



Consumer response to monochrome Guideline Daily Amount nutrition labels



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ABSTRACT

Front-of-pack (FOP) nutrition labelling has received extensive political attention in recent years. Most studies assessing the influence of nutrition labelling focus on consumer attention to labels, while few concentrate on its effects on actual purchase behaviour. In this study, we present results from an analysis of scanner data provided by a large UK retailer. We focus on two food categories, using store-brand products that are labelled with a front-of-pack, monochrome Guideline Daily Amount (GDA) nutrition label. The analyses are based on models at both an aggregated and disaggregated level to enable us to identify as many influencing factors on food choice as possible. We utilize the SSAg/1 health score for our food categories as a dependent variable to obtain an objective measure of healthiness.

Our results suggest that the GDA label introduction reduces attraction of unhealthier products in terms of market share but does not affect product choice behaviour. Instead, price and habit exhibit a greater impact on purchase behaviour and product choice than the GDA label introduction.

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Introduction

Lifestyle-related illnesses such as cardiovascular diseases can be attributed to poor diet and a lack of physical activity (Grunert et al., 2010; James et al., 2004; Schor et al., 2010; Verbeke, 2008; WHO, 2012). In many European countries, these adverse health behaviours result in considerable costs for both the individual and society. From this background, nutrition labelling has been cited as a means of providing information to consumers that supports health-conscious food choices (Commission of the European Communities, 2008). It is assumed that consumers are likely to consider the nutritional information provided and change their behaviour, resulting in the purchase of healthier products (Grunert and Wills, 2007; Russo et al., 1986).

In 1990, the US Food and Drug Administration introduced regulations requiring that all pre-packaged food products in the US display nutritional information in the form of a NLEA label, which

is typically found on the back of the package (Nutrition Labeling and Education Act, 1990). Nutrition labelling has recently also become mandatory within the European Union as a result of legislation on the provision of food information to consumers (EU No 1169/2011). This regulation requires pre-packaged foods to display energy values as well as amounts of fat, saturated fat, carbohydrates, protein, sugar, and salt in the same field of vision, typically on the back of the package.

While comprehensive back-of-pack (BOP) nutrition information is already present on a wide range of foods across Europe (Storcksdieck et al., 2010), the average consumer has neither the time nor the inclination to analyse this level of information at the point of purchase (Drichoutis et al., 2006). To make it easier for the consumer to distinguish between healthy and less healthy products, government bodies and the food industry have developed a variety of front-of-pack (FOP) nutrition labelling schemes.

One of the most prevalent FOP labelling schemes communicates the percentage of the Guideline Daily Amount (GDA) for energy, fat, saturated fat, sugar, and salt that a serving of food contains. These Guideline Daily Amounts were derived from the COMA report on dietary reference values (Wiseman, 1992) and are promoted by the industry organisation FoodDrinkEurope. Another widely used system, developed by the UK Food Standards Agency (2007), overlays interpretative colour and text onto the nutritional values for fat, saturated fat, sugar, and salt. This scheme indicates

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the levels of those nutrients in 100 g of the food as high (red), medium (amber), or low (green). A number of major retailers within the UK and across Europe have adopted this type of traffic-light FOP labelling (Grunert and Wills, 2007), while other retailers have embraced a more directive and aggregated FOP labelling approach. The Swedish keyhole (Larsson et al., 1999) and the smart choices logo (Lupton et al., 2010) are examples of labelling where a simple symbol or health logo indicates a food item is healthier than others within the same food category without the need for the consumer to process any nutritional information (Hodgkins et al., 2012). A more detailed discussion of the various types of FOP nutrition labelling is given by Hersey et al. (2013) and van Kleef and Dagevos (2015).

The recent EU regulation (EU No 1169/2011) does not legislate mandatory front-of-pack nutrition labelling, but it does allow for the energy value to be repeated in the principal field of vision, either alone or in conjunction with per-serving values for fat, saturated fat, sugar, and salt. Additional forms of expressing and presenting FOP labels, such as Guideline Daily Amounts (GDA), traffic lights, and health logos, are currently being reviewed by the European Commission.

Grunert and Wills (2007) present a review of European research on consumer response to nutrition information on food labels. The response variables include perception, liking, understanding, and use of nutrition labels. Research with real purchase data from away-from-home eating places reveal mixed results regarding the effectiveness of nutrition labels in promoting healthier purchase behaviour (for reviews, see Harnack and French, 2008; Swartz et al., 2011). The same holds for research investigating the impact of nutrition labels at supermarkets (see, e.g., Hersey et al., 2013; vant Riet, 2012). As studies analysing the influence of FOP labelling on consumer behaviour using real purchase data are rare, many authors have called for further research in this area (Andrews et al., 2014; Feunekes et al., 2008; Hersey et al., 2013; Lachat and Tseng, 2013; vant Riet, 2012). However, the few studies that do use real purchase data do not show a generalizable impact of FOP labelling on consumer behaviour at supermarkets. Balasubramanian and Cole (2002) found mixed results regarding healthier purchase behaviour for eight different food categories. Similarly, Sacks et al. (2009) and Sacks et al. (2011) were unable to show an impact on the healthiness of foods purchased following the introduction of a traffic-light FOP label.

The objective of our study is to gain further insights into consumer's response to the introduction of FOP nutrition labelling. Our study contributes to existing literature in two ways. First, we analyse real purchase data as recommended by recent research. We have access to a large dataset from a UK retailer, including information about store brands sales, product characteristics, and consumer characteristics for one year before and after the introduction of a monochrome GDA labelling scheme (as shown in Fig. 1). We study the potential effects of the GDA label introduction on market share and choice in selected food categories.

Second, we study the effects of the monochrome GDA label introduction not only on an aggregate level, as in all previous studies analysing nutrition label effectiveness with purchase data, but

also on an individual basis. We have information about two different food categories: yogurt and ready meals. To our knowledge, this is the first study analysing FOP label effects at different data-aggregation levels, comparing the outcome of both approaches. This is also the first study to investigate the effectiveness of the monochrome GDA label. We control for price, trends, and seasonality at the aggregated market share level, but we also study the effects of the GDA labelling at the disaggregated level. This is accomplished by estimating the effects of the labelling format based on a discrete choice model with price, promotional activity, and consumer characteristics.

Dataset

A major retailer located in the UK provided the data used for analysis. Three different datasets are available. The first dataset contains purchase transactions of loyalty card members purchasing the retailer's store brands between May 2005 and April 2007. The food categories yogurt and ready meals are available for analysis. Within each food category, we group the products based on an objective measure of healthiness, as will be explained later in this section.

The dataset contains 75 different yogurt products accounting for nearly 20 million purchase transactions for the yogurt category as well as over 3000 different ready meal products accounting for 30 million transactions. Furthermore, the transaction dataset provides information about the consumer ID, the date of purchase, the product ID, quantity, unit price in pennies, and whether the product was purchased with discount. The second dataset provides information about the product IDs, with product size given in grams and different nutrition values per 100 g. For each product ID, we calculate a health index using the SSAG/1 measure (Rayner et al., 2004) as described in Table 1. The SSAG/1 measure enables the calculation of an overall objective health score for a given product. In addition, the measure focuses on the unhealthy components of the food that are typically included in the monochrome GDA label (calories, fat, saturated fat, sugar, salt). Lower values of the SSAG/1 score indicate that the food is healthier.

In the yogurt category, we obtain health scores from 0 to 3, while in the ready meals category, we end up with values between 0 and 4 and a final group of products with health scores above 4 (5+).

The third dataset includes consumer-specific information provided at the time of application for the loyalty card program, such as gender. The share of female loyalty card holders purchasing during the time span of the study is 75% in the yogurt category and 73% in the ready meals category.

Combining product and consumer information with the transaction dataset generates the final dataset for the analysis. The GDA label introduction date is May 2006. Therefore, we operationalize this variable by a 0/1 dummy with 0 for the transactions before May 2006 and 1 for May 2006 and later.

For our aggregated model, we calculate for each food category (yogurt and ready meals), each health level (yogurt with $h = 0$ to

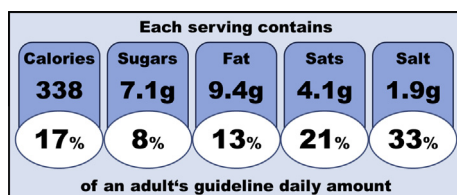


Fig. 1. Example of a monochrome GDA label.

Table 1

Calculation of the SSAG/1 health score.

SSAG/1
Scoring bands per 100 g as follows
Energy value: 0–895 kJ = 0; 895–1790 kJ = 1; 1790–2685 kJ = 2, etc.
Saturated fat value: 0–2.6 g = 0; 2.6–5.2 g = 1; 5.2–7.8 g = 2, etc.
Sugar value: 0–6.3 g = 0; 6.3–12.6 g = 1; 12.6–18.9 g = 2, etc.
Sodium value: 0–0.235 g = 0; 0.235–0.470 g = 1; 0.470–0.705 g = 2, etc.
SSAG/1 value = Energy value + saturated fat value + sugar value + sodium value

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