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Author: Kornelia Hagen

Nutritional Information: Traffic Light Labelling is the Best Way to Reach Consumers

More than half of German adults are overweight. Those most often affected include the elderly, poor, and individuals with poor education. Yet is overweight an issue that economists should address?

Poor nutrition and lack of exercise play a major role in widespread deseases. One-third of total health care expenditures are devoted to illnesses related to overweight. This is just one of the reasons why economists should examine how to promote more health-conscious nutritional decisions.

One instrument favored by policy makers in this regard is nutrition labelling. At present, manufacturers display nutritional information on food packaging on a voluntary basis and in a non-standardised format. This is supposed to change. In the near future, the European Parliament will convene to debate the standardisation of nutritional information.

How food labelling regulations should be designed remains a subject of controversy, however. There are essentially two models to choose from: the EU Commission prefers a system in which the recommended daily values for each dietary component would be indicated as a percentage, without the use of a color-coded classification system. By contrast, consumer and health care organisations prefer a traffic light model, with red, yellow, and green lights to indicate nutrient levels in a particular food. Against this backdrop, the present article examines the following question: Is there an empirical or theoretical basis for favoring one of these labelling systems in light of consumer and health-care policy objectives?

The key finding of this article is that there is no clear empirical justification for discarding either of the two models. However, explanatory approaches based upon information and behavioural economics indicate that the traffic light model has some clear advantages, primarily because consumers are only able to assimilate a limited amount of information basis when making purchase decisions.

Several years ago, the European Commission began working to revise regulations related to food labelling. The motivation for action in this area was the lack of a unified, standardised framework for information about the nutritional and health-related components of packaged food. The EU Commission first conducted an evaluation of food labelling regulations and tried to ascertain how consumers would prefer to be informed about foods (see Box). In 2006, the European Commission passed a regulation concerning nutritional information in foodstuffs. And in 2008, the Commission presented a proposal for the consolidation and harmonisation of food labelling regulations.

The regulation calls for mandatory nutritional labelling based on unified criteria at the European level. This requirement is to apply to all levels of the food supply chain and to all packaged foods that go to end consumers, restaurants, or to establishments with communal dining (such as schools, hospitals, and canteens).

The EU Commission is pursuing a number of goals in its harmonisation program: *From the perspective of competition policy* it aims to improve the free exchange of goods in the domestic market and strengthen competition in the food sector. In terms of *nutritional and health policy*, the goal is for consumers to nourish themselves in a healthier and more balanced way (see Dossier). An additional aim of the new labelling is to encourage the consumption of individual dietary components in accordance with scientific recommendations for healthy nutrition.[1] The *consumer policy goals* for mandatory nutritional labelling are to protect consumers from misleading information, to create transparency about food quality with respect to dietary components, and to provide help to consumers in making comparative choices based upon health considerations.

The EC's point of reference is the empowered consumer who desires information

With its proposal, the EU Commission once again favors information as a central instrument of consumer policy. The special importance of this instrument is based on the reasoning that consumers, when fully informed, will behave in an economically rational way, thereby guaranteeing efficient markets and, in turn, increasing both individual and societal welfare.

In addition, the Commission asserts that a structural knowledge deficit concerning the quality and characteristics of products and services exists among consumers, placing food suppliers at an informational advantage (i.e., there are informational asymmetries between manufacturers and consumers). Consumer policy, it is argued, must counterbalance these asymmetries. Moreover, the EU Commission starts from the premise of a fictive normal consumer, "who is normally informed, attentive, and knowledgeable." Thus, the EU Commission's consumer policy is not based on empirically verifiable findings about the behavior of real consumers, but instead on the ideal of a *homo oeconomicus,*[2] *a concept* that is also embedded in the legal outlook of the European Court: If consumers are provided with information, they will conduct themselves in a rational and empowered fashion in their economic decision-making processes. In other words: What the EC is saying is that consumers should act how we want them to from a normative perspective.

There is certainly much evidence to show that consumers by no means behave rationally. As a result, the model of the perfectly rational consumer needs to be revised and adapted to reality. To provide a simple example, given the widespread incidence of overweight, it is hard to conclude that consumers primarily act in an (economically) rational way, consistently making prudent eating choices.

Box

Selected European Union initiatives regarding food and nutritional content labelling

2005:
Release of the EU Commission Green Paper titled "Promotion of healthy diets and physical activity: a European dimension for the prevention of overweight, obesity and chronic illnesses."
ec.europa.eu/health/ph_determinants/life_style/nutrition/green_paper/consultation_en.htm.
A European consultation procedure began with the introduction with the Green Paper. The current goal is to reverse the trend towards overweight by 2015 at the latest. Alongside improved consumer information, the EU is promoting increased innovation in the food industry as well as improved food recipes and nutritional content from a health perspective.

2006:
The following legislation was passed in 2006: EC Regulation No. 1924/2006 of the European Parliament and the Council of 20 December 2006 on nutrition and health claims made on foods; as well as European Commission Health Claim Directive 2006/142/EC of 22 December 2006 amending Annex IIIa of Directive 2000/13/EC of the European Parliament and of the Council listing of ingredients which must under all circumstances appear on labelling of food labels.

2007:
European Commission White Paper: A Strategy for Europe on Nutrition, Overweight, and Obesity Related Health Issues. COM(2007), 279 final (SEC 2007) 706, SEC (2007) 707.

2008:
EU Commission: Proposal for a regulation from the European Parliament and Council on the provision of food information to consumers, Brussels, 30.1 2008, COM (2008) 40 final, of January 30, 2008.

This proposal aims to bring together and modify general food law (Directive 2000/13/EC about labelling and packaging of foodstuffs as well as food advertising) and the nutritional labelling law (Directive 90/496/EEC of 24 September 1990).

The proposal is partially based upon input from stakeholders (government organs, consumer organisations, health associations, industry associations, and individuals).

Color-coded or colorless; percentages or quantities?

Soon the European Parliament and then the European Council will come to a decision about an EU Commission directive and thus about a Europe-wide unified system of nutritional labelling for foodstuffs.[3] It is a matter of contention as to which system of nutritional labelling should be approved.[4] Basically, there are two diametrically opposed models under debate, and, in addition, there is a compromise model. The EU Commission prefers the Guideline Daily Amount (GDA) model. The essential features of this model are: (1) nutritional content is shown as percentages of the daily recommended intake for each respective nutrient; and (2) no traffic light system or color coding is used to identify the nutrient levels in foods. This model is also referred to as *expanded nutrition labelling* or the "1 plus 4" model. In Germany, it is favored by the federal ministry for consumer protection as well as by the food industry and Food, Beverages, and Catering Union (NGG).[5]

The opposing model under consideration is the so-called nutrition traffic light, which in addition to providing data on absolute nutrient quantities also designates every nutrient with the color red (i.e. high content), yellow (moderate content) or green (low content).[6] This system is promoted by a wide range of consumers associations and health care organisations.[7] The opposition parties in the German Bundestag also have expressed their support for the nutrition traffic light.[8]

In contrast to the GDA model, the traffic light label uses a *color-coded classification* to highlight the relative levels of each nutrient. The similarities to a street traffic light are intentional: Red indicates the presence of an especially high amount of a nutrient in a product. Consumers get the message that, "for this nutrient, there is a red warning signal, so think again about your consumption and avoid frequent consumption of this food." The thresholds for red, yellow, and green are to be based on scientific criteria from nutritional and health research. Finally, there is a compromise model, also designated as the hybrid model, in which the GDA data is shown as percentages but also emphasised with traffic light color codes (see Table).

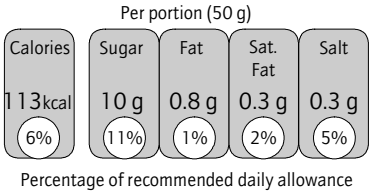
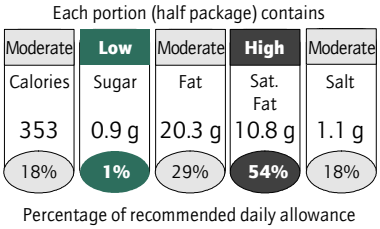
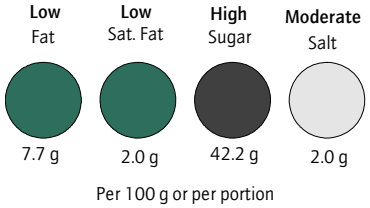
Is the traffic light system arbitrary in its valuation?

The opponents of traffic light labelling raise the criticism that it is based on subjective norms. Furthermore, it is argued that the traffic light may not lead to healthier food choices, since it does not differentiate sufficiently between healthy and unhealthy foods. As a result, the traffic light model may discriminate against some products and may promote an unbalanced diet. The traffic light system also ignores foods that have more constituents than the few listed nutrients; evaluating single nutrients in the food, it is said, does not lead to a balanced diet. In this respect, opponents argue that the traffic light is not a suitable measure for combating overweight. In the traffic light system, green creates a false sense of security, and red wrongly suggests a food is bad. Low-calorie colas, for example, would receive a green light for all four nutrient categories, whereas fruit juices containing sugar would be marked as yellow or red. Because of their sugar or fat content, fruit, muesli, milk, and olive oil get a red light, although these foodstuffs provide nutrients that are necessary for life.

Proponents of the traffic light argue in turn that under this system, it is not the product but only the amount of each nutrient that is being judged, and that red does not mean the food is unhealthy across the board, but instead simply stands for a high content of that particular nutrient.[9] Against the criticism of arbitrariness, the traffic light's advocates argue that all products will be evaluated according to the same criteria. They also claim that the examples cited by opponents are poorly chosen: Thus, milk would not receive a single red light for any individual nutrient and because of its fat content, olive oil, like any other oil, would receive a red color only for this nutrient.

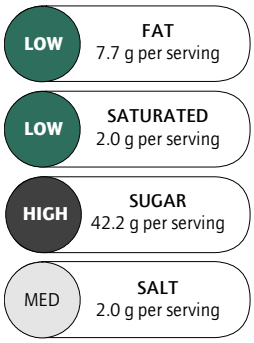
Table

Basic Models under Consideration for Nutritional Labelling Regulation

Percentage GDA Model	Hybrid Model	Traffic Light Labelling
Model favored by: European Union, German Federal Ministry of Food, Agriculture, and Consumer Protection (BMELV), Confederation of the Food and Drink Industries of Europe (CIAA) Calories plus 4 nutrient values with color-coding on the front side of packaging; non-classifying colors allowed.  	Calories plus 4 nutrient values with traffic light colors for absolute amounts and daily percentages on the front of the packaging.  	Model favored by: The Federation of German Consumer Organizations (VzBv) and others.[1] Calories plus 4 nutrient values with traffic light colors for absolute amounts on the front side of the packaging. 

Selected Nutritional Information Systems Currently In Use

Multiple traffic light system in the UK
Nutritional values with traffic light colors; no amounts or percentage figures on the front side of the packaging



FRoSTA labeling system:

A pilot project launched by the company FRoSTA; labeling used on four of the company's most popular frozen dinners.

Total calories listed with color-coded nutrient values

Green = low amount / no cause for concern yellow (here, light gray) = moderate amount / caution advised
red (here, dark gray) = high amount / use sparingly

1 Bundesverband der Allgemeinen Ortskrankenkassen (AOK), Berufsverband der Kinder- und Jungendärtze Deutschlands (BVKJ), German Medical Association, Deutsche Herzstiftung, diabetesDE, Gesetzliche Krankenversicherungen-Spitzenverband, and Foodwatch.

Sources: German Federal Ministry of Food, Agriculture, and Consumer Protection (BMELV), Federation of German Consumer Organizations (VzBv), FSA, FRoSTA; figure by DIW.

Viewed objectively, it is clear that the traffic light does not evaluate the product as a whole, but only individual nutrients. The criticism that the traffic light ignores certain nutritional components may be justified, but as this is also true of the GDA information, it is not convincing in the present debate. Under both models, figures are only provided for four nutrients, even though many other nutrients obviously exist.

Whether the traffic light promotes an unbalanced diet is a question that has not been studied to date. For methodological reasons alone, it would be quite difficult to study this issue empirically. Ultimately, there are huge problems of attribution in any attempt to determine the extent to which a labelling system has led to changed eating behavior. This problem exists regardless of the specific system of labelling to be employed.

Dossier

Current status of nutritional and health policy

World Health Organization: Overweight is a global epidemic – Germany's ranking is particularly bad

For some time now, overweight has been at the top of the list of significant public health problems. Globally, overweight and obesity rank among the fastest growing core health problems. The number of overweight persons has significantly increased in recent years in all highly developed nations and also in a large number of emerging nations. The proportion of the population that is obese has risen in all OECD member states during the past 30 years.

Compared to the rest of Europe, Germany (along with the UK) has the highest proportion of overweight individuals in its population. In Germany, "…about one half of all men and a third of women over 18 years of age are overweight. An additional 17 percent of men and 20 percent of women suffer from obesity …"[1]

Nutrition and health research has demonstrated several connections between overweight and socio-economic characteristics. For example, overweight and obesity increase with age; a higher Body Mass Index (BMI)[2] is associated with lower levels of schooling for both men and women; the BMI falls with rising net per capita income; and the largest percentage of individuals who are seriously overweight belong to the lower economic classes.[3]

Improper nutrition leads to overweight and results in an increased risk of illness

Health and nutrition research explains overweight and obesity as the products of genetic predisposition, family-specific and obesity-promoting life circumstances, as well as behavioural patterns.[4] Research has clearly proven that improper diet and exercise is a critical factor in individuals becoming overweight. The latest research also proceeds from the assumption that a close connection exists between genetic factors and individual behavior.

Research has also shown that overweight goes hand in hand with serious health risks. Of course, while health is dependent upon multiple determinants – including age, genetic predisposition, exercise, stress, environmental factors, and education – nutrition is also a critical factor. Thus, overweight and obese individuals have a considerably higher risk of illness than individuals of normal weight. This relationship is aggravated because overweight and obesity are frequently associated with a lack of physical exercise.

Overweight and obese individuals suffer an increased incidence of serious and chronic illnesses: cardiovascular diseases, high blood pressure, Type 2 diabetes, disorders of lipid metabolism, gout, back disorders, diseases of the musculoskeletal system, gall bladder disease, strokes and various types of cancer.

WHO Body Mass Index (BMI) – Classification for Adults

	BMI (kg/m^2)	Associated Disease Risks
Underweight	< 18.5	low, but the risks for other clinical problems are increased
Normal Weight	18.5 – < 25	average
Overweight	≥ 25	requiring treatment
Pre-Obese	≥ 25 – < 30	increased
Obese class I	≥ 30 – < 35	moderate
Obese class II	≥ 35 – < 40	severe
Obese class III	≥ 40	very severe

Source: WHO 2000. DIW Berlin 2010

Parental overweight is a significant factor for overweight in children

A study of child and adolescent health in Germany shows that around 15 percent of children and adolescents are overweight and about six percent are obese. Findings from these studies additionally show that in about half of these children and adolescents, at least one resultant illness was present (high blood pressure, disorders of lipid metabolism, Type 2 diabetes, or orthopedic complications).[5] The most important determinant for overweight in children and adolescents was parental overweight; an additional significant factor is high media usage. Obesity also affects the entire life cycle. Pre-obese and obese mothers are likelier to have overweight babies than normal weight mothers, and their children then have a high risk of becoming obese adults.

Improper nutrition results in high social costs

The increasing incidence of overweight and serious resultant illness leads to health-care and social costs from, among other things, hospital stays, medications, an inability to work, and higher research expenditures. In addition, there are significant social problems. Overweight is often accompanied by a reduction in the quality of life for overweight persons and for their families. It is estimated that about 30 percent of overall health care costs – equivalent to over 70 billion euros annually – are spent for illnesses that are partially mediated by diet.[6] This does not include intangible costs that arise as a consequence of illnesses but cannot be assessed monetarily.

1 Robert Koch Institute, German Federal Statistical Office: *Gesundheitsberichterstattung des Bundes: Gesundheit in Deutschland*, 2006, pp. 113-114. Note that Germany's poor performance may be partially due to the methodology employed. Thus, the findings for Germany and the UK are based upon objective measures, whereas the other countries use self-reported body weight and size. German Federal Ministry of Health: *Gesunde Ernährung und Bewegung – Ein Schlüssel für mehr Lebensqualität,* available at: *http://bmg.bund.de/cln_160/nn_1168258/sid_DB553812E3A7AD370752E27D65B13D6E/SharedDocs/Standardartikel/DE/AZ/B/Glossar-Bewegung-und-Gesundheit/Daten-und-Fakten-zu-Ernaehrung-und-Bewegung.html?__nnn=true*.

2 The Body Mass Index (BMI) is an indicator for overweight and obesity defined by the WHO. The BMI is calculated in the following way: $BMI = W/H^2$, where W is the body weight in kilograms and H is the height in meters. Other indicators for overweight and, in particular, for an increased risk profile for the heart and blood vessels (cardiovascular risks) are waist circumference and the waist-hip ratio, see Kleiser, C.: Determinants and Health Risks of Overweight and Obesity Among Children and Adolescents in Germany. Dissertation at the University of Bonn, Bonn 2009.

3 Max Rubner Institute, German Federal Research Institute of Nutrition and Food (MRI): *Die Nationale Verzehrsstudie II: Wie sich die Bürgerinnen und Bürger in Deutschland ernähren.* This study, commissioned by the Federal Ministry for Nutrition, Agriculture and Consumer Protection (BMELV 2008, see *www.was-esse-ich.de/index.php?id=74*), serves as the basis for nutritional recommendations and consumer information.
4 German Nutrition Society (DGE): *Ernährungsbericht 2008*, available at *www.dge.de/modules.php?name=News&file=article&sid=914*.

5 Robert Koch Institute: *Studie zur Gesundheit von Kindern und Jugendlichen in Deutschland* (KIGGS Study), available at *www.kiggs.de.*

6 Valid data are not available for the consequential costs of overweight, since illnesses in health reporting are not recorded statistically according to their causes. The costs provided in this report are only an estimate cited by the BMELV (German Federal Ministry for Nutrition, Agriculture and Consumer Protection) and BMG (German Federal Ministry of Health) in *Gesunde Ernährung und Bewegung – Schlüssel für mehr Lebensqualität.* 2007, 2. These estimates are based upon a study by the BMG: *Kosten von ernährungsabhängigen Krankheiten in der BRD im Jahre 1990*. Volume 27, 1993. At that time, related costs were calculated to be 42.7 billion euros, as cited by the German Society for Nutritional Medicine: *Newsletter 1: Ernährungsmedizin heute*. 2005 and BMG: *Daten und Fakten zu Ernährung und Bewegung Prävention.* The German Institute for Nutritional Medicine and Dietetics (D.I.E.T) calculated the data for 1990 as being just as high and came up with costs totaling 148.5 billion Deutschmarks for nutrition-related illnesses in 2001.

Does traffic light labelling patronise mature consumers?

Criticism has also been voiced that traffic light labelling interferes with the personal responsibility of consumers. Yet this contention overlooks the fact that the traffic light is merely a way to provide information, and that the consumer is in no way forced to behave in a specific manner. Instead, the consumer is merely provided with the option of choosing a product based upon additional information.

Traffic light labelling is also criticised because it ostensibly discriminates against entire groups of foods that are especially flavorful, such as sweets. For this reason, it is said to be a political-ideological attempt to control demand. In fact, the purpose of nutritional labelling is to inform consumers about high levels of certain nutrients in a basic way that is independent of any specific system. The nutritional and health policy aim of labelling is ultimately to support the consumer in making health-conscious food choices. However, the consumer remains free to purchase foods that are considered unhealthy from a nutritional perspective. Thus, labelling represents a low level of regulatory intervention. It would be a different story altogether if indulgent foodstuffs were banned or saddled with a high tax.

Does traffic light labelling lack a sold scientific basis?

Other critics have targeted the lack of a solid scientific foundation for traffic light labelling. However, an evaluation of the existing body of research on nutritional labelling shows that this criticism could be leveled against either system. Empirical research to date has provided very few hard facts to justify conclusions about which labelling system would have a measurable impact on nutritional behavior.[10]

Further points of contention

Apart from the core question – color-coding of nutrient values or GDA figures without classifying colors – there are a series of additional points regarding the configuration of the labelling system that have been the subject of disagreement. These points also relate to the question under examination here about which kind of labelling would better contribute to the consumer and health policy objectives of greater transparency and healthier eating behavior.

Which nutrient values should be included: “1 plus 4” versus “4 plus 8”

Regarding the nutrient values that should be subject to mandatory labelling, the question revolves around which and how many dietary components should be required and where these figures should be positioned. The GDA model foresees labelling for four dietary components, the so-called *big four* – sugar, salt, fat, and saturated fat. The food industry advocates only placing the calorie content on the front of the package, reasoning that this is the most relevant information for consumers.

By contrast, consumer and health care organisations are in favor of placing the big-four dietary components in full view on the front of the packaging. In an addition, total calories could be indicated. On the reverse side of the packaging, additional mandatory information should be included so that the *big eight* nutritional values are all listed (calories, protein, carbohydrates, sugar, fat, saturated fats, fiber, and sodium/salt).

Percentage figures or amounts: “15 percent fat” or “2 grams of fat?”

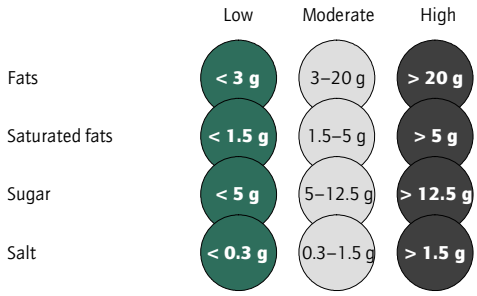
The question whether a percentage figure or an amount should be shown for nutritional values is another significant difference between the two models. The GDA model foresees indicating the recommended daily allowance in percent along with the nutrient amount in grams. Supporters of a simplified traffic light label, by contrast, prefer only displaying weight data on the front of the package without any reference to recommended daily intake, arguing that standard recommendations do not apply to all consumers equally and thus might mislead the consumer. The compromise, or hybrid, model would provide information on both grams and percentages and also highlight them with color-coding.

Recommended daily values – but for whom?

The GDA values for the intake of various nutrients are based upon the recommendations of the Confederation of the Food and Drink Industries of Europe (CIAA). Supporters of the traffic light model are critical of the GDA values and oppose using them as a basis for regulation, citing the fact that they were defined by the food industry itself. Some of the GDA values are lower than the respective values defined by the World Health Organization and the so-called D-A-CH standards jointly set by the German, Austrian, and Swiss national nutrition societies (see Figure).[11] Critics of the GDA model also find fault with the fact that the reference values are based upon the nutritional needs of an average woman in terms of weight, health status, and physical activity. The same allowances are not applicable to many other consumers, including children, the elderly, those who are already overweight, and the chronically ill.

Figure

The Big Four Nutrients: Threshold Values For Each Traffic Light[1]



1 The data relates to 100 g amounts, and not portions. For beverages, all values are halved.

Sources: Federation of German Consumer Organizations (VzBv)

Portion figures: per portion, per half-package, per 40 g, or per 100 g?

There is also controversy concerning whether information should be presented per 100 grams (for foodstuffs) and 100 milliliters (for liquid products) or related to the standard portion size of the particular product. Industry groups would prefer to display the information per portion. The food industry considers data presented in 100-gram amounts as something to be avoided, for in many cases, smaller portions are actually eaten. The advocates of traffic light labelling instead favor a mandated, uniform reference standard of 100 grams or 100 milliliters. Manufacturers would be free to provide additional per portion data as long as it were defined in a way that is consistent for every product and uniform among suppliers of the same product group. In addition, manufacturers would be required to state the portion amount in clear relation to the package contents. This could be fulfilled with a statement that, “A portion consists of half the package” or by packaging the product according to portions.

Could behavioural and information economics provide additional help?

As presented in the foregoing, the specific configuration of future nutritional labelling is a matter of intense controversy. There are no unequivocal empirical data available as of yet that would prove beyond a doubt which of the debated systems would have a measurable impact on eating behavior. However, the insights offered by information and behavioural economics can be of significant assistance in the formulation of policy, as will be shown below.

The complexity of purchasing and eating behavior raises questions about how people are able to absorb and process complex information. What hampers and what facilitates information absorption and processing? What behavioural mechanisms and strategies do people develop and how can these mechanisms be influenced? The fields of information and behavioural economics offer insights in this regard that are supported by many experimental studies.

Consumers have information deficits and cannot accurately judge food quality

Starting from the assumption that product quality governs product selection, information economics distinguishes between different qualities of products according to how clearly and at which point in time these product characteristics become recognisable to consumers. In this regard, foods are basically seen as search goods, since most often, their quality is already known to some degree of certainty at the time of purchase, and at the latest by the time of consumption.[12]

Yet foodstuffs also increasingly demonstrate characteristics of “experience” and “credence” goods. In the case of such goods, quality can scarcely be known or not known at all. This applies, for instance, to nutrient levels in foodstuffs. To

provide an example: while a consumer might suffer negative long-term effects from the excessive consumption of saturated fatty acids, in the absence of the information on the fat content of foods, he or she cannot recognise the link to these negative effects.[13] Figuring out which foods and which dietary practices are healthy places a significant burden upon the competency of consumers.[14] Consumer information – such as nutritional labelling – aims to increase transparency about quality and to correct the structural knowledge deficits of consumers. Consumer uncertainty about the quality and the benefits of different foods is aggravated by the fact that both nutritional science and the media often report equivocal or contradictory findings.[15]

Finally, not all consumers are actively interested in health and nutrition. Thus there will always be consumers who are consciously or unconsciously closed off to new information, whether for reasons of time, lack of awareness, insufficient education, or from the emotional need to overlook their own ignorance. In addition, some people may have absolute cognitive limitations that limit their capacity to assimilate new information.[16]

Consumers do not make rational decisions: Short-term impulses trump long-term goals

Why do people eat more than is good for them? Why do they buy foods whose consumption, at least in large amounts and over long periods of time, is not beneficial for them? Behavioural economics explains that in their purchasing and eating decisions, people systematically deviate from the kind of rational economic behavior postulated by neoclassical explanatory models. Indeed, in many instances, consumers behave in a systematically irrational way.[17]

According to behavioural studies, in the search phase of purchasing (thus, prior to the actual purchase) at least three *anomalies* can arise, including (1) selective perception; (2) decisions based upon past experiences; and (3) conclusions based on the way information is presented (also known as *framing effects*). The moment of purchase is itself influenced by several anomalies. These include the *source effect*; the *anchoring bias* (i.e. when information presented early on is weighted more heavily than the rest); the overestimation and underestimation of one's own behavior; excessive self-certainty regarding one's own judgment based upon a single chance success; and, finally, a similar, systematic misestimation of risks.[18] Further anomalies relate to *herd behavior,* which refers to peer pressure from family and friends.[19]

Behavioural economics has demonstrated that the environment where decisions are made has a large impact upon decision behavior. Examples of this are foods that are seductive based upon their shelf position, their packaging, or their rapid accessibility (such as frozen dinners).[20] The majority of preferences are first formed at the moment of a purchase decision, which indicates that there is a significant potential to influence the consumer.[21]

In addition, people would rather make decisions based on short-term impulses rather than long-term goals. In this regard, behavioural economics speaks of *hyperbolic discounting,* meaning that consumers easily discount the future in the interests of the here and now.[23] Thus, the negative consequences of consuming excessive carbohydrates are often subtle and only become manifest years later (e.g. when one contracts diabetes). By contrast, short-term need-fulfillment typically generates significantly stronger behavioural impulses.

Of course, consumers employ their own personal strategies to combat their irrationality, such as self-control. Educated and health-conscious consumers may react to a loss of control by imposing mechanisms of self-restraint, e.g. by joining a nutritional counseling group.[23] A major factor in changing consumer behavior is for rewards and punishments to become clearly associated with the act of eating. This may help consumers to overcome present-biased preferences (such as the need for sweets).[24] An element that is especially problematic from the perspective of behavioural economics is the repetitive experience of *mistaken* purchasing decisions. This occurs when consumers realise that they have not acted in accordance with their own rational, long-term behavioural preferences (for example, by neglecting fat content). Such experiences of failure decrease self-confidence and the capacity for self-control, and over multiple repetitions can turn into a self-fulfilling prophecy.[25]

From the observations described above, behavioural economics would draw the conclusion that additional information would only have a limited effect on decision-making or self-control. Behavioural economics differentiates between reflective, rational action on the one hand and intuitive, learned patterns of thought and choice on the other – in the latter case, people are especially resistant to new information. In the purchase of foodstuffs, it is clear that people often act intuitively and based on habit.

What would behavioural economics recommend?

With regard to the practical problems of communicating information, behavioural economics would conclude that a great deal depends on how governmental nutritional-labelling regulations are ultimately conceived. Experts in the field

of behavioural economics suggest that you should provide information in a simple but emphatic way in order to achieve a desired behavioural change.[26]

Behavioural economics states that in order to help pave the way for individuals to pursue their best self-interests and the good of the entire society, goals must remain transparent and the individual must always retain the option of opting out of the government measure (i.e. we should pursue a form of *soft paternalism)*. From this perspective, it is impossible to say with certainty which system of nutritional labelling is preferable. However, experts in behavioural research would likelier prefer a colored traffic light over the colorless dietary data because traffic lights have a greater signaling effect and they communicate a simple, easily understandable message.

Conclusions

Health data show that eating behavior in Germany is not satisfactory. It is essential to expand public understanding of nutrition and health, and it is of greatest priority to improve eating behavior given the high social costs of overweight and bad nutrition. The mandatory labelling of nutrient levels should help consumers to become better informed about the quality of foodstuffs and to make more health-conscious purchases.

In the contentious debate between the GDA and traffic-light models, it should first be emphasised that the GDA model more strongly emphasises supplier freedom of choice, competition, and nutritional education. By contrast, the traffic light model primarily underscores the consumer policy goal of preventing consumers from being misled. In addition, it embodies the health policy goal of promoting a more health-conscious choice of foodstuffs.

Some experts are forcefully opposed to a color-coded scheme for nutrient value information. They argue that traffic light labelling does not provide consumers with any clear buying strategy, and would instead tend to promote conflicted decisions. They argue that foodstuffs might end up simultaneously displaying red, yellow and green lights. However, this ambiguity is also true of the GDA system.

Other experts suggest that the battle about symbols and colors is ultimately irrelevant, since there are many causes of unhealthy lifestyles and overweight and the graphic configuration of nutritional labels will certainly not have any negative effects upon consumers. Consumer associations and health care organisations do not share this estimation. They explicitly advocate the traffic light system.

Existing studies cannot provide an unequivocal conclusion about whether the GDA data or the traffic light system would be better at promoting health-conscious purchasing and diet decisions by consumers. Neither model has a clear advantage over the other on this basis. For this reason, in pursuing of a policy decision, it is especially important to consider the insights of behavioural economics. In light of the findings of behavioural economics concerning the actions of real people, policy makers should give preference to a color-coded presentation of nutrient level data and to absolute amounts versus percentage figures. This is especially true if consumer and health policy wishes to also reach naive and poorly educated consumers, and those without an active interest in health. Traffic light labelling sends a clear behavioural signal – and precisely this is of key concern in the consumer and health policy reasoning that is cited for the reform of food labelling.

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1 This aim is stated in general guidelines for nutritional information passed in 1991 at an international level (Codex Alimentarius) as well as in the guidelines for nutrition-related information that have been in place since 1997.

2 This took place in connection with Directive 84/450/EEC of the Council of 10 September 1984 on misleading and comparative advertising.

3 In March of this year the Committee on the Environment, Public Health, and Food Safety (ENVI) recommended the GDA model to the European Parliament. Nevertheless, many member of the Committee indicated their preference for a hybrid model that combines the traffic light and GDA information. The Parliament is not bound to adopt the Committee's recommendation. The Directive is supposed to define general rules for displaying information, but

stipulate a special system. The right of member states to use their own labelling standards is also to be preserved, provided these standards don't contravene EU rules.

4 The discussion in this regard is based on the debate between German proponents. Nevertheless, it largely reflects the EU debate.

5 See the Bund für Lebensmittelrecht und Lebensmittelkunde (BLL), Federation of German Food and Drink Industries (BVE), Federation of German Industries (BDI), and German Retail Federation (HDE), and Markenverband: *Gemeinsame Erklärung zur Ampeldiskussion – Fakten statt Populismus – Absage der Wirtschaft an die Kehrtwende in der Politik zur Nährwertkennzeichnung von Lebensmitteln*. 29. May 2008. The German Food, Beverages, and Catering Union (NGG) fears that traffic light labelling could lead to job losses in its sector.

6 The German Nutrition Society (DGE) criticises the traffic light and GDA models: *Stellungnahme der Deutschen Gesellschaft für Ernährung zur erweiterten Nährwertinformation auf der Basis des „1 plus 4"–Modells*. On the subject of the GDA model, see the DGE statement titled *Stellungnahme zur Anwendung von „Guideline Daily Amounts" (GDA) in der freiwilligen Kennzeichnung von Lebensmitteln* 2008.

7 Open letter from the Federation of German Consumer Organisations (Vzbv) of 1 Feb. 2010; VzBv of 7 May 2010: Letter to the German Federal Ministry of Food, Agriculture, and Consumer Protection (BMELV) concerning the foodstuffs directive.

8 Press release of the SPD Bundestag fraction's Working Group on Nutrition, Agriculture, and Consumer Protection, 2009; Green party Bundestag fraction, 2009.

9 See e.g. Food Watch: *Die Vorwürfe der Industrie gegen die Ampel.* 2010, http://foodwatch.de/kampagnen__themen/ampelkennzeichnung/10_argumente/index_ger.html.

10 In many countries there is simply a lack of practical examples. In addition, there are considerable problems of attribution. See the second article in this Weekly Report.

11 For example, the industry guideline allowance for sugar is 90 grams per day, whereas the WHO allowance is 60 grams per day. For the D-A-CH guidelines, see www.dge.de/modules.php?name=News&file=article&sid=920.

12 We are speaking in this case of the definition of goods in transactional economics. In the case of experience goods, the quality is first discernable through experience and learning after purchase (i.e. a visit to a restaurant). In addition, there are also credence goods, for which it is not possible to determine quality even after purchase (i.e. medications), see Nelson, M. P.: Information and Consumer Behavior. In: *Journal of Political Economics* 78, 1970, pp. 311–329; Hagen, K., L. A. Reisch: Riesterrente: Politik ohne Marktbeobachtung. *DIW Wochenbericht* 8/2010.

13 Caswell, J. A., D. I. Padberg: Toward a More Comprehensive Theory of Food Labels. In: *American Journal of Agricultural Economics*, Vol. 74, No. 2, 1992, pp. 460–468. The labelling of goods is a policy instrument for addressing informational uncertainties faced by the consumer. This can take place in various forms for various product characteristics. It can also be regulated by the government or occur voluntarily by the manufacturer.

14 For more on promoting the ability of consumers to make good decisions, see Piorkowsky, M.-B. et al.: *Verbraucherkompetenz für einen persönlich erfolgreichen und gesellschaftlich verantwortlichen Konsum.* Statement of the Scientific Council for the German Federal Ministry of Food, Agriculture, and Consumer Protection (BMELV), 2008.

15 Virtually all of us have read at least once that the consumption of fruit can help to prevent illnesses such as cancer. Yet articles that question this conclusion are also not uncommon.

16 Most people can absorb and process a 7 +/-2 "information chunks," see Miller, G.: The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information. In: *Psychological Review* 63, 1956, pp. 81–97.

17 For a detailed account of the various anomalies, see Hagen, K., L.A. Reisch, ibid., 6.

18 One example of a behavioural anomaly that occurs systematically is the tendency to put off changes in behavior that are perceived as disadvantageous or limiting. This is a form of distorted mental bookkeeping. For example, the thought "eat too much today" is cancelled out by "eat less tomorrow" – the actual limitation of behavior is then put off with each passing day. The Eurobarometer shows that very few people are risk conscious when they go food shopping, see

www.eufic.org/jpage/de/page/JSURVEY/surid/2.

19 Baumeister, R. F., E. A. Sparks, T. F. Stillman, K. D. Vohs: Free will in consumer behavior: Self-control, ego depletion, and choice. In: *Journal of Consumer Psychology* 18, 2008, pp. 4–13.

20 Product manufacturers have exploited these phenomena in their advertising for many years: see e.g. Warmbier, W. *Der programmierte Kunde: Neuromarketing – Frontalangriff auf unsere Sinne.* 2008.

21 The majority of preferences are constructive, as they are first formed at the time of purchase. Such preferences are dependant on the context, can change quickly, and are easy to manipulate. The placement and presentation of a product plays a major role in which product will be chosen. A difference is drawn between such preferences and so-called inherent preferences that are independent from the decision-making context, stable over the long term, based on that which has been learned, and are partially explained by genetic disposition. The relative influence of constructive and inherent preferences is a matter of ongoing debate.

22 Benabou, G. S., J. Tirole: Willpower and Personal Rules. In: *Journal of Political Economy* 112(4), 2004, pp. 848–886.

23 For example, when on a Weight Watchers diet, participants must adhere to strict eating plan, and eating behavior is monitored and controlled by regular weighing, group support, and reward mechanisms.

24 Thaler, R. H., S. Benartzi: Save More Tomorrow: Using Behavioural Economics to Increase Employee Saving. In: *Journal of Political Economy*, 112(1), 2004, pp. 164–187. A current US study shows that individuals who want to reduce their weight and who have strong present-biased preferences are less frequently successful at dieting than individuals who have weaker present-biased preferences. Another mechanism – so-called mental editing, i.e. the modification of memories – is at work here. It is a strategy for protecting the psyche and ensures that internal reputation mechanisms are not undermined or become ineffective.

25 Kim, J. Y.: Hyperbolic discounting and the repeated self-control problem. In: *Journal of Economic Psychology* 27, 2006, pp. 344–359.

26 Cutler, D. M., E. L. Glaeser, J. M. Shapiro: Why Have Americans Become More Obese? In: *Journal of Economic Perspectives* 17(3), 2003, pp. 93–118; Sunstein, C. R., R. H. Thaler: Paternalism Is Not An Oxymoron. In: *The University of Chicago Law Review* 70(4), Fall 2003, pp. 1159–1202; Sunstein, C. R., R. H. Thaler: Nudge: Improving Decisions About Health, Wealth, and Happiness. New Haven 2008.