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ORIGINAL ARTICLE

Food Labelling to Advance Better Education for Life

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Background/Objectives: Nutrition labels are potentially a major instrument for enabling consumers to make healthier food choices, but current insights into how nutrition labels are used by consumers in real-world shopping situations are limited, making the science-based formulation of new labelling policies and the evaluation of existing ones difficult. The objective of the European Union-funded project Food Labelling to Advance Better Education for Life (FLABEL) is to determine how nutrition labelling can affect dietary choices, consumer habits and food-related health issues.
Subjects/Methods: A wide range of qualitative and quantitative consumer research methods is being used, including physical auditing, label sorting tasks, eye tracking and electrodermal response, structured interviews and analysis of retail scanner data.
Results: First results from the project show that, on the basis of consumer responses, nutrition labels available in Europe can be categorised as non-directive, semidirective or directive. Penetration of nutrition labelling on food and drink packages in five product categories seems widespread, with the nutrition table on the back of packs being the most prominent format (found on 84% of over 37 000 products audited in 28 countries). The higher penetration observed in Northern Europe is paralleled by more public health campaigns in this region alerting consumers to nutrition labelling systems and elements covered therein (for example, calories, salt and fat).
Conclusions: The findings to date indicate that nutrition labelling is widespread in Europe but formats and level of detail may differ between countries and products. Upcoming studies within FLABEL will decipher whether and how the various elements of nutrition labels affect attention, liking, understanding, use and dietary choices, and what the implications are for stakeholders such as policy makers.
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Keywords: food labelling; consumer behaviour; label format; food choice

Background and objectives

The European Commission is currently revising the nutrition labelling directive (EC, 2008), and several national governments have been pushing voluntary schemes in cooperation with retailers and industry. This has stimulated considerable research activity, particularly in the area of front-of-pack (FOP) labelling (for example, 'Traffic Lights', Guideline Daily Amounts (GDA)), and nutritional labelling more generally (Grunert and Wills, 2007). However, what is lacking from this research activity is scientific evidence on whether nutrition information on food labels is exerting an effect on healthy food choices among consumers, how strong this effect is, under which circumstances it occurs, which factors are responsible for it occurring and whether the effect differs between consumer groups.

On the basis of this, the objective of the European Union-funded project Food Labelling to Advance Better Education for Life (FLABEL) is to determine how food and nutrition labelling can affect dietary choices, consumer habits and food-related health issues by developing and applying an interpretation framework, incorporating both the label and other influencing factors. On this basis, guidelines will be developed on use of nutrition labelling for European Union (EU) policy and the food industry, in particular for small- and medium-sized enterprises. The guidelines will include recommendations for assessing the impact of ongoing and future legislative and voluntary food labelling schemes. This objective is to be achieved by a set of six experimental work packages (WPs 1–6) feeding into a WP on stakeholder

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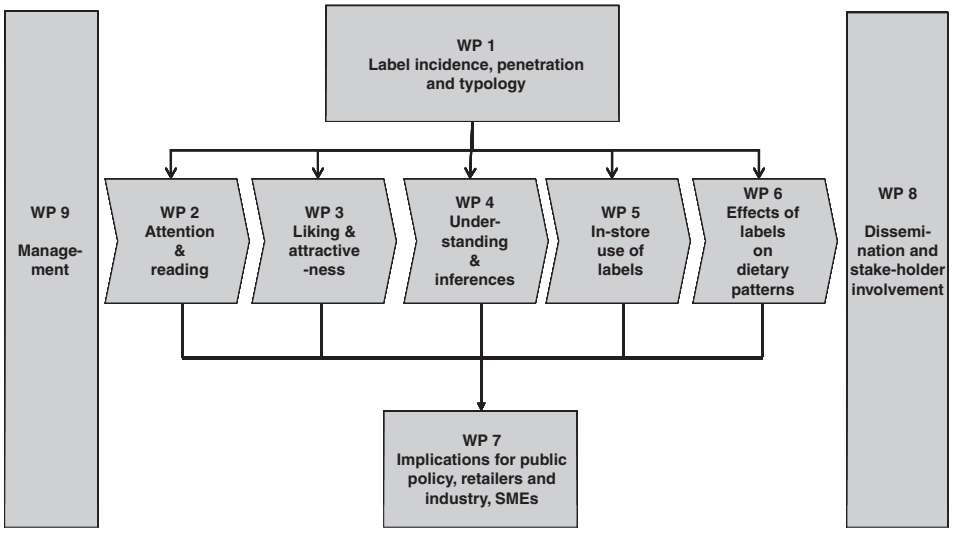

Figure 1 Structure of the FLABEL project. WP, Work Package; SME, Small and Medium-sized Enterprise.

implications (WP 7) and bracketed by work packages dealing with dissemination and management (WPs 8 and 9) (see Figure 1).

Project status and key findings by WP

WP 1—Label incidence, penetration and typology

At the start of the project, the consortium developed a benchmark of consumer exposure to nutrition labels in different countries, identifying the major types of labels used, as well as the major differences between the various systems. This was carried out by mapping the existing labelling schemes in Europe (27 EU Member States and Turkey) and involved recording the information on more than 37 000 products in five product categories (breakfast cereals, carbonated soft drinks, biscuits, yoghurts and pre-packed fresh ready meals) in 84 retail stores across 28 countries (three stores per country). On average, 85% of the products audited contained back-of-pack (BOP) nutrition information (from 70% in Slovenia to 97% in Ireland) and 48% contained FOP nutrition information (from 24% in Turkey to 82% in the United Kingdom) (Storcksdieck genannt Bonsmann *et al*., 2010). The most widespread format was the BOP tabular or linear listing of nutrition content. Nutrition claims and GDA labelling were the most prevalent forms of FOP nutrition information, each showing an average penetration of 25% across all products audited. Among categories, breakfast cereals showed the highest penetration of nutrition information, with 94% of all products bearing nutrition labelling BOP and 70% FOP. These data for the first time show penetration of FOP nutrition labelling across Europe and indicate that nutrition labelling in general is more prevalent than reported previously (European Advisory Services, 2004).

Public health awareness campaigns providing information on nutrition labelling or on nutrients and other components covered on nutrition labels may drive consumers to use such labelling schemes when planning their meals and shopping for food. To map the existence of public health awareness campaigns addressing—directly or indirectly—nutrition labelling in the 27 EU countries plus Turkey, information in the form of leaflets, websites and other media was gathered through national contacts of consortium partners. The specific campaign information gathered included (i) campaign name, (ii) focus, objective(s) and main message(s), (iii) starter or sender of the campaign, (iv) staff involved in the campaign development or implementation, (v) media used to spread the campaign, (vi) whether campaign information was distributed in retail stores, (vii) target population, (viii) duration and frequency and (ix) evaluation of campaign efficacy. Inclusion criteria required that campaigns occurred on a national scale and were ongoing, had taken place within the last 3 years or were foreseen within 6 months from the date of data collection.

A total of 125 information campaigns from the 28 countries were collected. A total of 42 of them (34%) fulfilled the inclusion criteria. These 42 campaigns came from 16 different countries (Austria, Belgium, Czech Republic, Denmark, Finland, Greece, Ireland, Italy, Lithuania, Malta, the Netherlands, Poland, Slovenia, Spain, Turkey and the United Kingdom). Campaign density was highest in a northern belt of countries comprising Scandinavia, the British Isles and the Netherlands. When comparing the results from the public health awareness campaigns with the labelling penetration audit data, a similar ranking between presence of campaigns and penetration of nutrition information was observed. The most common nutrient addressed was salt. Eligible campaigns mostly targeted the general population, and it was most common to communicate through two or more types

of media. Half of the campaigns were sent out by the government. Only 31% of the campaigns included evaluations. Governmental senders were more likely to evaluate the campaigns than other sender categories. Stakeholder involvement was high in the development and implementation of public health awareness campaigns. Whether there is any link between campaign efforts and label preferences, understanding and use remains to be seen when data from other WPs become available.

To gain qualitative insight into how consumers categorise different forms of nutritional labels (typology) and an understanding of the conceptual systems that consumers use to make sense of a range of nutrition label systems, a study was developed using the Multiple Sort Technique (Rugg and McGeorge, 1997) and involving both 'free' and 'structured' sorting of a range of nutritional labelling content elements presented on cards. The importance of categorisation is well established in the field of psychology and it was anticipated that analysis of this type of data using Multiple Scalogram Analysis (Wilson, 1995) would facilitate the development of a typology of the current European labelling systems to take forward into the other WPs in the project.

The study was carried out in the United Kingdom, Poland, Turkey and France, with 15 participants from each country regularly responsible for food shopping for the household. Selection of the elements to include on the cards was primarily based on the inclusion of the widest possible diversity of labelling elements that exist within Europe. Despite the differences in penetration of the various nutrition labelling systems across the four countries, the ways in which consumers from different countries categorised and conceptualised the study labels seemed to be similar. The main differences occurring 'within country' and not 'between countries' are promising within the context of identification of a pan-European labelling system. These 'within country' differences were mostly similar across all four countries and may relate to an individual's perceived 'need for information' and/or their preferred 'processing style' (that is, heuristic vs systematic). The overall configuration of points within the Multiple Scalogram Analysis appeared to be best explained by the constructs of 'levels of information' and 'healthfulness' as having dominant roles; for the purposes of future FLABEL studies, three categorisation levels for nutrition labelling have been proposed: directive (for example, health logo), semidirective (for example, traffic lights) and non-directive (for example, GDA).

WP 2—Attention and reading

Within FLABEL, assessment of consumer attention to and reading of labels is organised around four pillars, corresponding to four stages of processing of the nutrition information (in particular, nutrition labels):

(1) At the input level, to explore the extent to which the human eye actually focusses on the relevant information. This is captured through the analysis of the respondent's gaze (with eye-tracking methodology; Rayner, 1998) when consumers are confronted with assortments that either do or do not contain different types of FOP nutritional information.
(2) At the basic processing level, to investigate the extent to which individuals (a) detect the relevant information FOP; and (b) correctly identify the information they have seen. Using visual search paradigm (the standard paradigm within psychology and psychophysics to quantify attention; Bundesen, 1990; Duncan and Humphreys, 1989; Treisman and Gelade, 1980), data on performance speed and accuracy of individuals are recorded, with the task being either of the following: (a) detect whether information is present or absent within the visual field (for example, ' is there a nutrition label or not?'); or (b) correctly identify which information is present (for example, 'is there a nutrition label A or B?').
(3) At the recall and recognition level, to address the following questions: (a) do individuals spontaneously recall having seen and/or used particular nutrition information; and (b) whether individuals recognise having seen and/or used this information. In the first case, in experimental choice situations, consumers are either confronted with an assortment including or excluding (different types of) FOP nutrition information. After completion of the choice task, they are asked to report spontaneously what they based their choice on. Content analysis of reasons stated allows for an assessment of how much attention FOP nutrition labels attract in making choices. In the latter case, in recognition tasks, consumers are asked whether they have seen and/or used specific nutritional information in their choice. They are confronted with different types of nutrition labels to assess correct recognition.
(4) At the output level, to explore the extent to which the presence of nutrition labels affects healthy choices. If the presence (in different formats) or absence of nutrition labels is the only factor being manipulated, changes in consumer choice behaviour from an assortment can only be because of attention being paid to nutritional information. Choice behaviour thus provides an indirect (outcome-related) measure of attention paid to nutritional information. The methods and methodologies have been validated in small-scale experiments, and two main approaches emerged: (a) visual search paradigm: reaction time and accuracy measures; and (b) eye-tracking studies combined with recall and recognition approach (Bialkova and van Trijp, 2010). These two approaches have been implemented in the research protocols for data collection in Poland, Turkey and Germany.

WP 3—Liking and attractiveness

Using a variety of directive, semidirective and non-directive label types, the FLABEL consortium will investigate degrees of liking based on the provision of completeness of information, the level of complexity, the level of direction

and physical attractiveness. These variables will be tested for hedonistic and utilitarian food products and crossed with different sociodemographic factors. Protocols have been established for this research and field studies will be carried out mainly in the first half of 2010. Furthermore, researchers will apply a novel approach to labelling research by drawing from the vast body of work associated with human interactions with objects. Studies will examine usefulness in situational contexts: former, present and future experiences. In addition to this, the frequency of label exposure will be studied in relation to liking.

WP 4—Understanding and health inferences

A combination of qualitative and quantitative research methodologies will be used to determine consumer understanding and health inferences from labels. Protocols have been established for a variety of multicountry studies that will consider different sociodemographic factors and use various techniques, including laddering interviews and sorting tasks. Important to this research is the establishment of an objective standard for healthfulness with which subjective inferences can be compared. The consortium has decided to use the Simple Scoring Group A Nutrients (SSAg/1) product classification system (Rayner *et al*., 2004), used by the UK Food Standards Agency, to determine the healthfulness of food products. The Simple Scoring system, Group A nutrients, scores the selected nutrients according to content per 100 g: energy, 0–895 kJ = 0; 895–1790 kJ = 1; 1790–2685 kJ = 2 and so on; saturated fat, 0–2.6 g = 0; 2.6–5.2 g = 1; 5.2–7.8 g = 2 and so on; non-milk extrinsic sugars (NMES), 0–6.3 g = 0; 6.3–12.6 g = 1; 12.6–18.9 g = 2 and so on; sodium, 0–235 mg = 0; 235–470 mg = 1; 470–705 mg = 2 and so on; final score = energy + saturated fat + NMES + sodium, the food being less healthy if score is $\geqslant$4. To optimise data collection and enable relevant comparisons to be made, consortium partners from WPs 3 and 4 are working together on a four-country survey that will address aspects of both liking and attractiveness, as well as understanding and health inferences.

WP 5—In-store use of labels

To validate much of the research that is being undertaken in laboratory situations in WPs 1–4, WP 5 will test label usage in a real-life in-store environment. In addition to testing labelling concepts that are currently available on the market through use of a benchmark study, the FLABEL consortium will test conceptual labels to be developed on the basis of results from the different WPs. To capture consumer reactions in a real-life environment, a number of techniques will be used, including observations (hidden), interviews at point of sale, mobile eye-tracking and electrodermal response. The conceptual labelling study will be undertaken in the latter part of 2010, when results from WPs 3 and 4 are available to define an 'ideal label' to be tested.

WP 6—Effects of labels on dietary patterns

To determine the effects of nutrition labels on dietary intake, scanner data received by retailers will be analysed. Such data will enable the FLABEL consortium to ascertain whether the introduction of nutrition labels on products has had an effect on consumer choices over a period of time. Two types of models will be used to analyse the data: (1) an individual product probability choice model; and (2) a shopping basket model. Using these methodologies, the consortium will be able to identify the types of products purchased by certain types of consumers, as well as any potential effects across product categories. Data have been provided by Tesco for the United Kingdom, spanning a 5-year period that covers the introduction of their nutrition labelling on different product categories. The data set includes information for the year before and the year after the introduction of their nutrition labelling scheme, thus enabling impact assessment.

WP 7—Implications for public policy, retailers and industry, small- and medium-sized enterprises

Part of the FLABEL project is to develop a list of issues that are perceived by key stakeholders to be important in the context of food label policy and industrial competitiveness. These issues were identified from desk and empirical research. Two focus groups were carried out with members of the FLABEL stakeholder advisory board and the FLABEL consortium, and an additional focus group was held with organisations involved in the Danish 'StopGDA' initiative. This third focus group was held because of developments in the public debate surrounding nutrition label policy. The results of the focus groups were then used in a best–worst scaling investigation to uncover the prioritisation of issues. The desk research and results of the three focus groups led to the identification of 13 important issues: (1) the resources necessary to implement a mandatory nutrition label; (2) the usability of the information on the label; (3) the type of information that is on the label; (4) where the label is placed on the packaging; (5) the implications for the competitiveness of commercial organisations; (6) the implementation costs for commercial organisations; (7) the label format (for example, GDA, Traffic Light, Keyhole system); (8) the effects on consumers' purchase behaviour; (9) effects on consumers' dietary patterns; (10) the ability of consumers to understand the labels; (11) the flexibility of the label to allow for national differences; (12) that there is an explicit goal for labelling the product; and (13) the scientific documentation of the effectiveness of the label (Ormrod and Grunert, submitted for publication).

The best–worst scaling investigation asked experts of the focus groups (useable $n = 26$) for their perception of the 'best' (most important) and 'worst' (least important) issues in the context of nutrition labelling in general, and with regard to industrial competitiveness in particular. It was found that consumer issues (such as the ability of consumers to understand the nutrition label, the usability of the informa-

tion on the nutrition label and the effects on consumer purchase patterns) were important, irrespective of context, whereas industry-oriented issues (such as the implications for industrial competitiveness and the implementation costs for commercial organisations) were only considered to be important when the focus was specifically on industrial competitiveness. Overall, the most important issues across both the consumer and industry contexts were the effect of a nutrition label on consumer purchase and dietary behaviour, together with the usability and comprehension of the nutrition label. In addition to this, the financial and competitive implications of the standardised nutrition label for business were considered to be important in the context of industrial competitiveness. The assessment of these issues is carried out within FLABEL using a combination of several methods, including panel data, a longitudinal analysis of scanner data and standardised assessments of costs to business.

WP 8—Dissemination and stakeholder involvement
A strategic communication plan has been developed to underpin all of the FLABEL project's research activities. Dissemination tasks completed so far include the creation of a project logo and graphical identity, website creation, creation and dissemination of a project leaflet, media relations (generating in excess of 30 FLABEL-related media clippings), as well as broad outreach through traditional newsletters and new technologies (webinars). In addition to these activities, 17 presentations have been given at key scientific and stakeholder conferences and 4 scientific publications have been submitted to peer-reviewed journals.

Expected final results

On project completion, the FLABEL consortium will have achieved the following:

- Creation of the first EU-wide benchmark study on incidence and penetration of nutrition information on food labels, leading to insights into the extent to which nutrition labelling is actually available in different parts of Europe.
- Definition of the determinants of consumer attention and reading, liking and understanding of different types of nutrition labels, explicitly dealing with the potential trade-offs between simplicity, completeness and coerciveness of nutrition information on food labels.
- Large-scale knowledge of actual nutrition label use in a real-world context, drawing on both store observations and retail scanner data, leading to solid insights into the extent and ways in which nutrition labels have behavioural consequences and affect consumption patterns.
- Evidence on how consumers form opinions about the healthfulness of products, and how the nutrition label information interacts with other information in this process, including media, advertising and school education.
- Definition of the role of nutrition information on food labels in food decision making in families with children, thus providing evidence on how nutrition labels can be used to positively influence children's dietary intake.
- Development of a research-based best practice proposal for nutrition labelling, tested in a real-life store environment.
- Best practice methods for assessing the impact of nutrition labelling on consumers' product choice.

Conclusions

At this stage of the project, it is interesting to note that nutrition labelling, despite being voluntary in the absence of nutrition or health claims, was widespread across Europe in the product categories audited. Existing schemes can be categorised into non-directive, semidirective or directive, and several countries use public health nutrition campaigns to inform consumers about these systems or elements contained, such as energy or specific nutrients. Once the data from WPs 2 to 6 become available, a holistic analysis of the interaction between consumers, nutrition labels and the environment will be possible, ultimately providing a solid information basis for future research and public policy.

Conflict of interest

The authors declare no conflict of interest.

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