FLABEL PROJECT FINAL REPORT

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4.1 Final publishable summary report

Executive summary

FLABEL (Food Labelling to Advance Better Education for Life) is an EU-funded project which has explored the impact of food labelling among consumers in Europe

Nutrition labels are a potentially useful tool for helping consumers to make more healthful food choices, but insights into how these labels are used in real-life shopping situations are limited. It also seems that the different labelling formats already in place may stimulate a range of consumer reactions, making it difficult to develop new labelling policies and evaluate existing ones. To fill in the gaps in the scientific evidence, FLABEL was set up to find out what effect nutrition labelling has on dietary choices.

FLABEL showed that the availability of nutrition information on food products in Europe is very high. It was found that the majority (85%) of food packages have some nutrition information on the back of the pack and nearly half (48%) have nutrition information on the front of the pack.

Consumers can understand the information presented in nutrition labels, in the sense that they have no problems using this information to rank products according to healthfulness. Variations in label format have only small or no effects.

Lack of motivation and attention are significant bottlenecks, preventing nutrition labelling from having a positive effect on consumer choice. The project results show how average attention to nutrition labels is too brief for the information to be processed meaningfully. Consumers need to be motivated to engage with nutrition information – for instance, by having a health goal – in order to pay greater attention to nutrition labels.

According to FLABEL data, the most promising option for increasing consumers' attention to and use of nutrition labels would be to provide information on key nutrients and energy on the front of the pack in a consistent way. Complementing this information with a health logo can also increase attention and use, especially when the consumer is under time pressure.

The insights gained from this research can be used to develop guidelines on the use of nutrition labelling for EU policy and the food industry. Some policy implications which have been discussed with different stakeholders include considering nutrition labelling in a broader context, standardising guidelines on the use of nutrition labelling (e.g. widespread use of front-of-pack nutrition information would be particularly desirable), or the use of nutrition labelling as a major incentive for product reformulation and innovation.

Summary description of project context and objectives

The link between diet and diseases such as obesity, diabetes, cardiovascular diseases, hypertension and some types of cancer is a continuing source of debate. In developed countries, these diseases account for an increasing proportion of deaths, and represent a growing challenge for the public health authorities. There has therefore been increasing attention on measures aimed at encouraging more healthy eating patterns. Nutrition information on food labels, nutrition labelling, is one of them.

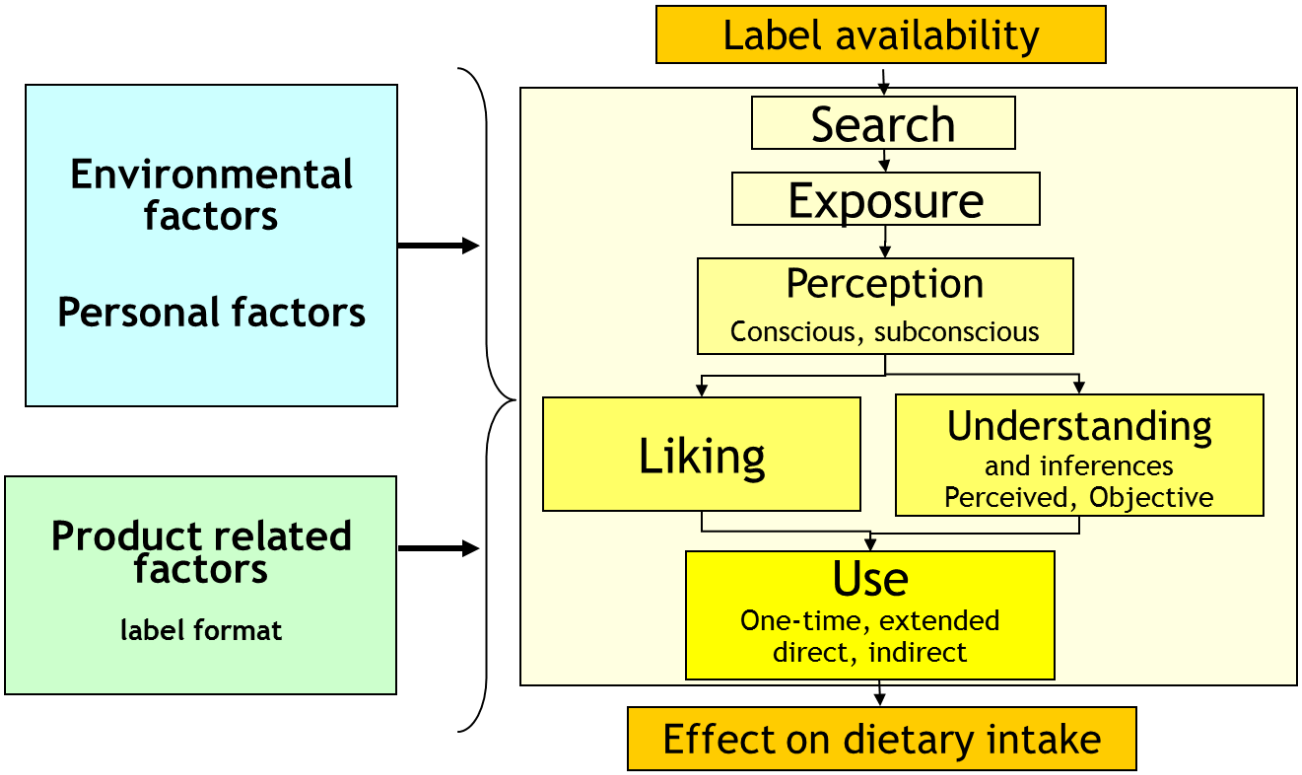
Effective and efficient nutrition labelling is important for all stakeholders (DG SANCO, 2006). For public policy it is about reducing information asymmetry and providing consumers with information that can actively help them in making informed choices and stimulate healthier eating. For consumers, it provides an easy-to-use cue in bringing about more healthy food choices. For consumer associations, it is an important element for ensuring their right to be properly and correctly informed. For retailers and the food industry, nutritional information on food labels is a way to provide consumers with the nutrition information they need to make an informed choice, as well as a way to position and differentiate themselves from their competitors, and to demonstrate good corporate social responsibility.

There is ongoing discussion about the ways in which nutrition labelling can be improved. At the time FLABEL started, the European Commission was revising the nutrition labelling directive, and several national governments were pushing voluntary schemes in cooperation with retailers and industry. This stimulated considerable research activity, particularly in the area of front of pack labelling ("Traffic Lights", Guideline Daily Amounts –GDAs- and other formats), and nutritional labelling more generally (Grunert & Wills, 2007). However, what was lacking from this research activity was 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 this background, the strategic objectives of the FLABEL Small Collaborative Project were:

- To determine how nutrition information on food labels can affect dietary choices, consumer habits and food-related health issues by developing and applying an interpretation framework incorporating both the label and other factors/influences.
- To develop guidelines on use of nutrition information on food labels for EU policy and the food industry, including recommendations for assessing the impact of ongoing and future legislative and voluntary food labelling schemes.

This project explored the interplay of environmental factors (penetration of nutrition information on food labels, nutrition campaigns, level of nutrition awareness in society), personal factors (nutrition knowledge and interest, socioeconomic factors, presence of children) and characteristics of the food label itself (format of nutrition information on the food label, other health-relevant information like ingredients list and health claims) in explaining the role of nutrition label information in making food choices and the resulting effects on dietary intake. Effects of nutrition information on food labels on consumer food choice can be analysed in terms of the hierarchical model shown in Figure 1.

Figure 1: Conceptual framework for effects of nutrition information on food labels on consumer behaviour



The model shows how the availability of nutrition information on food labels, in the environment has an effect on dietary intake. Only nutrition information on food labels to which the consumer is exposed to can be expected to have any effect. The likelihood of exposure is increased if the consumer actively searches for it, although accidental exposure is also possible. Exposure will only have an effect if the information is perceived (consciously or subconsciously) by the consumer, and any effects on purchase decisions will depend on consumers' understanding of what the nutrition information on the label means. Understanding has both a subjective (the meaning the consumer attaches to the information) and an objective (whether the consumer's understanding of the message is compatible with the intended meaning) component. Consumers may infer a meaning by relating the information to pre-existing knowledge. Consumers' choices may also be affected by their liking for a particular label. Finally, the food label information may be used in making choices, which may affect both immediate and future decisions about purchasing the product. It can also change the overall pattern of shopping, for example, by altering the perception of food categories that are subsequently considered more or less healthy than previously. Nutrition information on food labels may that way affect consumers' dietary intake. Effects on choice and dietary intake refer not only to the shopper, but to the family for whom the shopper is acting. Search, perception, understanding, liking and use are all influenced by three types of factors: environmental factors, personal factors, and product- or label-related factors. Most important, it is the interplay of these factors, and how they affect the processing of label information, that will determine whether and how nutrition labelling affects dietary intake.

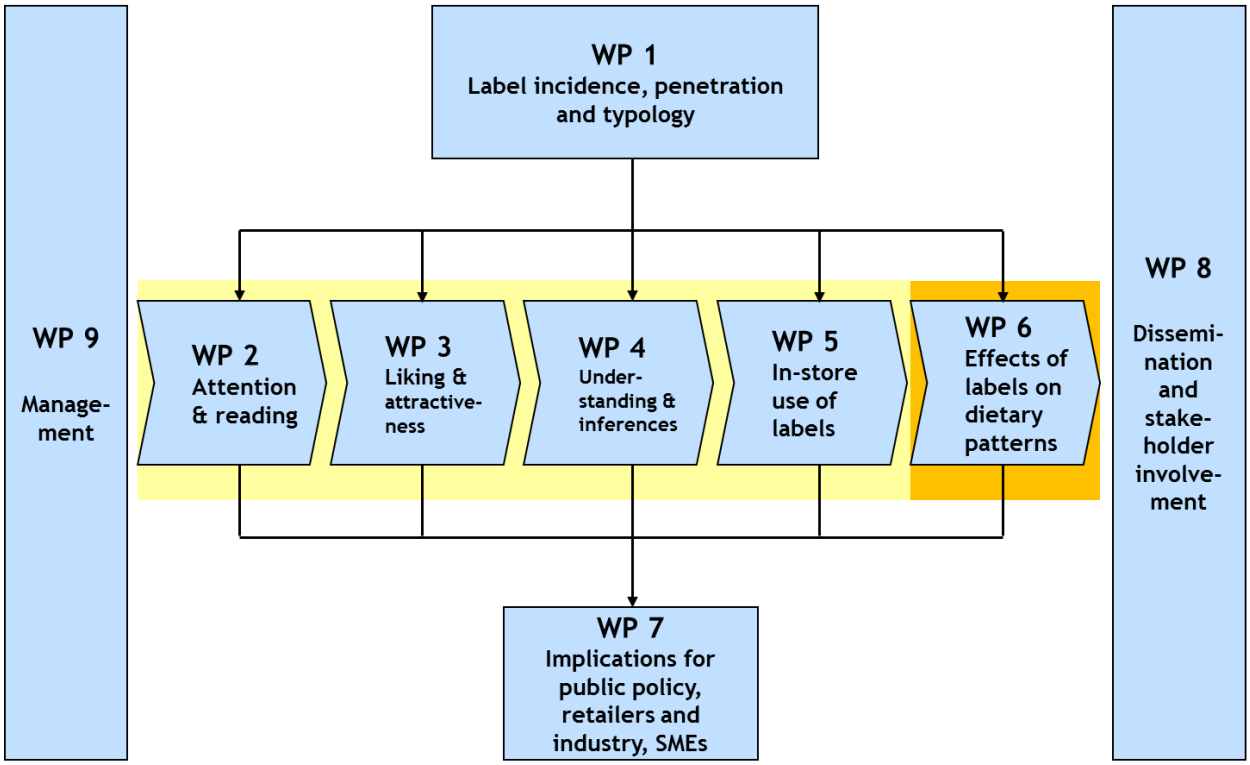
The work programme of this project, organised in scientific work packages, followed closely the model in Figure 1. The objectives of the scientific work packages are as follows:

Work package	***Main objective***
1: Incidence, penetration and typology of food nutrition labels	Provide a benchmark of consumer exposure to nutrition information on food labels in different countries, and identify major types of nutrition labelling used.
2: Attention and reading of labels	Identify and quantify key determinants of consumers' attention to and reading of nutrition information on food labels in realistic situations.
3: Liking and attractiveness of labels	Identify and quantify key determinants of consumer liking and attractiveness of different types of nutrition information on food labels.
4: Understanding and health inferences from labels	Understand how consumers infer healthiness from the nutrition information on food labels in combination with other information.
5: In-store use of labels	Identify and quantify the actual use of nutrition information on food labels in real-life store choice situations, and how it can be increased by implementing an 'ideal format' nutrition label (containing all the elements identified WP1-4 as increasing attention and reading, liking and attractiveness, understanding and perceived healthiness). Explore the effects of supplementing the "ideal format label" with other label elements (e.g. GDA, traffic light colour coding) and the mechanisms behind these effects.
6: Effects of labels on dietary intake	Analyse how the introduction of nutrition information on the labels of food products, changes in the format of nutrition labels, and reformulations of products as mirrored in the nutrition label information affect product choices, composition of the shopping basket, and overall patterns of dietary intake.
7: Implications for public policy, retailers, industry and SMEs.	Derive implications for public policy, retailers and for industry, including SMEs.
8: Dissemination, exploitation and stakeholder's involvement	Disseminate and extend the results of the project to a wider audience at the European level with special efforts in new member states or candidate countries.

Description of the main S&T results/foregrounds

The FLABEL objectives were achieved by organising the work in a set of work packages (WP; see Figure 2 below) covering an analysis of current penetration of and exposure to nutrition labels in the EU (WP 1), determinants of attention to and reading of nutrition labels (WP 2), determinants of consumer liking of nutrition labels (WP 3), understanding how consumers infer healthiness of food products from label information in combination with other sources (WP 4), in-store use of labels (WP 5), effects of label use on dietary intake (WP 6), and implications for public policy, regulators, industry and especially SME (WP 7). The project drew on the involvement of stakeholders from the whole food sector to ensure results with high practical relevance and disseminated widely (WP8). Finally, the project has being managed carefully to ensure optimal use of skills and EC-funding (WP9).

Figure 2: FLABEL workflow overview

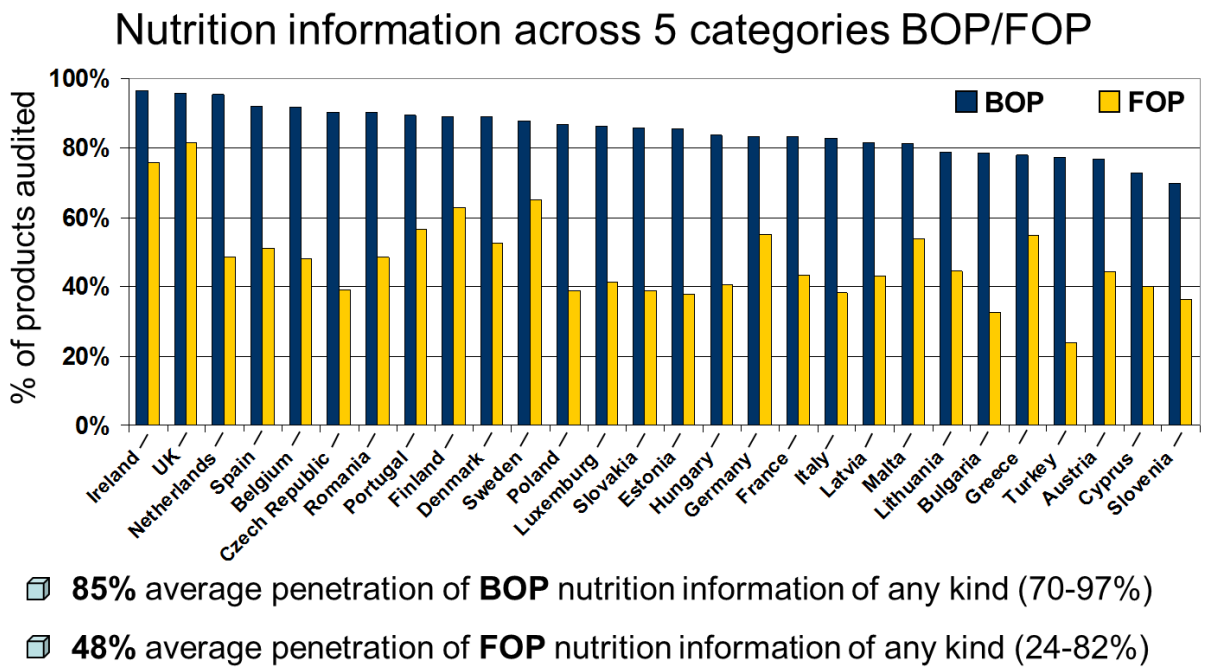


Work Package 1 – Label incidence, penetration and typology

The first part of the work dealt with creating a benchmark of consumer exposure to nutrition labels in Europe, identifying the major types of labels used and the major differences between the different systems. This was done by carrying out an audit of more than 37,000 products in all 27 EU countries plus Turkey with regard to five product categories: sweet biscuits, breakfast cereals, ready meals, carbonated soft drinks and yogurts. Three retailers were selected in each country: one which was among the top five retailers in that country, a consumer co-operative or a national retailer, and a

discounter. Figure 3 demonstrates that the large majority of products audited had nutrition information somewhere on the product label. On average, 85% of the products investigated had nutrition information on the back of the package. The most widespread information was a nutrition table, usually found on the back of the pack, while the two types of information that were most widely available for the front of the pack were Guideline Daily Amounts and nutrition claims (about 25% for both).

Figure 3: Incidence and penetration of nutrition information in EU27 plus Turkey



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A four-country label typology study (in the UK, Poland, Turkey and France) was carried out using the multiple sorting technique, and provided significant direction for all future studies. Researchers found that even when confronted with 22 different types of labels, consumers use two constructs to categorise nutrition labels; a) the extent to which the label directly shows that the product has a high level of healthiness, and b) how much information is being provided in the label.

They also found that these two dimensions are correlated: those labels that indicate directly which product is the healthier one have less information content, while those that have a lot of information content are less explicit in giving guidance on which products are healthiest. Following these results, the consortium agreed that for the purpose of future studies, nutrition labels would be divided into 3 groups:

1) Directive (e.g. health logos). Those labels do not contain detailed nutrition information, only appear on the 'healthiest' products of a category, and the presence of the logo itself identifies the product as 'healthy' relative to other products in the same food category, thus attempting to simplify the 'healthy choice' options for a consumer.
2) Semi-directive (e.g. traffic light and hybrid labels) labels contain detailed nutrition information (typically fat, sat fat, sugar, salt and energy) and appear on all products,

regardless of where they are on the health continuum. Directiveness is provided at nutrient level but the decision as to where to place the product on this health continuum is placed with the consumer.

3) Non-directive (e.g. GDA systems and nutrition tables) labels contain detailed nutrition information (typically fat, sat fat, sugar, salt and energy), appear on all products, regardless of where they are on the health continuum, and the decision as to where to place the product on this health continuum is placed with the consumer. The relative healthiness of the food is only provided in the context of daily intake.

Work Package 2 – Attention and reading

In Work Package 2, the FLABEL consortium addressed the factors related to attention and reading of labels. The aim was to find out if people pay attention to labels on products and if this, in turn, carries through to healthier choices. Researchers were interested in two types of factors: the first was related to people's goals when buying food and the second was related to the label itself (label format, label familiarity, and information density of labels). A variety of studies (n=10) in different countries (Netherlands, Poland, Turkey and Germany) and a range of methods were used to investigate these factors, including visual search tasks and experimental decision outcome research. All studies complied with Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy. The study designs were subjected for initial ethical approval in the Netherlands to the Ethical Committee for Social Science Research of Wageningen University, the Scientific Research Ethics Committee of the Psychology Faculty Council, in Turkey to the Dokuz Eylül University ethical committee, and in Germany to the University of Saarland ethical committee. All studies received approval.

Researchers found that the goals people have – whether they select a product that they like most or the product that is the healthiest – have a big influence on attention and reading. Namely, attention to the nutrition label is higher if people have a health goal. Some features of the label increase the likelihood of attention; for example, bigger labels, labels with which people are familiar, the use of colour (a monochrome label leads to more attention), and consistency in the location of the nutrition label on the package. The information density on the package was also found to have an effect in that the nutrition label attracted less attention when the rest of the package contained a high level of information. The consortium found that the different types of label format (Semi-directive, Non-Directive, Directive system) all performed well in terms of their effects on healthfulness of choice; however, the Directive systems performed better in a situation of time pressure. Familiarity with the label also had an effect, although this was mostly related to whether people recognised the label and how they evaluated it and not to the effect of the label on product choice.

In summary, the major conclusions from this part of the work are that attention and reading are dependent on motivation. It also makes a difference if the health motive is specific or general. For example, if a person not only wants to buy the most healthful product but also the product that has the lowest salt content, they will pay more attention to labels which provide this kind of information. Attention is a necessary but insufficient condition for labels to have an effect on consumer choices. In fact, attention may be a major bottleneck that has been under-researched in previous studies.

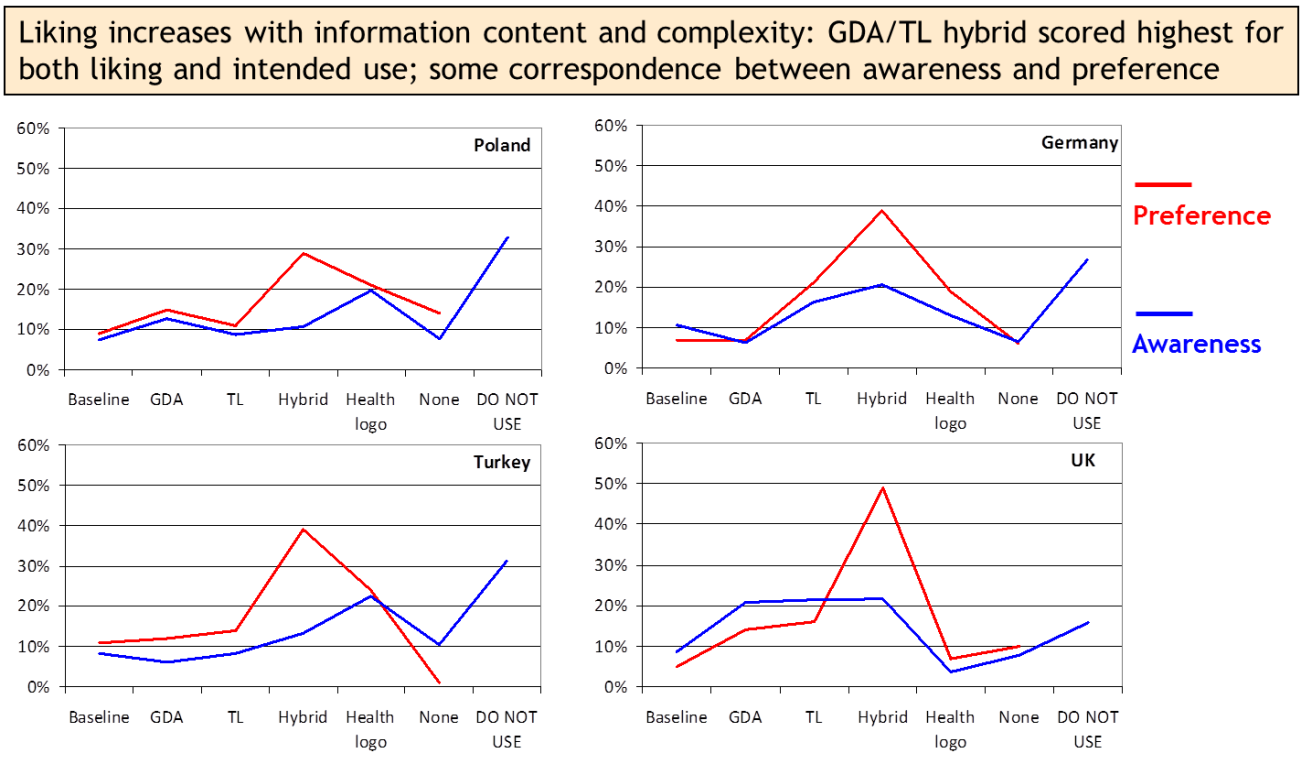
Attention can be facilitated by design factors of the label itself, but also by the way the label is integrated into the overall package design and the way the choice context is created at the point of purchase. The consortium found that the use of different methodologies in this part of the work was very useful, allowing them to move beyond the use of self-reported behaviour. They also found that the observational data differed from the self-reported behaviour and that there were differences between countries, although these differences were more related to people's account of their own behaviour rather than the actual behaviour observed in the experiments.

Work Package 3 – Liking and attractiveness

In Work Package 3, researchers were interested in which type of label format people like most and whether this depends on the type of product or on consumer characteristics. They investigated the degrees of liking based on the provision of completeness of information, the level of complexity, the level of direction, and physical attractiveness. These variables were derived from previous research and were thought to have an impact on people's liking of labels.

Furthermore, researchers applied a novel approach to labelling research by drawing from the vast body of work associated with human interactions with objects. Studies examined usefulness in situational contexts: former, present and future experiences. In addition to this, the frequency of label exposure was studied in relation to liking.

Figure 4: Liking and attractiveness of labels: results from choice task



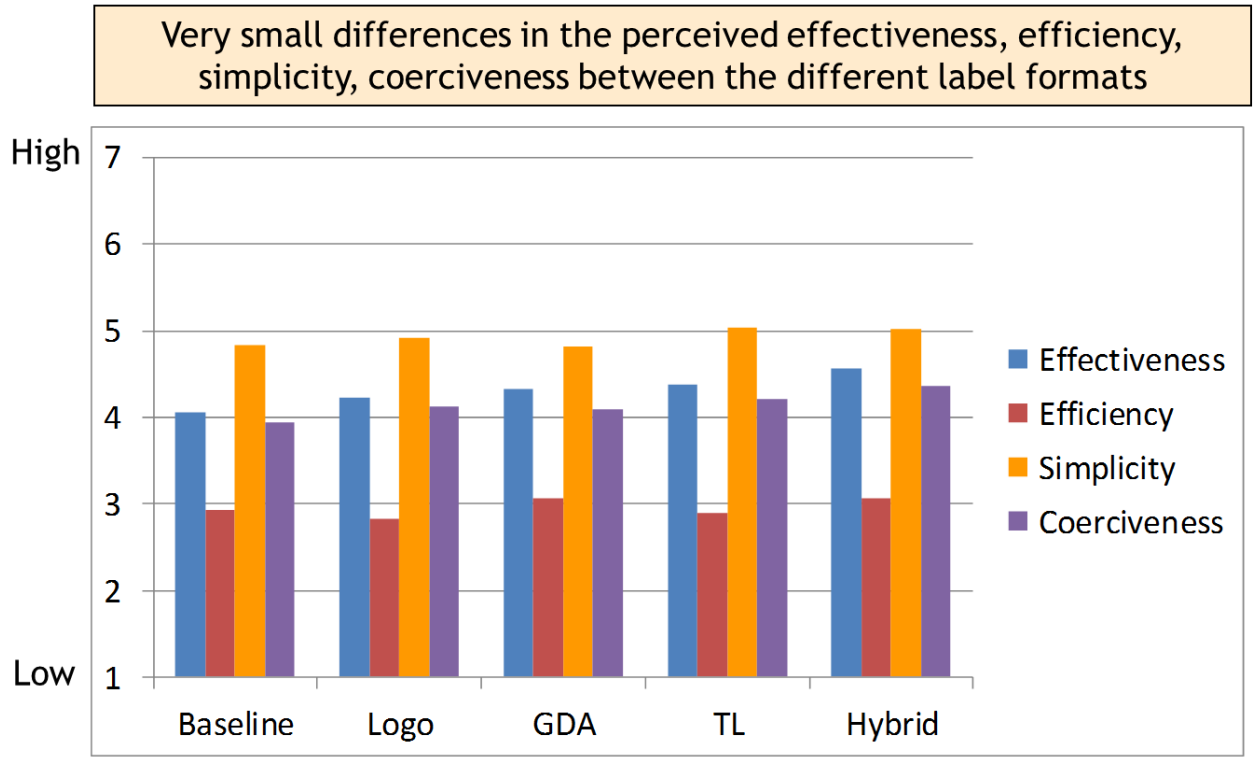
The major study carried out in this part of the project was a survey in four countries (the UK, Poland, Turkey and Germany) with 500 subjects per country, all of whom were at least partly responsible for food shopping in their household. The data collection was carried out by GFK NOP market research

and was conducted in line with the Marketing Research Association (MRA)'s Code of Marketing Research Standards.

The consortium compared five labelling systems and used different products as a context. The graphs in Figure 4 show the labels people recognised and the percentage of people who liked each label the most. The labels compared in this survey were the baseline label (which gave the nutrient-based information in grams and the energy in calories), the GDA label, a traffic light label, a hybrid combining the GDA and traffic light labels, and a health logo. These graphs show that the degree of awareness of a particular label format and the preference for that label format are related. In other words, people have a tendency to like those labels more that they have seen before and are familiar with. Researchers found that the hybrid label was liked by most people: this is the label with the most information, and is therefore also the most complex.

Figure 5 demonstrates that there are no real differences between the labels in terms of the way people evaluate them on the above-mentioned dimensions (effectiveness, efficiency, simplicity and coerciveness).

Figure 5: Liking and attractiveness of labels: evaluation of different label formats



The major conclusions from this part of the project were that liking seems to increase with information content and complexity. As such, the GDA-traffic light hybrid system scored highest in the various measures of liking investigated in this Work Package. However, there were only very small differences in the perceived effectiveness, efficiency, simplicity and coerciveness between the different label formats. Researchers also observed that awareness of, and preference for, labels are related. In sum, it was found that the labels with the highest amount of information and complexity are liked most and that liking depends on previous exposure.

Work Package 4 – Understanding and health inferences

A combination of qualitative and quantitative research methodologies were used to determine consumer understanding and health inferences from labels. Researchers were interested in whether people make correct inferences on the healthfulness of the product based on the label content and whether this is affected by the label format, the type of product, and consumer characteristics. Important to this research was the establishment of an objective standard for healthfulness to which subjective inferences could be compared. The consortium decided to use the SSAg/1 product classification system, used by the UK's Food Standards Agency, to determine food product healthiness. It was a useful benchmark for healthfulness as it is based on the same information that is available on the typical nutrient-based label.

To optimise data collection and enable relevant comparisons to be made, consortium partners from Work Packages 3 and 4 worked together on a four-country survey that addressed aspects of liking and attractiveness as well as of understanding and health inferences. As such, the major study carried out in this part of the research was the same four-country survey used in WP3. For three different product categories – pizza, yogurts and biscuits – people were shown three products that differed in levels of healthfulness and given only basic information in terms of nutrients in grams and energy in calories. The respondents were asked to rate the healthfulness of these three products, and these ratings were compared with the objective health indicator as measured by the SSAg/1. The respondents were then given additional information to investigate whether the provision of traffic lights, health logos, GDAs, or the combination of GDAs and traffic lights increases the correctness of the healthfulness evaluation.

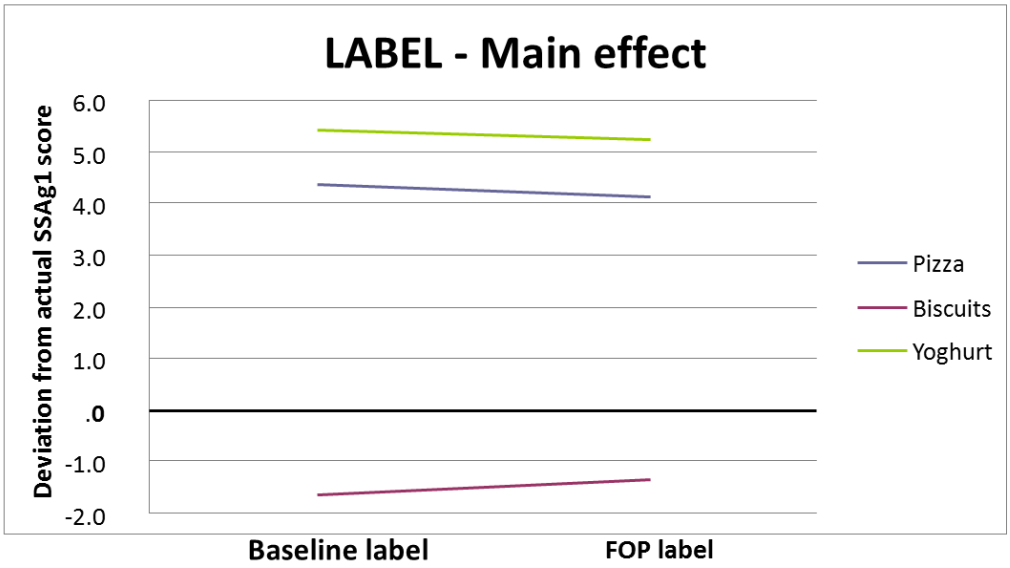
Figure 6 illustrates the difference between people's evaluation of healthfulness and the objective evaluation of healthfulness. Researchers found that people differed from the SSAg/1, even though they were still able to rank the three products correctly in terms of healthfulness using only the basic information. However, the provision of additional front-of-pack label information in terms of GDAs, traffic lights or a health logo had a slight but positive effect on the correctness of the respondents' health inferences.

The major conclusion from the survey was that front-of-pack labelling systems can result in (small) improvements to objective understanding of nutrition information. There were small differences and improvements between the various formats with different levels of directiveness compared to a format listing only the nutrients in grams and the energy in calories. This means that nutrition information, regardless of the format, is sufficient to enable consumers to detect the more healthful alternative (when products are compared within a product category).

The consortium also investigated whether there were differences between the label formats. Given that the overall effect was so small, major differences due to a particular label format were not expected. However, there was a slight tendency for use of colour to have an additional effect on the correctness of the health inferences.

Figure 6: Understanding and health inferences from labels

FOP labels make overall healthfulness ratings more accurate (i.e. closer to objective health rating) (*small effect*)



As part of Work Package 4, researchers also carried out a qualitative food sorting study where people were given 11 different snack food products and asked to rank them according to healthfulness in the absence of front-of-pack labels. The data collection undertaken in the UK, Poland and the Netherlands followed the rules of the University of Surrey ethical committee, University of Warsaw ethical committee, the Ethical Committee for Social Science Research of Wageningen University and the appropriate national and EC rules.

Researchers wanted to investigate people's ability to evaluate healthfulness across a range of product categories, rather than within a product category. The study included a group of people with a low interest in healthy eating and a group of people who were type-2 diabetics, and consequently had a high interest in healthy eating. There were some systematic differences in the evaluation of the healthfulness of the different product categories for both groups, where some product categories were systematically overrated in terms of healthfulness (e.g. banana chips) and some were systematically underrated (e.g. chocolate-flavoured milk). It was observed that in the absence of front-of-pack labels, people use other indicators for healthfulness that can lead to erroneous inferences. For example, people overrate the healthfulness of banana chips because they think it is a fruit and must be healthy. This study also found that the provision of front-of-pack labelling information leads to a more deliberative approach and can increase the correctness of people's health inferences. Finally, the consortium found that in cases where people's healthfulness ratings were grossly deviant from the objective health indicator, the use of colour coding at a nutrient level appeared to help people overcome these erroneous evaluations.

Formulation of working hypotheses

After completing Work Packages 1-4, the consortium formulated some working hypotheses based on the results to guide the subsequent stages of the project.

The first hypothesis was that the provision of information on energy and key nutrients, in calories and grams, in a consistent way on the front of the package would improve attention and understanding and facilitate healthy choices. It was also predicted that the addition of a health logo would be useful, based on previous results from the project which had shown how the use of a health logo facilitated healthy choices in a situation of time pressure.

An 'ideal baseline label' format (Figure 7) was developed, which provides information on nutrients on a per gram basis and the energy in calories. This label has a standardised format and was provided in the same way on all products, supplemented by a health logo which was either present or not present (in the latter case, it was clear that the health logo was not present). The consortium hypothesised that the consistent use of such a label would improve attention and understanding, and facilitate healthy choices.

Figure 7: "Ideal baseline label" format

The second hypothesis concerned the additional elements that could be added to this ideal baseline label such as GDAs, colour- coding or the provision of low, medium, or high text. It was predicted that this would neither increase attention nor result in major improvements in understanding, but that it would have an impact on consumer liking and might also have an impact on healthy choices.

Work Package 5 – In-store use of labels

To validate much of the research undertaken in laboratory situations in Work Packages 1-4, and guided by the two above hypotheses, Work Package 5 tested label usage in a real world in-store environment. In addition to testing labelling concepts that are currently available on the market through use of a benchmark study, researchers tested the 'ideal baseline label' format that was developed based on results from the different work packages. Researchers wanted to see whether the use of this new label format would have an effect on attention and on choices as compared to existing labels, and to investigate any effect of additional elements to this ideal baseline nutrition label. To capture consumer reactions in a real-life environment, a number of techniques were used: (hidden) observations, interviews at point of sale, mobile eye-tracking and electrodermal response.

A test store was designed in which people were asked people to shop for products wearing an eye-tracking device. This allowed the researchers to measure the amount of attention people gave to various parts of the label, especially the nutrition label. The researchers also recorded the choices that

people made and compared these to the healthfulness of the different alternatives as measured by the SSAg/1.

It was found that the average time people spent looking at a food package was not very long: about one second. In addition, people looked at the name of the product and the picture on the package the most, while the nutrition label accounted for a very small share of their attention (on average 0.02 seconds); only 10% of the people looked at the nutrition label at all.

Figure 8 shows the effects on attention-getting measured by three indicators: 1) how many of the people in the shop looked at the nutrition label, 2) how many of these labels people looked at, and (3) how long on average they looked at these labels. The consortium found that the introduction of the ideal baseline label did increase attention, even though the amount of attention given to the nutrition labels was still small.

Relating to the second hypothesis, researchers wanted to investigate what happens if other elements are added to the baseline label. These elements included GDA information, text that was low, medium, or high with regard to nutrients, and the use of colour. This study was carried out in Germany and Poland. It was found that none of the elements improved healthfulness of choice, which again was measured by correspondence with the SSAg/1. Two types of tasks were performed: preference tasks where people were asked to choose they product they liked most, and health tasks where they were asked to select the healthiest product. The respondents were first given 10 products to choose between and asked to choose the product they liked most, or to choose a product that was healthiest. They were then asked to perform the same task after 10 more products had been added to the set that were on average healthier than the first 10 products. The researchers found that adding healthier products to the choice set seemed to have a positive influence on the healthiness of people's choices. This means that the range of healthfulness of the products available on the shelf may be an important determinant of the choice healthfulness.

The conclusions from this part of the project were that the ideal baseline label increases visual attention in terms of the number of consumers looking at labels, the number of labels, and the number of labels looked at. This effect was strongest when all products on the shelf carried this label. It was also found that the share of attention towards the nutrition label compared to other elements of the food product label increased, although this was only significant at 100% penetration.

However, the attention given to labels was low, as measured by gaze duration and the number of respondents that looked at labels. It was lower compared to the laboratory studies done as part of this project, and too low for extensive processing of the information.

Researchers also looked at whether the introduction of the label had an effect on the choices made, as measured by correspondence with the SSAg/1. They found that these effects were significant only for those people who had low scores on a self-control measure. Therefore, the ideal baseline label does enable consumers with low self-control to make more healthful choices.

Figure 8: In-store use of labels

Products with the "ideal baseline nutrition label" get more attention compared to food items with the existing nutrition labels on FOP

Product Category		"Old" Label	"Ideal Baseline Label"	Difference significant?
Cereals	% participants looking at labels	61.1%	88.9%	NO (p=.18)
	Number of Observed Labels	1.385	3.376	YES (p<.05)
	Gaze Duration	0.290 sec	0.467 sec	NO (p=.27)
Sweets	% participants looking at labels	38.9%	94.4%	YES (p<.05)
	Number of Observed Labels	0.511	3.160	YES (p<.01)
	Gaze Duration	0.121 sec	0.626 sec	YES (p<.01)
Ready Meals	% participants looking at labels	66.7%	83.3%	NO (p=.45)
	Number of Observed Labels	1.015	5.672	YES (p<.01)
	Gaze Duration	0.148 sec	0.1033 sec	YES (p<.01)

As already mentioned, the addition of other information – GDAs or traffic lights – to the label neither increases visual attention nor promotes more healthful choices. However, it was found in a take-home choice task that there was an interaction of the health logo and the presence of traffic light coding which did seem to have an effect on more healthful choices, adding to the other weak indicators about the effect of colour in nutrition labelling.

Work Package 6 – Effects of labels on dietary patterns

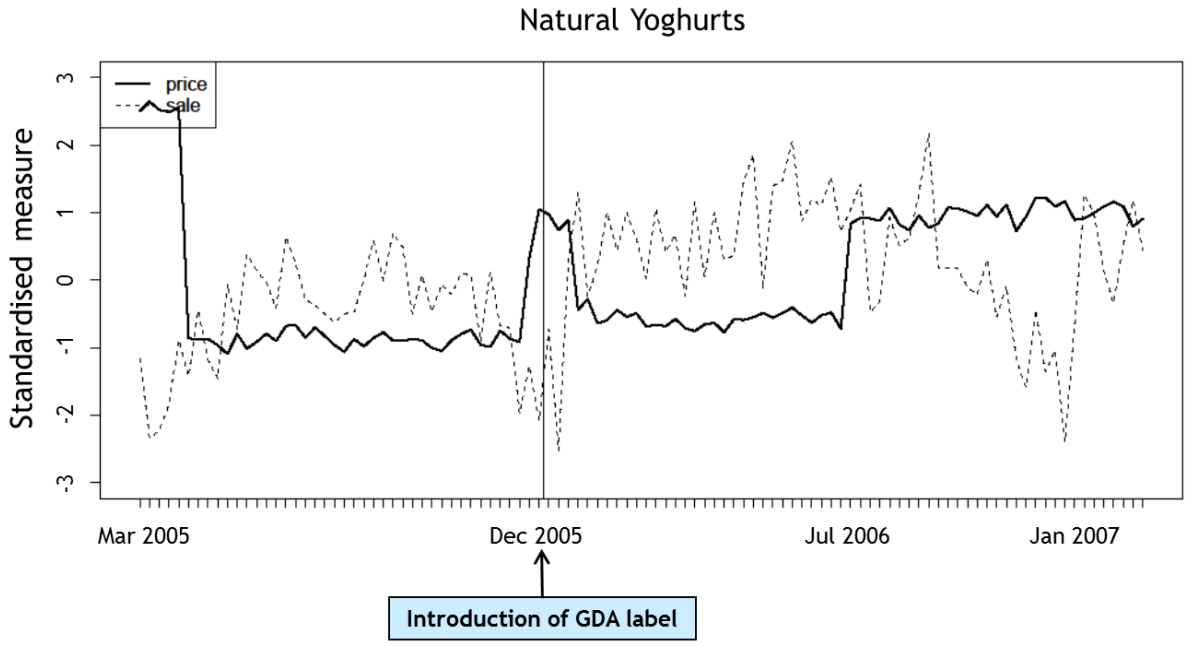
The consortium was interested to learn about the effects of labels on dietary intake. To determine this effect, researchers analysed scanner data received by retailers to ascertain if the introduction of nutrition labels on products had an effect on consumer choices over a period of time.

Two types of models were used to analyse the data; a) an individual product probability choice model and b) an aggregated model. By using these methodologies, the consortium was able to identify the types of products purchased by certain types of consumers as well as any potential effects across product categories.

Data was provided by Tesco for the United Kingdom, spanning a 5-year period that covered the introduction of their nutrition labelling on different product categories. The dataset included information for the 1-3 years before and 1-3 years after the introduction of their nutrition labelling scheme, thus enabling impact assessment.

The consortium carried out a range of statistical analyses with these data. Figure 9 is an example of the time series analysis where, for a range of several years, the sales of a particular product category – in this case, natural yoghurts – were monitored over a period of several years. Since natural yoghurts are one of the healthier alternatives within the yoghurt category, it was expected that its sales would increase after the introduction of the GDA label. However, the researchers observed that sales of this product fell instead, possibly because there was also a price increase for that particular product at the time of the label introduction.

Figure 9: Time-series analysis for natural yogurts



The researchers carried out a range of other statistical analyses with these data and tested a number of hypotheses about how the GDA label would affect sales if it really did help consumers to make more healthful choices. However, no systematic effects of the introduction of the label were found. The time series analysis failed to reveal apparent short-term effects of GDA labelling on sales and, as mentioned above, price increases which occurred at the same time as the introduction of the label may have masked potential short-term effects of the labelling on sales. However, products without price changes similarly show no clear relationship between changes in sales and the GDA label introduction. Other studies using scanner data have come to the same conclusion; namely, that for this type of data effects of label introduction on people's choices cannot be shown.

Overall conclusions

In reaching some overall conclusions, the consortium has identified potential bottlenecks regarding the effect of nutrition labelling on dietary choices. First, availability of nutrition information is to some extent a bottleneck. Most products across Europe do carry nutrition information. However, FLABEL has also shown that consistent front-of-pack information with 100% penetration would help.

The project has shown that attention is a major bottleneck with regard to the effects of nutrition labels on choice behaviour. Average attention to nutrition labels is very short and mostly related to motivation – more so than to the label format.

In line with other studies, the project has shown that consumers like the idea of front-of-pack nutrition labelling. Consumers like the most complex labels most, such as the colour-coded GDA label. However, it seems that liking and intended or imagined use are not correlated with actual use and impact on choices.

FLABEL research has shown that consumers have no problems ordering products according to healthiness when they're given basic nutrition information, regardless of the format. Variations in label format have only small or no effects.

The project has also found that motivation is a major bottleneck. People are not always motivated to choose food based primarily on healthiness. There are many other considerations apart from health when making food choices: people buy out of habit, under time constraint, or based on family liking and tastes. As such, selecting according to preferences is only partly determined by health considerations. However, for people with low self-control, consistent provision of nutrition information on front-of-pack labels or the baseline ideal label was shown to have at least some effect on increasing the healthfulness of these people's choices.

With regard to label format, providing consistent information combining food nutrient level information in a directive and non-directive way (the gram- and calorie-based information combined with a health logo) was shown to improve attention. Health logos can also help, especially in situations of time pressure, while additional elements such as GDAs, additional text, and traffic light colours had little or no effect. The use of colour was found to have effects under certain circumstances, especially for comparative evaluation of healthiness across product categories, but these effects were weak.

Overall, the major bottlenecks regarding the effect of nutrition labelling on dietary choices are lack of attention and lack of motivation. The label format can help to boost attention and use by providing more consistency, while the way in which nutrition information is presented on the label seems to be less important.

Policy implications

These results were discussed with stakeholders at a consensus workshop that took place in November 2011. There was widespread agreement that the results show a need to see nutrition labelling in a broader context. This is mainly related to the issue of motivation: motivation for healthier eating has to be addressed by other means. Secondly, it was agreed that broad penetration of front-of-pack nutrition information is desirable. This is related to the results on consistency for 100% penetration of nutrition labels. There was widespread agreement that consistency and familiarity are more important than the adoption of any particular format. One other aspect was mentioned that was that nutrition labelling, in addition to the effects it has on consumers, has an important function as an incentive for product reformulation and product innovation leading to healthier products. This is an

especially relevant conclusion in the light of the project's results that the healthfulness of the choice of products on the shelves has a major effect on the healthfulness of the choices that people make.

Potential impact and main dissemination activities and exploitation of results

Potential impact

Providing consumers with nutrition information on food labels is high on the agenda of policy makers, non-governmental organisations and food producers (WHO 2007, Golan et al., 2001, Baltas, 2001). The intention of providing these labels is to improve citizens' ability and opportunity to make better informed and healthier dietary choices. Efforts dedicated to improving consumers' choice at the point of sale are regarded as especially important, considering that a large share of consumers' final product decisions are made in front of supermarket shelves (Block & Morwitz, 1999; Groeppel-Klein & Bartmann, 2009).

Effective and efficient nutrition labelling is important for all stakeholders. For public policy it is about reducing information asymmetry and providing consumers with information that can actively help them in making informed choices and stimulate healthier eating. For consumers, it provides an easy-to-use cue in bringing about more healthy food choices. For consumer associations, it is an important element for ensuring their right to be properly and correctly informed. For retailers and the food industry, nutritional information on food labels is a way to provide consumers with the nutrition information they need to make an informed choice, as well as a way to position and differentiate themselves from their competitors, and to demonstrate good corporate social responsibility.

Due to the pressing necessity stakeholders see in changing consumers' health-related food choice behaviour, more and more labels have been introduced on the back and more recently on the front of pack. Which is the 'right' format of providing this information to citizens is however unclear. It depends on many factors such as the label design, the food product, shop environment and the citizen's individual situation. Furthermore, there might be differences between which kinds of labels are read, which are understood and which actually lead to healthier choices.

The European Union (EU)-funded research project FLABEL, was developed in order to meet the need for further knowledge on consumers' handling of nutrition labels, and thus to help basing policy decisions on evidence. The project aim was to determine how nutrition information on food labels can affect dietary choices, consumer habits and food-related health issues by developing and applying an interpretation framework incorporating both the label and other factors/influences. Furthermore, the project also aimed to provide the scientific basis on use of nutrition information on food labels, including scientific principles for assessing the impact of different food labelling schemes, to be shared with the EU institutions, the food industry, especially small and medium-sized enterprises (SMEs), and other stakeholders.

The results of the FLABEL project have filled in some of the gaps in our knowledge about nutrition labelling in Europe. They show how labels are widely available on food products across the continent, and how consumers are capable of understanding and using nutrition information under certain conditions. Across all the studies carried out as part of FLABEL, a major conclusion emerging was that attention and motivation are the major bottlenecks in trying to encourage more healthful choices by nutrition labelling. Food choice is driven by multiple motives, and health is only one of them. On top of that, choosing food products in supermarkets can be a matter of seconds, and the amount of attention given to nutrition labelling information is small. Against this background, much of the earlier discussion on finding the best form of nutrition labelling seems ill-conceived, as it was mostly based on issues about understanding or possible misunderstanding of different labelling formats. Our research shows that all the current label formats are well understood by consumers, at least in the sense that they can use them to correctly rank products within a product category according to healthfulness. When aiming to encourage healthful choices by nutrition labelling, one should rather ask which elements of nutrition labelling are most helpful to pass the attention filter. Here, consistency and familiarity seem to be most important. Whether one supplements the basic nutrient information with other elements, like daily amounts or colour-coding, appears to be a secondary consideration. Health logos may have a better chance of not only passing the filter of attention but also receiving enough processing capacity to actually influence choice, although one should only expect modest effects at best. The other basic bottleneck, motivation, cannot be solved by nutrition labelling. Motivation for healthy eating can be affected by measures of nutrition education. But motivation will be a bottleneck only as long as the health motive will lead to a different choice than the preference motive. When the preferred option becomes the healthy option, motivational bottlenecks will disappear. This is a question of product development and reformulation more than of nutrition information.

In order to derive implication of project results for public policy, FLABEL results were shared and discussed with policy makers, retailers, industry and SMEs at a consensus workshop. The goal of the workshop was to jointly arrive at a document that describes both the differing views expressed as well as the areas of agreement identified through the discussion of results between different stakeholders. In the following, the main issues on which consensus were reached are described.

1. Seeing and integrating nutrition labelling into a broader context

FLABEL research has shown that nutrition labelling can positively affect consumers in a number of ways. However, the extent of influence is rather limited. Thus, it is important to see nutrition labels as only one tool among others. Nutrition labels should be integrated into the broader context of efforts aimed at increasing healthy eating, notably information campaigns and (school) education. This is crucially important as FLABEL research has shown that the attention paid by consumers as well as the motivation of consumers to use labels are the most important bottlenecks preventing a bigger impact of nutrition labelling on healthy choices. It was mentioned in this regard that future information campaigns should be made more emotional and engaging.

In addition, also the promotion of environments that lead to the ‘easy choice being a healthy choice’ should be furthered, also in the light of the FLABEL finding that a larger assortment of healthier

products alone can possibly influence healthiness of choice. It was mentioned that new technologies that facilitate information access may have a potential to increase information use.

2. Wider availability of FOP nutrition labelling

Nevertheless, due to its potential benefits, most participants voiced the opinion that nutrition labels should be increasingly displayed on products. More specifically, it was stated that nutrition labelling should be available FOP on all food products in Europe. In order to ensure this, the EC might provide guidelines on the basis of the current regulation. Based on this, it is the industry stakeholders that should be taking action here, in agreement with the remaining stakeholders. The format of the label should be nutrient-based, and the additional use of health logos is supported.

3. Consistency and penetration more important than label format

There is neither clear agreement nor conclusive evidence about whether the nutrient-based label should be directive (e.g. health logo) or non-directive (e.g. tabular/linear nutrition information), and whether colour-coding should be used. There are, however, research indications that consumers can understand most formats, and it appears that consistency and familiarity are more important than the exact type of format. It was thus agreed that it is important to present the nutrient-based label in a consistent way, especially with regard to positioning. The EC might provide guidelines with respect to the principles underlying the inclusion of forms of expression and presentation of nutrition information which are not specified in the current regulation.

Agreeing on displaying consistent nutrient-based labels at all is more important than the exact format agreed on. Therefore, it was appealed to stakeholders to focus on agreement rather than own interest or the perfect solution. Agreement might be on the dominant form or the lowest common denominator in order to reach a 'critical mass'.

Ensuring high penetration of nutrient-based labels on the market, enough consistency of formats and coupling this with matching efforts in public and private communication and education (public awareness campaigns, food marketing and information provision by producers and retailers, education campaigns and school curricula, etc.) is expected to improve familiarity and effect of nutrient-based labels.

4. Capturing incentives for stakeholders

Many stakeholders voiced that they expect nutrient-based nutrition labels as well as health logos to encourage industry to make efforts in innovation, reformulation and changes of assortments. It was mentioned that consistent nutrient-based labels or health logos can increase transparency in this process for consumers, and they might serve branding functions for producers as well as support producers' and retailers' CSR efforts. In this regard consumer scepticism towards food producers' information provision was raised as a challenge, and that this aspect of trust and credibility should be tackled by the industry.

FLABEL has brought clarity into how nutrition information on food labels affects consumer purchasing decisions. The project has also developed an instrument for policy assessment that:

- raises awareness of the challenges in assessing label effectiveness by highlighting the relevant consumer behaviour theories, research challenges and results from the project's work, and
- recommends a science-based but practical tool that can be used to assess the effects of changes to current nutrition label policy on consumer behaviour, based on the methodological experiences and research results from the FLABEL project's work.

Finally, even though the project's aim was not to provide an assessment of the impact on industrial competitiveness, FLABEL research showed this is an important concern in relation to food nutrition labels, and expert surveys are suggested as a means to assess the impact of food labelling on industrial competitiveness.

Main dissemination activities and exploitation of results

During its lifetime FLABEL set out different dissemination activities aimed at promoting its research and at reaching the widest and most varied audience possible.

The first dissemination activities revolved around establishing a communication plan for the project, defining the project identity (including the project logo) and creating the main dissemination tool, the FLABEL website.

The communication plan was presented to the consortium at the first AGM on 9/10 February 2009. There was general agreement from the consortium regarding approach and partners understood the role they were expected to play in dissemination of FLABEL results. At the same meeting, work package leader EUFIC gauged the partners' media experience, offered training tools and has taken this experience into consideration for the subsequent media-related activities. Academic partners shared key contact details in their respective university press offices. Recognising the importance of show-casing the FLABEL results, a conference plan was drawn up to complement the communication plan, where speaking opportunities were identified for 2009-2012.

The project identity was based on the project objectives. Given the segregated views on nutrition labelling, the FLABEL logo was designed to be inclusive, representing the consortium's objective scientific perspective in this political debate. Incorporating elements of different types of labelling systems; colour-coding system (Nutripass), GDAs and health logos (Swedish keyhole), the logo is easily distinguished.

The project website www.flabel.org with its user-friendly structure and simple graphical design went live on 24 November 2008. The launch of the website was announced through a press release, which provided a generic overview of the project and promoted through EUFIC networks (over 40.000 health professionals, media, policy makers, consumer organisations, food and drink industry, educators, consumers) and EUFIC online newsletter. The FLABEL website was also promoted

through a quadrant created on the EUFIC website (www.eufic.org, ~500.000 visits/month) whose main aim was to drive traffic to the FLABEL website.

Other press releases were produced in the course of the project for presenting the results of the WP1 penetration data (April 2009), or at the end to promote the final FLABEL conference (November 2011).

Two leaflets were produced during FLABEL life; a generic leaflet (2,500 copies) that introduced the main aims and objectives of the project, and a final leaflet (2,500 copies) that provided an accessible and quick overview of project top line results. Both leaflets have been used by partners for dissemination at conferences and seminars. For example, EUFIC shared a stand with DG Research at DG SANCO's Youth Conference "Be Healthy, Be Yourself" on 9-10 July 2009. The successful completion of a simple questionnaire based on the leaflet meant that leaders of Europe's youth organisations could win fun DG Research prizes. The youth representatives recognised that they hadn't reflected upon the role of nutrition labelling and expressed an interest in the FLABEL project.

EUFIC used webinar technology for three of its key communication initiatives. Webinars encourage interaction and dialogue with participants (as they can host live question and answer sessions), whereas podcasts are one-way communication tools. This element of interaction was deemed very important to convey transparency of FLABEL results and to have the opportunity to respond to stakeholders' questions. The first webinar presented the results of the WP1 penetration data to a broad base of interested stakeholders. It was held on 30 April 2009 and is publicly available from the project website. To date over 3.000 people have viewed it. The second webinar took place on 26 January 2010. It was not an open webinar but rather used as a means for the consortium's Scientific Advisor, Professor Klaus Grunert, to inform the project's Stakeholder Advisory Board about the progress that has been made to date. The third and final webinar which took place on 29 January 2012 contains the final FLABEL results and has been promoted with a wide audience (41.000). This last webinar can be also accessible from the FLABEL website.

There has been considerable interest in the FLABEL project, particularly in the pan-European specialised media. To date numerous press clippings have been generated that make reference to the project.

A podcast was also recorded with the leader of research activities related to "Attention and reading of labels", highlighting key results (July 2010).

Several articles targeted at a lay audience have been written about FLABEL. A generic article about the FLABEL project appeared in issue 65 of EUFIC's popular newsletter Food Today (December 2008). More than 10,000 subscribers receive the printed version in English, French, German and Spanish. A further 30,000 recipients are sent the newsletter electronically. The article is also available on www.eufic.org in Czech, English, French, German, Greek, Italian, Hungarian, Polish, Portuguese, Slovak and Spanish. Since little was known about the penetration of nutrition information on food labels in the European Union (EU), the second article (Food Today issue 71, March 2010) highlighted FLABEL results evaluating to what extent consumers are exposed to

nutrition labels in all 27 EU Member States and Turkey. On March 2012 the last Food Today article with the key findings from the project was published and promoted to the 40,000 subscribers.

The final FLABEL project conference was organised on 24 November. Selected European and national stakeholders (consumer organisations, food industry, retailers), policy makers, and academics, were invited to attend. Sixty-five people attended the day. The conference, signalling the end of the project was publicised through a press-release that was distributed through Alpha-Gallileo and promoted through the partner's press-officers.

FLABEL results were presented and mentioned at different key stakeholders meetings and conferences, held within and outside Europe, with participants representing the broad range of stakeholders the consortium aims to inform about the FLABEL project. A selection of those can be found as follows:

- International Chewing Gum Conference, 5 June 2009, Rome, Italy
- Conference of the International Society for Behavioural Nutrition and Physical Activity, 17-20 June, Cascais, Portugal
- CIAA (Confederation of the Food and Drink Industries of the EU, now FoodDrinkEurope) Consumer Information Meeting, 25 June 2009, Brussels, Belgium
- UK Nutrition Society Summer Meeting, 2 July 2009, Guildford, UK. A scientific poster, showing the key results from WP1 was also displayed.
- DG SANCO's Youth Conference "Be Healthy, Be Yourself", 9-10 July 2009, Brussels, Belgium. A scientific poster, showing the key results from WP1 was also displayed.
- 3rd International EuroFIR Congress, 7-10 September 2009, Vienna, Austria. A scientific poster, showing the key results from WP1 was also displayed.
- 3rd DIETS conference, 23-24 September 2009, Lisbon, Portugal. A scientific poster, showing the key results from WP1 was also displayed.
- 19th International Congress of Nutrition, 7 October, Bangkok 2009, Thailand
- Eurocommerce Food Policy Committee Meeting, 20 October 2009, Brussels, Belgium
- EU Platform for Action on Diet, Physical Activity & Health, 4 December 2009, Brussels, Belgium
- EuroScience Open Forum,2-7 July 2010 -, Torino, Italy
- 20th IUHPE World Conference on Health Promotion, 11-15 July 2010, Geneva, Switzerland
- Etiquetage alimentaire: Entre désir et réalité, 17 September 2010, Berne, Switzerland
- 2nd World Conference of Public Health Nutrition, 23-25 September 2010, Porto, Portugal
- 18th European Congress on Obesity, ECO, May 2011, Instanbul, Turkey. The slides of the talk were then made available from the FLABEL website (as they consisted of a general presentation with most recent updates to date).

Numerous scientific articles have been submitted for publication in peer-reviewed journals. The list of all FLABEL publications to date is found on www.flabel.org.

Other publications reporting FLABEL research targeted at the food and drink industry, policy makers and other stakeholders are:

- JM Wills, KG Grunert, L Fernández Celemín, S Storcksdieck genannt Bonsmann (2009). Do European consumers use nutrition labels? AgroFood industry hi-tech 20(5):60-62.
- JM Wills, KG Grunert, L Fernández Celemín, S Storcksdieck genannt Bonsmann (2009) European consumers and nutrition labelling. Food Engineering & Ingredients 34(3):11-13.
- Grunert KG, Fernández-Celémin L, Wills JM, Storcksdieck S, Nureeva L (2010). Anwendung und Verständnis der Nährwertkennzeichnung. Ernährung im Fokus 8:328–32.
- Storcksdieck S (2010). Lebensmittelkennzeichnung – wie viele beachten sie? VDL Journal 1.
- Fernández Celemín L, Storcksdieck genannt Bonsmann S, Carlsson E, Larrañaga A, Egger S (2011). Mapping public health nutrition awareness campaigns across Europe, AgroFOOD industry high-tech 22(n1):38–40.
- L Fernández Celemín, KG Grunert (2012). Helping Europe make healthier food choices. Projects magazine 28:55-57.
- Grunert KG, Fernández Celemín L, Storcksdieck genannt Bonsmann S, Wills JM (2012). Motivation and attention are the major bottlenecks in nutrition labelling - key findings from the FLABEL project. Food Sci & Technol. 26(1):19-21.

To achieve active involvement from stakeholders, a Stakeholder Advisory Board (SAB) was established that served as a valuable discussion platform to the consortium. The SAB comprises national food agencies, consumer organisations, as well as food and retail sector representatives (both multinational and SME). The members were:

- Susanne Döring, Lisa McCooey, Isabel Ortiz, FoodDrinkEurope (Confederation of the Food and Drink Industries in EU), Belgium/EU; (NOTE: Susanne Döring left the organisation)
- Marina Valverde López, Eurocommerce (European Representation of Retail, Wholesale and International Trade Sectors), Belgium/EU
- Mike Rayner, University of Oxford, UK
- Karen Powell, Joanna Disson, Alette Addison, FSA (Food Standards Agency), Department of Health, UK
- Irène Margaritis, AFSSA (French Food Safety Authority), France
- Anita Laser Reuterswärd, SLV (National Swedish Food Administration), Sweden
- Josephine Wills, EUFIC, Belgium/EU*
- William Lay and Noël Molisse, COFACE (Confederation of Family Organisations in the European Union), Belgium/EU*
- Ludger Fischer, UEAPME (European Association of Craft, Small and Medium-Sized Enterprises), Belgium/EU*
- Rodrigo Gouveia, Euro Coop (European Community of Consumer Cooperatives), Belgium/EU*
- Karen Tonks, Tesco Stores Ltd., UK*
- Observer: Helen Lee, European Commission DG SANCO (Health and Consumer Protection), Belgium/EU

*also partners in the FLABEL consortium

The SAB met annually at the Annual General Meeting and in addition to providing general feedback on the project, they were active participants in WP7 research. SAB members also agreed to disseminate FLABEL results throughout the project.

Address of the project public website, if applicable as well as relevant contact details

The FLABEL project public website is: www.flabel.org

The FLABEL logo:

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