the sample into a low and a medium–high income group, where the low income group is defined as the group that belongs to the lowest one third of the household income variable. Our sample is somewhat overrepresented with college-educated, high income, older age and female respondents.

The generic semi-hard cheese varied in four attributes of two levels each: (i) a price of 42 vs. 58 Norwegian kroner (NOK) per five hundred gram cheese,[1] (ii) regular-saturated-fat vs. low-saturated-fat cheese, (iii) regular-fat vs. low-fat cheese, and (iv) conventional vs. organic cheese. Thus, in the full factorial design there are $2^4 = 16$ un-

[1] During the period of data collection, the USD to NOK exchange rate was approximately USD 1.00 = NOK 6.80.