



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# Nutrition and health claims – call for and justification of governmental intervention from the consumers' perspective

## Nährwert- und gesundheitsbezogene Angaben über Lebensmittel – Notwendigkeit und Rechtfertigung einer staatlichen Regulierung aus Konsumentensicht

Monika Hartmann, Anne Katrin Lensch, Johannes Simons and Sylvia Thrans  
University of Bonn

### Abstract

In December 2006 the Regulation (EC) No. 1924/2006 on the use of nutrition and health claims (NHCs) on foods was enacted in order to prevent consumer deception and to harmonise law within the EU. Against this background, this paper analyses the potential costs and benefits linked with NHCs and the necessity for governmental intervention to regulate NHCs within a theoretical and empirical framework.

The theoretical investigation shows that NHCs can induce direct economic effects as well as spillover effects in the market of information. Whether those effects are beneficial or adverse depends on the truthfulness of the NHCs, and consumers' perception and processing of such claims. As self regulatory forces of the market might not be sufficient to prevent market failure due to fraudulent claims, governmental intervention seems necessary. An analysis of the EU Regulation on NHCs reveals that this law focuses on preventing the authorisation of false or misleading claims. It is less concerned with not authorising a true and correctly understood claim.

The results of the empirical analysis which is based on a standardised consumer survey reveal that the stated impact of NHCs on product perception considerably differs among consumers. While e.g. some consumers feel misled by NHCs on products with a negative nutrient profile such as candies, others point out that such claims have no impact on their product perception or even help them to make better choices. The results also indicate that the great majority of consumers is opposed to a ban of NHCs on products with a negative nutrient profile such as candies and salt.

### Key words

nutrition and health claims; consumer deception; information economics; market transparency; consumer protection policy

### Zusammenfassung

Zur Verhinderung der Irreführung von Verbrauchern und zur Harmonisierung des europäischen Rechts wurde im Dezember 2006 die Verordnung (EG) Nr. 1924/2006 zur Regelung nährwert- und gesundheitsbezogener Angaben (NGAs) über Lebensmittel erlassen. Vor diesem Hintergrund erfolgt im vorliegenden Beitrag eine Analyse der potenziellen Kosten und Nutzen von NGAs. Darüber hinaus wird die Notwendigkeit einer staatlichen Regelung zur Verwendung von NGAs innerhalb eines theoretischen und empirischen Rahmens untersucht.

Die theoretische Analyse zeigt, dass NGAs sowohl direkte ökonomische als auch externe Effekte auf dem Informationsmarkt induzieren können. Ob diese Wirkungen positiv oder negativ sind, hängt von der Richtigkeit der NGAs sowie von ihrer Wahrnehmung und Verarbeitung durch die Konsumenten ab. Da die Selbstregulierungskräfte des Marktes Marktversagen infolge falscher Angaben nicht grundsätzlich verhindern können, erscheint die Notwendigkeit eines staatlichen Eingriffs gegeben. Die Analyse der EU-Verordnung

macht deutlich, dass der Fokus auf der Verhinderung einer Zulassung falscher und irreführender Angaben liegt. Negative Folgen einer unterlassenen Autorisierung wahrer und richtig verstandener Angaben findet in der Gesetzgebung weniger Beachtung.

Die Ergebnisse einer standardisierten Konsumentenbefragung zeigen ein sehr differenziertes Bild im Hinblick auf den Einfluss von NGAs auf die Produktwahrnehmung. Während ein Teil der Konsumenten das Gefühl hat durch NGAs auf Produkten mit einem negativen Nährwertprofil wie Bonbons irreführt zu werden, geben andere an, dass entsprechende Angaben keinen Einfluss auf ihre Produktwahrnehmung haben bzw. ihnen helfen, eine bessere Wahl zu treffen. Darüber hinaus weisen die Ergebnisse darauf hin, dass die große Mehrheit der Konsumenten gegen ein Verbot der Verwendung von NGAs auf Lebensmitteln wie Bonbons (16 %) und Speisesalz (3 %) ist.

### Schlüsselwörter

nährwert- und gesundheitsbezogene Angaben; Verbraucherirreführung; Informationsökonomik; Markttransparenz; Verbraucherschutzpolitik

## 1. Background and objective

The variety of claims emphasising special food ingredients (nutrition claims, NCs) or the impact of food on health (health claims, HCs) has increased within labelling as well as advertising. As consumers become more interested in their diet and its relationship to health this development seems to meet consumers demand for information. However, consumers can only benefit from nutrition and health claims (NHCs) if those claims are correct, complete and well perceived. To provide a high level of consumer protection with respect to NHCs and in order to harmonise the rules for using such claims at Community level, the European Commission adopted the Regulation (EC) No. 1924/2006 on NHCs used in the labelling, presentation, and advertising of food in December 2006.

Against this background, the paper analyses the opportunities and risks of NHCs for the performance of food markets and the necessity for governmental intervention to regulate NHCs within the framework of information economics (section 2). Section 3 deals with the EU Regulation (EC) No. 1924/2006 on NHCs, discussing its main elements as well as evaluating the possible costs and benefits associated with this Regulation. This theoretical perspective is complemented by an empirical analysis (section 4) based on a standardised consumer survey. In the final section of the

paper (section 5) conclusions and policy implications are presented.<sup>1</sup>

## 2. Analysis of NHCs from the perspective of information economics

Information economics explores the extent to which markets and other institutions process and interchange information and how information affects economic decisions. Particular interest is given to situations with information asymmetry (MACHO-STADLER and PÉREZ-CASTRILLO, 2001). Therefore, this branch of economics provides the adequate theoretical background for analysing the effects of information given by NHCs to consumers.

### 2.1 Effects of NHCs on market transparency

Market transparency is a fundamental precondition for the functioning of a free market economy. Consumers can choose products according to their preferences and as a result maximise utility. Advertisement can enhance market performance by transferring useful information to consumers (IPPOLITO and PAPPALARDO, 2002: 130ff.).

However, the possible<sup>2</sup> benefits of advertisement can only accrue if the following three conditions hold: (1) advertising is truthful, (2) (some) consumers notice and (3) are capable to correctly process, and comprehend the provided information.

With respect to the truthfulness of information on product characteristics, theory and empirical research on the economics of information, reveal that fraudulent advertising is most likely and most harmful in case of credence attributes (e.g. RUBIN, 2000: 272). NCs and HCs are credence attributes: NCs refer to the specific composition of foods<sup>3</sup> and it takes a lot of equipment and knowledge to verify the information. HCs relate to the impact of food consumption on health, but there are manifold interdependent factors that influence the status of health and it is hardly possible to detect and isolate the effect of a specific food. Due to the difficulties in controlling NHCs there is room for fraudulent information. The claimed composition of the food may be wrong or the positive impact on health may not exist. Both kinds of fraud can be classified as objective delusion which means that the information does not comply with reality (KROEBER-RIEL and WEINBERG, 2003: 286).

Perception and processing of claims modifies their influence on market transparency on an individual basis, and thus general statements on the impact of NHCs are no longer possible because information processing varies between consumers. Precondition for a claim to have an effect is that it is noticed by consumers. Thus, false information only worsens market performance if it causes consumers to have false beliefs (e.g. ATTAS, 1999: 50; CARSON et al., 1985: 50ff.).<sup>4</sup> Hence (some) consumers will not be deceived by false claims because they ignore or substantially discount the information as several studies reveal (GARRETSON and BURTON, 2000: 214ff.; DARKE and RITCHIE, 2006; FRIESTAD and WRIGHT, 1994; FORD et al., 1990).

In addition, literally true claims might deceive consumers if they induce a wrong impression of reality in the minds of individual consumers (e.g. BEALES et al., 1981: 496ff.; ATTAS, 1999: 49; CARSON et al., 1985: 93ff.; KROEBER-RIEL and WEINBERG, 2003: 286). Some examples may illustrate different ways of so called subjective delusion.

- A producer claims a product as “90% fat-free”. But 10% fat is a high fat content for the majority of products. If consumers infer from such a statement that the product has a low fat content, this truthful claim is regarded as deceptive (halo-effect, TROMMSDORFF, 2004: 282).<sup>5</sup>
- A claim on salt with added folic acid advertises that folic acid lowers the risk of cardiovascular diseases. This kind of claim is sometimes regarded as deceptive since it fails to disclose that salt increases the risk of high blood pressure (deception by omission, RUBIN, 2000: 280ff.).
- A claim on jelly beans states that the product is fat-free. This claim is true; however, it is true for all products of jelly babies (deception by false uniqueness, BEALES et al., 1981).

Therefore, the potential of NHCs to improve market transparency and thus market performance is only realised if the claim is true and causes true beliefs. Otherwise market performance is not influenced, or even worsened. As consumers perceive and process information differently, the impact of specific information on market transparency can only be analysed on an individual basis.

### 2.2 Potential costs and benefits of NHCs

NHCs can induce beneficial or adverse effects regarding two different dimensions: direct economic effects and spill-over effects on the market for information.

Direct economic benefits emerge because truthful and correctly understood claims increase the efficiency of purchase decisions, e.g. by providing consumers with information that may enable them to improve their diet by eating more of the healthier foods and less of the foods most likely to cause serious health problems. This is equivalent to an increase in consumers' utility.<sup>6</sup> In addition, market per-

<sup>1</sup> Though ‘harmonisation of the rules for using NHCs’, is mentioned as a central objective of the Regulation (EC) No. 1924/2006, this objective will not be dealt with in the paper.

<sup>2</sup> We use the term “possible”, since even advertisement that is truthful, complete and well perceived may not induce any benefits to (some) consumers since they might not at all be influenced in their action by the advertisement. It is well known that consumers' behaviour with respect to food is influenced by a multitude of determinants of which information is one (KROEBER-RIEL, WEINBERG, 2003: 120; KROEBER-RIEL, ESCH, 2004: 74).

<sup>3</sup> Although nutrition claims do not predicate a positive impact on health, consumers perceive them like implicit health claims. The reason is that consumers know about the impact of the nutrient on the body or, at least, they assume a positive effect (NATIONAL CONSUMER COUNCIL, 1997: 32; FOOD STANDARDS AGENCY, 2002: 32).

<sup>4</sup> Unlike lying which is only the attempt in causing someone to cause a false belief deception implies success in doing so. Thus, deception is an outcome concept while lying is not (e.g. ATTAS, 1999: 50; CARSON et al., 1985: 50ff.).

<sup>5</sup> Empirical evidence affirms a halo-effect in case of HCs on food as well (ROE et al., 1999).

<sup>6</sup> In addition, diet related costs to society might be reduced, inducing positive welfare effects to society as a whole. As

formance is enhanced since the opportunity to advertise special food ingredients or a positive impact of food on health enables firms to tailor their products to the needs of consumers (RUBIN, 2004; CALFEE and PAPPALARDO, 1991: 40; MURIS, 1991: 118; MATHIOS and IPPOLITO, 1999; CALFEE, 1997: 26). Direct economic costs arise if consumers believe in false or deceptive NHCs. They may pay higher prices for products with such claims, sacrifice taste or convenience without gaining a health benefit, eat too much of the product they regard as healthy or even leave out a necessary medical treatment (CALFEE and PAPPALARDO, 1991: 37ff.; CARSON et al., 1985: 99ff.). Moreover, direct economic costs occur if the truthfulness of claims can not be verified and if the health value of the advertised food product can not be identified by consumers, respectively. Referring to AKERLOF (1970) this can lead to market failure so that only low quality products (food with no or false claims) are sold even though consumers are willing to pay higher prices for high quality products (products with truthful claims) ('Lemon' problem).

In addition, substantial beneficial spillovers can be expected from NHCs for the information market. The most obvious benefit is the reduction of consumers' costs for obtaining nutrition and health information. Empirical evidence reveals that disseminating health and nutrition information by NHCs can fill a gap in the coverage of consumer information: Especially consumers that do not use traditional sources of nutritional and health advice can be reached by NHCs and be encouraged to change their diet (MATHIOS and IPPOLITO, 1999: 193ff.; MURIS, 1991: 117; CALFEE and PAPPALARDO, 1991: 39; ALDRICH, 1999: 13ff.). From that point of view advertising may be a completion rather than a substitute to public nutritional information programmes (ALDRICH, 1999: 12). Thus, NHCs can result in more knowledge about the linkages between food and health, thereby increasing the demand for and supply of healthier food innovations (RUBIN, 2004; CALFEE and PAPPALARDO, 1991: 40; MURIS, 1991: 118; MATHIOS and IPPOLITO, 1999; CALFEE, 1997: 26).

But, NHCs can also induce negative spillover effects on the information market. If consumers rely on NHCs they may substitute information from private or public experts by advertisement that is primarily intended to influence purchase behaviour in favour of the promoted product (CALFEE and PAPPALARDO 1991: 38). Even if the claim is true, consumers may come to a decision based on incomplete information (deception by omission).

Other negative effects on the information market accrue if the prevalence of false NHCs reduces the credibility of true claims (RUBIN, 2000: 278ff.; BEALES et al., 1981: 506; CALFEE and PAPPALARDO, 1991: 38; CARSON et al., 1985: 100ff.; DARKE and RITCHIE, 2006) and the overall level of trust in NHCs and thus impedes the dissemination of true claims (CARSON et al., 1985: 100; DARKE and RITCHIE, 2006). Empirical studies dealing with the credibility of advertising give evidence for the relevance of such negative spillover effects (e.g. CALFEE, 1997: 37; CALFEE and PAPPALARDO, 1991: 38, FORD et al., 1990).

---

those costs are estimated to be considerable and sharply increasing this effect is of great relevance (e.g. LOUREIRO, 2004; FINKELSTEIN, FIEBELKORN and WANG, 2003).

## 2.3 Self regulatory forces of the market

The negative effects of deception can be avoided by market forces if consumers are able to determine the truthfulness of claims by screening the market and/or if firms have the opportunity to credibly signal the truthfulness of their claims (KAAS, 1991).

With respect to the former, consumers will seek additional information until the cost of continued searching exceeds the utility of the information obtained (TIETZEL, 1988: 25). In case of NHCs, however, an individual consumer cannot screen claims at reasonable costs or access the impact of food on health. Thus, consumers can hardly verify the truthfulness or falseness of nutritional and health advertisement of a specific food even if they consult so called 'experts', whose credibility varies as well (ALDRICH, 1999: 2; LENSCH, forthcoming). As a consequence, the scope to overcome the malfunctioning of markets in the case of NHCs by screening is limited.

The second group of endogenous market mechanisms to reduce the costs of wrong claims are signalling measures. Though producers are primarily interested in signalling positive and holding back negative information regarding their products, economic models of voluntary information disclosure indicate that competitive markets will provide the required information and prevent deception. According to GROSSMANN (1981: 652), all sellers have an incentive to disclose the relevant information except the seller with the lowest product quality, presupposing that consumers are sceptical to products which do not inform about a particular product attribute. As a result, the competition with respect to providing information (unfolding process) leads to supply all positive product information. That also applies to the negative product information, as long as producers are able to promote their product as less negative compared to the others.<sup>7</sup> However, the process of unfolding may be impeded due to the existence of information overload and bounded rationality of consumers. The same holds if firms possess market power. In this case, NHCs could even enhance that market power leading to an even stronger exploitation of consumers at least in the short run (CALFEE and PAPPALARDO, 1991: 37; ALDRICH, 1999: 12; IPPOLITO and PAPPALARDO, 2002: 140 et. seq.; GOLAN et al., 2000: 7ff.).

As NHCs are credence attributes that cannot be verified by consumers, their credibility needs to be supported by complementary signals. Such measures are for example (see also LENSCH, forthcoming):

- Investments in establishing reputation, brand names or trademarks which can serve as a kind of guarantee for consumers since the firm loses at least part of the value of these investments if consumers e.g. eventually discover that the quality is not satisfactory or that claims are false (RUBIN, 2000: 279; RUBIN, 2004). Thus, reputation, brands and trademarks may help to overcome the problem of lemon markets (SCHÖLLING, 2000: 110; THRAMS, forthcoming).<sup>8</sup>

---

<sup>7</sup> IPPOLITO and MATHIOS (1990: 430) exemplified in their investigation of the margarine and butter market that all but the worst products voluntarily provide complete information.

<sup>8</sup> However, it should be noted that an American study could not provide evidence that a favourable reputation of a food seller

- Certification of NHCs by third parties which assures consumers that the information provided by manufacturers is accurate (GOLAN et al., 2000: 9). Although such signals can provide valuable information, they are still linked to two problems. (1) a certification system will only be established if the willingness to pay for a certified product is high enough to cover the costs of certification, monitoring, and enforcement. (2) since consumers are not able to verify the truthfulness of the assumed “independent” entities, the problem of information uncertainty, though reduced, cannot be completely eliminated (HAUCAP and SCHMIDT, 2002: 6; GOLAN et al., 2000: 9ff.).

Despite the existence of endogenous market mechanisms dealing with the negative spillover effect on the market for information due to false or misleading NHCs, market failure may still occur. Therefore, governmental regulation seems necessary.

### 3. Economic analysis of the EU Regulation (EC) No. 1924/2006 on NHCs made on foods

Existing governmental regulations with respect to NHCs differ not only considerably between countries (WHO, 2004: 11ff.) but also have changed significantly in different countries over time (e.g. IPPOLITO and PAPPALARDO, 2002: 86ff.). In the EU the ruling of NHCs was left to the national governments until July 2007 when an EU Regulation on the use of NHCs on food was applied. Though the Regulation covers textual, pictorial, symbolic and graphic NHCs, the provisions predominantly focus on the wording of claims. In this section the main elements of this Regulation will be presented and analysed with respect to its impact on market transparency and economic welfare.

#### 3.1 Preventing objective consumer delusion

One central objective of the nutrition and health claims Regulation (EC) No. 1924/2006 of the EU is to reduce objective consumer delusion. To achieve this, NHCs are only allowed if based on scientific evidence. Consequently, non-specific health and well-being-related claims are banned if not accompanied by an authorised specific claim. In addition, claims which suggest that health could be affected by not consuming a food product are prohibited.

The following procedure was implemented to restrict the use of HCs in order to prevent objective consumer deception:

- A community list of permitted health claims<sup>9</sup> – which in the literature are referred to as Structure Function Claims (e.g. IFT EXPERT GROUP, 2005) – will be adopted. The list can be updated according to new scientific results. Claims on this list can be used by all food marketers if their products meet the standards.
- A specific authorisation procedure was implemented for claims that refer to the reduction of a disease risk and for claims regarding childrens’ development and health. The

European Food Safety Authority (EFSA) is proposed to act as the autonomous scientific institution to control the validity of these claims and to authorise their use on the basis of data provided by the applicants. The claim is designed as a proprietary claim. It cannot be used by other producers until the end of a five-year period unless the claim is approved based on their own scientific data.

However, scientists are rarely able to prove a causal link between diet and health since “controlled” experiments on nutrition are hardly possible, and in addition often open to different interpretation. Thus, expert consensus on the health effects of food are likely difficult to obtain (CALFEE and PAPPALARDO, 1991: 43ff.; IPPOLITO and MATHIOS, 1990: 432ff.; IFT EXPERT GROUP, 2005). Therefore, within the implemented authorisation process, two possible errors – Type 1 and Type 2 error – can emerge (RUBIN, 2004; CALFEE and PAPPALARDO, 1991: 41ff.). As figure 1 illustrates, a Type 1 error occurs if the use of a false claim is approved. Since false claims potentially distort the market for products and information authorising them leads to societal welfare losses. However, the regulatory body may also err by not allowing a truthful claim and make a Type 2 error. In this case, a possible rise of consumer utility as well as the positive spillover effects on the information market cannot be realised, thus leading to societal welfare losses, too.

**Figure 1. Errors in approving NHCs and their effects on welfare**

		False claim	True claim
Decision	Ban	Right decision = welfare gains	<b>Type 2 error</b> = welfare losses
	Authorisation	<b>Type 1 error</b> = welfare losses	Right decision = welfare gains

Source: own illustration

Attempts to reduce the probability of wrong decisions have to consider the following interdependencies:

- Anything that reduces the chance of committing a Type 1 error will increase the probability of committing a Type 2 error and vice versa for a given amount of information.
- The only way to reduce the chance of both types of errors is to gather additional information. But additional substantiation leads to additional research costs and to a change in the profitability of products with health impact. Therefore the higher the burden of substantiation, the higher the risk for producers, the less claims will be made and the fewer products will be developed.<sup>10</sup> Taking this into account, the request for more scientific proof might induce the same kind of welfare losses as the Type 2 error.

leads to an increased credibility of HCs perceived by consumers (CAUDILL, 1995: 193).

<sup>9</sup> Health claims other than those referring to the reduction of disease risk and to childrens’ development and health.

<sup>10</sup> IPPOLITO and PAPPALARDO (2002) reveal for the US that there is a statistically significant relationship between the regulatory framework for health claims and their use. In addition, PARKER (2003) showed in an empirical study covering the period 1998 and 2000 that HCs were almost of no relevance in the US. He explains this result with the stringent guidelines and the lengthy FDA approval process at that time.

- Even if firms decide to further invest in proving a claim, the level of substantiation affects consumers if useful information about potential health effects of a product is not available. In this case, at least for a limited period of time the effects of the Type 2 error occur. As a consequence, the decision not to act until more information is available is still a decision with effects on product and information markets and thus on societal welfare (CALFEE and PAPPALARDO, 1991: 42; RUBIN, 2004: 7ff.).

From an economic perspective, policy making should attempt to maximise expected utility and to minimise expected total costs of a decision, respectively (RUBIN, 2004: 8). Given that the costs of Type 1 and Type 2 errors differ considerably for different claims the optimal required probability that a claim is true can vary from close to zero to almost one (CALFEE and PAPPALARDO, 1991: 41). Thus, from a theoretical perspective flexibility in the level of substantiation is required weighting the potential benefits of true claims against the potential costs of false claims case by case. But in practice measuring costs and benefits including those due to the spillover effects on overall trust in NHC for each case or even for groups of cases is hardly possible.<sup>11</sup> Even labelling the degree of scientific certainty for approved health claims as practised in the US since 2003<sup>12</sup> may be too sophisticated for many consumers (MASON et al., 2007; EDCOMS, 2007).

### 3.2 Preventing subjective consumer delusion

The EU Regulation seeks to prevent objective delusion, and thus attempts to strengthen market transparency on the first level, as well as subjective consumer deception, and hence seeks to improve market transparency on the second level, with respect to NHCs by several provisions:

- The use of NCs and HCs in the form of Structure Function Claims is bound to the declaration of information regarding, e.g., a statement indicating the importance of a balanced diet and healthy lifestyle on the product labels.<sup>13</sup> Beyond this, in the case of a reduction of disease risk

claim a statement has to be provided “indicating that the disease to which the claim is referring has multiple risk factors and that altering one of these risk factors may or may not have a beneficial effect” (Regulation (EC) No. 1924/2006).

- NCs are only allowed if the products meet standards that are defined in the Annex of the Regulation. These standards refer to the presence, absence or reduced content of a nutrient in a food, e.g. the NC ‘reduced fat’ may only be made where the reduction in content is at least 30% compared to a similar product.
- Claims referring to weight loss and to recommendations of individual doctors or health professionals are prohibited, as well as nutrition claims that compare nutrient contents between different product categories.
- The use of HCs on alcoholic beverages<sup>14</sup> and of NHCs in case of a nutrient profile deemed to be negative for health is strictly limited.

However, the intended aim of these provisions to prevent subjective delusion might not be achieved. In addition, the first level of market transparency can, as a negative side effect, be reduced. This will be illustrated by the following examples.

With additional information buyers shall be enabled to assess the claim in an adequate context of e.g. a balanced diet and a healthy way of living. This way, the Regulation attempts to stop ‘deception by omission’. However, a more adequate understanding of the claims only happens if consumers perceive and process the additional information at all. Under the constraints of bounded rationality (SIMON, 1972; KROEBER-RIEL and WEINBERG, 2003: 380ff.; KROEBER-RIEL and ESCH, 2004: 190) consumers only use a minor part of the large amount of available information. This especially holds for low involvement purchase decisions in case of fast-moving consumer goods (KROEBER-RIEL and ESCH, 2004: 148). In fact, experimental studies reveal that disclaimers often do not reach their intended objectives and can even cause additional problems (see e.g. EDCOMS, 2007; WILLIAMS, 2006). Furthermore, the request to provide additional information and the use of specific wording may reduce the effectiveness of a claim as a marketing tool and the incentive for producers to use HCs. Thus, requiring disclosures can lead to less information and thereby to a decrease in market transparency on the first level. In addition, incentives for a firm to invest in healthy product innovation are reduced. Policy must consider this trade-off (IPPOLITO, 2004: 950).

Limiting the use of NHCs on products with negative nutritional profiles aims at reducing biased perception and bringing purchase decision and food consumption more in line with scientific dietary recommendations. But NHCs in case of foods that have negative attributes do not necessarily mislead consumers partly because consumers assume advertising as incomplete and biased in general (CALFEE and PAPPALARDO, 1991: 46). Taking the frame of Type 1 and Type 2 error, the following effects have to be considered: costs linked to error Type 1 arise if a claim is authorised and leaves (some) consumers to hold a false belief

<sup>11</sup> Furthermore, according to an empirical investigation with 637 adult consumers which was conducted in Germany in December 2006, the majority of the interviewees (65%) state that manufacturers should be free to advertise with reduction of disease risk claims (RCs) only if claims are substantiated by commonly accepted scientific data. This indicates that a relevant share of consumers benefits from state approval and attaches great importance to the prevention of Type 1 errors (THRAMS, forthcoming).

<sup>12</sup> In the US since 2003 not only health claims for which significant scientific agreement exist are issued by the Food and Drug Administration (FDA) but also so called “qualified” health claims if accompanied by a disclaimer. Besides claims supported by significant scientific evidence three levels of evidence are differentiated, each linked to a specific mandated disclaimer (IFT EXPERT GROUP, 2005).

<sup>13</sup> In addition, a statement is requested regarding the quantity of the food and pattern of consumption required to obtain the claimed beneficial effect and “where appropriate a statement addressed to persons who should avoid using the food and an appropriate warning for products that are likely to present a health risk if consumed in excess” (Regulation (EC) No. 1924/2006). Finally, where NHCs are used nutrition labelling is compulsory.

<sup>14</sup> NCs referring to low alcohol levels or to the reduction of the alcohol content or the energy content will be permitted.



about a product. Foregone benefits associated with error Type 2 emerge for those consumers that correctly understand the claim and miss out on useful information if the claim is banned. Thus, the ban would result in a cutback of information valuable for this group of consumers, and worsens the first level of market transparency. This leads to the core question “How many consumers or what share of consumers must hold a false belief about a product and how inaccurate must that belief be to consider a claim being deceptive”.

According to the EU Regulation, NCs are permitted if only one nutrient exceeds the corresponding limit provided that a statement about the specific nutrient (e.g. ‘High sugar content’) appears in close proximity to the claim. This mandatory disclosure might result in a decreased number of NCs, because if consumers evaluate those products as less healthy (THRAMS, forthcoming; MASON et al., 2007, EDCOMS, 2007), producers are deterred from labelling their products with such claims. Again, the first level of market transparency would be worsened. However, if it is possible to modify product characteristics the provision might also motivate producers to improve the nutrient profiles of their food products to be able to make NCs without labelling the high content of the negative nutrient. In this case, the regulation would induce positive effects on the product and the information market.

The expositions reveal that the probability and the costs of each error are determined by governmental rules of e.g. scientific substantiation of claims, information disclosure, the wording of claims, and restrictions of using claims. As individual differences exist regarding the perception and processing of claims, governing health claims often implies deciding in favour of one group of the population and against another one.

## 4. Perception by the consumers

As Regulation (EC) No. 1924/2006 aims at protecting consumers, an empirical analysis of consumers’ perception of NHCs as well as their evaluation of governmental policies to regulate NHCs was conducted. For this purpose, it is essential (1) to look at the relevance of NHCs for buying decisions. Thus, it is examined whether they are noticed at all and have an influence on market transparency. In addition, the survey addresses (2) the perception and relevance of (non-)governmental control to prevent objective delusion, (3) the relevance of subjective delusion, and (4) appropriate governmental regulation to prevent subjective delusion. To investigate these topics, a standardised questionnaire was developed including questions referring to attitudes in general as well as concrete examples for illustration.

### 4.1 Description of the sample

The face-to-face interviews were carried out in December 2004 by specially trained students of a seminar on NHCs. 814 adult consumers were recruited at public places in the region Bonn/Cologne in Germany. The interviews split up into 50% in urban and 50% in rural areas. The distribution of selected socio-demographic parameters within the sample and the German population is shown in table 1. Comparing the two distributions reveals that older consumers,

**Table 1. Comparison of the characteristics of the sample and the German population (in %)**

Characteristics	Sample (N = 814)	German population (2004)
<b>Gender</b>		
- Male	49	49
- Female	51	51
<b>Age Group</b>		
- 18-34 years	39	25
- 35-54 years	31	38
- 55 years and older	30	37
<b>Household</b>		
- average size	2,42	2,13
- of one person	27	37
- of two persons	36	34
- of three persons	16	14
- of more than four persons	21	15
- without children under the age of 18 years	78	28
<b>Education</b>		
- Qualification for university admission	56	22

Source: own illustration based on survey results and on data of the STATISTISCHES BUNDESAMT (2004)

consumers not qualified for university admission as well as consumers in households with under aged children are underrepresented in the sample.<sup>15</sup> If results differ significantly by the socio-demographic variables, it is pointed-out in the discussion.

### 4.2 Relevance of NHCs

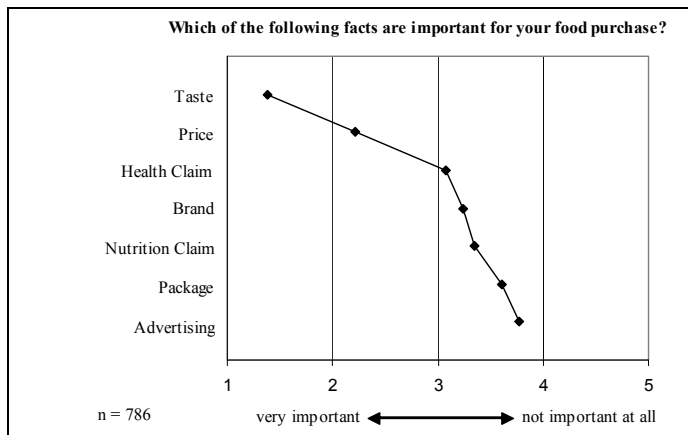
In order to appraise the relative relevance of NHCs, respondents accessed the importance of different characteristics, including NCs as well as HCs on a five point scale. As shown in figure 2, taste is the most important determinant, followed by price. However, food purchases also depend on NCs for 32%, and on HCs for 36% of the interviewees.

To analyse the relevance of health claims more precisely, respondents were requested to state whether they consider HCs in their purchase decisions. Almost half of the respondents state that they do. Among them, the majority is interested in HCs only on certain products and not in general. In contrast, nearly every second respondent declares not to pay any attention to HCs while shopping. Frequently mentioned reasons are disinterest (35% of those disregarding HCs) and disbelief (15% of those disregarding HCs). The latter indicates that market performance can be enhanced by state regulations that reduce the opportunity of fraudulent behaviour and thereby increase trust.

More specifically the relevance of NHCs was analysed in a choice set by presenting four existing candy brands.<sup>16</sup> This

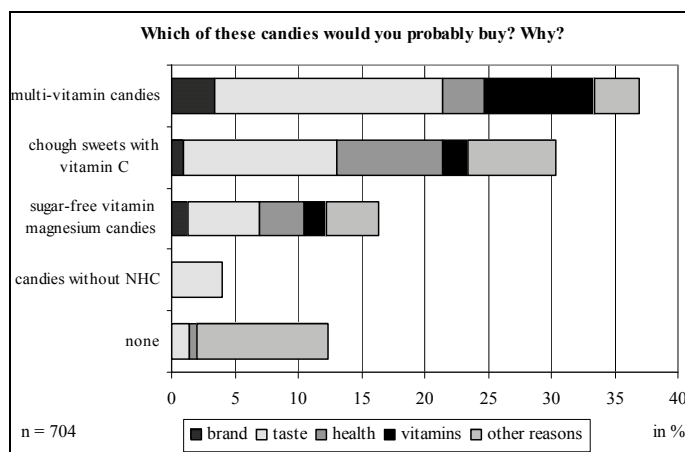
<sup>15</sup> In comparison with the German population the level of income of the sample is lower due to the major group of young consumers (18-34 years).

<sup>16</sup> The choice set consists of the following four products: (1) Granini multi-vitamin candies bearing a nutrition claim “with vitamins”, (2) fit for Fun candies bearing the two nutrition claims “without sugar” and “with mineral nutrients and vita-

**Figure 2. Determinants of food choice (mean values)**

Source: own illustration based on survey results

approach affirms a closer relation to market reality though problems may arise in generalising the results. Interviewees were asked about their disposition to buy one of the products and in an open ended question about the reasons why (figure 3). The results can be summarised as follows:

**Figure 3. Consumers' willingness to buy selected candies and their stated reasons (in %)**

Source: own illustration based on survey results

- Especially candies with multi-vitamins and cough sweets are preferred.
- Taste is most frequently mentioned for the disposition to buy the candy (41%). This holds for each of the four brands.
- 28% of the respondents specify health and vitamins, respectively, as an important reason for their answer.

Variance analyses shows consistency between reasons to buy candies with NHCs and the relevance of NHCs in general: people stating that they would buy candies because of health aspects including the vitamin content, show a significant higher relevance of NHCs in general<sup>17</sup> than people stating reasons like taste or brand ( $p < .001$ ).

mins", (3) Ragolds cough sweets labelled with a NC "with vitamins" and a HC "promotes immune system enhancement" and (4) Storck candies without any nutrition or health claim.

<sup>17</sup> Index calculated from the three mentioned variables (1) importance of HCs, (2) importance of NCs (see figure 3), and (3) consideration of HCs while shopping.

According to theory confidence in the truthfulness of a claim, should increase the relevance of NHCs for buying decisions. As consumers cannot confirm or falsify NHCs at reasonable costs, confidence in the truthfulness of claims was approximated by confidence in HCs made by producers which is in line with the trust building process of signalling described in section 2.3. Respondents were asked to rank their trust in producers' HCs on a five point scale. The results are non-uniform (figure 4): More than 40% of consumers distrust producers rather or strongly. In contrast, only every fifth respondent trusts them. More than one third is unsettled in answering. This is in line with the finding that consumers are in general (more) sceptical against (nutrition and health) claims if they are stated by the food industry and that consumers do not consider NHCs as an unbiased source of health information<sup>18</sup> (FSANZ, 2003: 25; MAZIS and RAYMOND, 1997; MUELLER, 1991; CALFEE and RINGOLD, 1988). As the statement presented to the respondents refers to producers in general, the result does not imply that individual producers cannot reduce or overcome lack of trust by signalling activities.

The influence of "confidence in HCs made by producers" on the relevance of NHCs for buying decisions was tested by a model that includes education, gender and dietary consciousness<sup>19</sup> as additional independent variables. The results of the OLS regression (table 2) reveal that confidence in HCs made by producers has a significant positive influence on the dependent variable "relevance of NHCs in food purchase decisions"<sup>20</sup>. However, the strongest influence stems from consumers' dietary consciousness: the higher the perceived dietary consciousness the higher the relevance of NHCs. Gender and education contribute to the explanation to a lesser extent, but they still are significant on a 1% level. The comparably low  $R^2$  shows that some explanatory variables for the general relevance of NHCs are missed.

### 4.3 Preventing objective delusion: perception and relevance of (non)-governmental control

To ensure the first level of market transparency NHCs have to be truthful. Whether consumers perceive claims as reliable depends not only on their trust in producers but also on consumers' perception regarding (non)-governmental policies to control NHCs. Figure 4 reveals that:

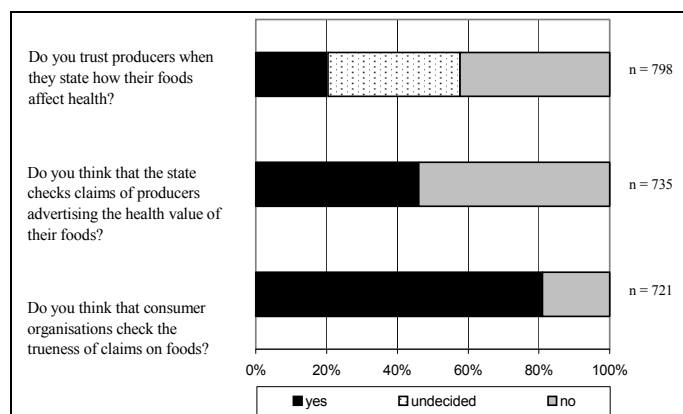
- Every second consumer supposes the state to check HCs and thus already relies on public regulations. Most of

<sup>18</sup> Respondents rather believe in the truthfulness of NHCs than trust in producers who in fact use these claims. As will be discussed later, consumers' expectations of public control (in case of NHCs) might give an explanation.

<sup>19</sup> The explanatory variable "dietary consciousness" is represented by an index of the three selected variables: (1) "How do you appraise your nutritional knowledge?" (five point scale), (2) "Please judge how health-conscious your diet is" (five point scale), and (3) "How many servings of fruit and vegetable do you eat on a normal day?"

<sup>20</sup> The dependent variable represents the index mentioned in footnote 17.



**Figure 4. Trust in producers and (non)-governmental organisations<sup>1</sup>**

<sup>1</sup> Relating to the first statement interviewees were asked for the degree of agreement on a five point scale (from “yes, very much” to “not at all”). The top two boxes were classified as “yes”, the bottom two boxes as “no” and the medium box as “undecided”. With respect to the second and third statement respondents were only given the options “yes” or “no”.

Source: own illustration based on survey results

**Table 2. Multiple regression model for the relevance of NHCs in food purchase decisions**

Explanatory Variables	Not standardised Coefficients	Standardised Coefficients	T-values
(Constant)	0.755***		3.734
Confidence in producers' HCs	0.196***	0.196	6.255
Dietary consciousness	0.642***	0.422	13.134
Gender (female)	0.176**	0.082	2.544
Educational achievement	-0.111**	-0.089	-2.819
Number of observations (n)	761		
R <sup>2</sup>	0.260		
Adjusted R <sup>2</sup>	0.256		

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Source: own illustration based on survey results

them, namely 76%, believe in an inspection before the food enters the market.<sup>21</sup>

- Beyond this, there is faith that consumer organisations control HCs. More than three quarters of the respondents think that consumer organisations do their job in controlling producers.

Thus, the majority of the survey participants believes in inspections of the state and consumer organisations. But, if consumers believe in a control that does not exist, producers get room for fraudulent behaviour.<sup>22</sup>

To secure the reliability of claims, the EU Regulation de-

mands governmental approval of HCs based on scientific evidence. In fact, the majority of consumers would appreciate this. For testing this, interviewees were asked about their willingness to pay if the positive impact on health is proven by the state.<sup>23</sup> Compared to a product priced at 1 Euro, almost two thirds of the consumers indicated an additional willingness to pay of 10 Cents. 43% stated to accept even a higher price for increased certainty.<sup>24</sup> In contrast, every third person is not disposed to pay more. Based on these results, the majority of consumers would benefit from state approval and control of NHCs.<sup>25</sup> This result is confirmed by several other empirical studies (see for an overview WILLIAMS, 2005).

#### 4.4 Relevance of subjective delusion

The theoretical approach suggests that NHCs can change perception (halo-effect) and thus, possibly also behaviour of consumers. In case of products with a negative nutrient profile like candies, NHCs might lead to inappropriate high consumption and thus induce adverse health effects.

To deal with that issue, interviewees were asked for their agreement on a five point scale to the statement that NHCs are of help in choosing a superior alternative in the “unhealthy” product category of candies. 46% of respondents agree fully or agree rather to this statement. If they are deluded, they are not aware of it. They think to benefit from the available information and use NHCs for a slightly healthier diet.<sup>26</sup> If their self-assessment is correct, NHCs on candies improves market transparency for this group of consumers. But about one third of the respondents disagree rather or strongly with the statement.

To have a closer look at the perception of the sugar content, the interviewees were asked for their agreement or disagreement on a five point scale to the statement that claims on vitamins and mineral nutrients make them forget about a high sugar content of candies. Half of the respondents answer that a healthy presentation of candies does not affect

<sup>21</sup> These results are consistent with NELSON's remarks (1974: 749) which indicate that people are in favour to trust in law on deceptive advertising, though, in fact law is missing or moderately enforced.

<sup>22</sup> Consumers who trust in health-related claims by producers are (significantly) more likely to believe in checks by consumer organisations ( $\chi^2$  test;  $p = .002$ ) and less likely to believe in state control ( $\chi^2$  test;  $p = .000$ ).

<sup>23</sup> The application of a discrete-choice-analysis to survey the willingness to pay (WTP) guarantees results with a greater external validity in comparison to the direct approach. Corresponding results will be provided within a short time (THRAMS, forthcoming).

<sup>24</sup> However, these results cannot predict whether consumers would pay an additional charge in reality if the costs of a governmental control were transferred on retail prices.

<sup>25</sup> Complementary to these findings, DIALEGO MARKET RESEARCH ONLINE (2004) ascertains that for 90% of the interviewees credence would increase if functional food were controlled and explicitly labelled. In this case, 86% of the consumers were more likely to buy functional food.

<sup>26</sup> Subsidiary to these results, WANSINK (2003) shows in his analysis that consumers tend to believe that the consumption of food products bearing HC help to countervail the eating of unhealthy ones.

their perception. However, every fourth respondent states to forget the sugar content if the candy is labelled with such a NC. The rest does not really know. The figures have to be evaluated in the frame of the standardised questionnaire: this approach assumes that consumers are aware of the influence of NHCs. Unconscious processes of consumers' perception are not addressed by the question. The share of 27% of respondents stating to forget the high sugar content appears quite high against this background.

While 59% of the consumers with a high nutrition knowledge (top two boxes)<sup>27</sup> believe that they do not forget the sugar content of the candies, this holds only for 37% of the respondents with a low nutrition knowledge (bottom two boxes,  $p < .01$ ; correlation:  $r = 0.139$ ,  $p < .001$ ,  $n = 788$ ). This provides evidence for the assumption that especially for the group with low nutritional knowledge, the high sugar content takes a back seat if other healthy ingredients are emphasised and give a hint for subjective delusion.

As abstract questions on this complicated issue might not lead to valid answers, pictures of existing candy brands were used in addition. The interviewees were asked to arrange the three candies<sup>28</sup> with NHCs into a ten point scale. The scale was anchored by an apple at point one and by candies without health promoting ingredients at point ten. On average, participants arranged the three brands with NHCs near the medium scale position. However, the share of consumers grading the NHC candies with one, two or three (and thus close to the apple) was 34% in case of multi-vitamin candies, about 30% in case of sugar free sweets added with magnesium and vitamins, and 25% in case of cough sweets. The results give evidence to a shift in perception due to additional ingredients announced by NHCs.

#### 4.5 Appropriate governmental regulations to reduce subjective delusion

To prevent adverse health effects due to NHCs on products with negative nutrient profiles, the EU-Commission initially proposed a ban of NHCs on such products. In case of candies, only 16% of the interviewed consumers are rather or strongly in favour of such a prohibition. With respect to salt with NCs about iodine, fluoride, or folic acid, the rejection of a ban is even higher – only 3% would appreciate it. These results show that consumers fear the risk of a decreased market transparency (level 1) and the loss of a decision-making aid due to an advertisement ban on such products. Those findings are in line with an Australian qualitative consumer study providing an indication of how consumers feel about the concept of disqualifying criteria. The majority of the participants does not support and understand this approach because they are viewing themselves in the position of being able to decide whether a food product belongs to an all in all healthy choice for them<sup>29</sup> (FSANZ, 2003: 61). These results challenge governmental regulation to ban NHCs on products with a negative nutrient profile.

<sup>27</sup> The variable nutritional knowledge is based on a self assessment by the respondents (five point scale).

<sup>28</sup> These are the first three candy brands mentioned in footnote 16.

<sup>29</sup> But, it is worth to mention that the sample includes only consumers who are concerned about the nutritional value and the health effects of the foods they buy (FSANZ, 2003: 18).

In addition, government seeks to prevent subjective deception by making the use of HCs dependent on mandatory disclosures. With additional information buyers shall be enabled to assess the claim in an adequate context of e.g. a balanced diet and a healthy way of living. However, health and nutrition information may be inappropriate not only due to missing information but also due to too much information, and thus the risk of information overload. In order to detect the desired amount of health and nutrition information, the interviewees were shown a template with four product packages of a yogurt-buttermilk-drink varying in the quantity of text related to the NC from no additional information up to covering the information requested by the guidelines of the EU Regulation (see table 3). The interviewees were asked to choose the alternative which contains the personally relevant information and the one that seems most appropriate to cover information needs of consumers in general. The results (table 3) indicate that about 28% of all consumers would personally favour no additional information beyond the NC, 20% prefer the NC together with an additional reduction of disease risk claim. In total, almost 50% of consumers assess the claims alone as appropriate. About 50% prefer additional information but only 15% the quantity requested in the EU Regulation. No significant differences exist between consumers responses regarding the amount of information they personally prefer and those which they in general find to be appropriate (see table 3).

Non parametric correlations (Kendall-Tau-b) show significantly that the

- higher the relevance of NHCs in general (see section 4.2) the more information is requested ( $r = 0.316$ ;  $p < .001$ ;  $n = 766$ ).
- lower the level of education the higher the need for extended information on the product ( $r = -0.112$ ;  $p < .001$ ;  $n = 775$ ).

**Table 3. Consumers' assessment of relevant and appropriate information on product packages**

Information on the product package	Label alternatives			
	A	B	C	D
Nutrition claim	x	x	x	x
Reduction of disease risk claim		x	x	x
Statement indicating the importance of a balanced diet and a healthy lifestyle			x	x
The quantity of the food and pattern of consumption required to obtain the claimed beneficial effect			x	x
Statement addressed to persons who should avoid using the food			x	x
Statement indicating that diseases have multiple risk factors and that altering one of these risk factors may or may not have a beneficial effect				x
Which of these pictures provides you with personally relevant information? (in %)	28	20	37	15
Which of these pictures appears as the most appropriate? (in %)	24	22	39	15

Source: own illustration based on survey results

Nevertheless, as shown above most consumers (85%) do not appreciate the information requirements of the EU Regulation. Therefore, doubts seem to be justified whether the provided amount of information will be perceived by consumers.

Information may also be inappropriate due to lacking comprehensibility. Since a general testing of the comprehensibility is not possible, the participants got three realistic examples and were asked to evaluate whether the claims are easy to understand.<sup>30</sup> The share of people finding the NHCs incomprehensible varies between 17% and 54% depending on the claim. Particularly, those respondents with a lower education had difficulties to understand the claims<sup>31</sup>. Since incomprehensible claims do not enhance market transparency, this fact should be considered while formulating claims. Claims that will be included in a positive list should be tested regarding their comprehensibility within a representative sample of European consumers.

## 5. Conclusions

The Regulation (EC) No. 1924/2006 of the European Parliament and of the Council on NHCs used in the labelling, presentation and advertising of food aims at preventing the dissemination of false or mistakable claims. The Regulation is primarily concerned in reducing welfare losses caused by the Type 1 error (authorising a false or mistakable claim). To a lesser extent it addresses those welfare losses induced by the Type 2 error (not authorising a true and correctly understood claim). From a theoretical perspective a case by case decision based on the probability and the impact of both types of errors for each claim would be welfare improving. This kind of analysis needs to consider spillover effects on the information market and particularly on general trust in NHCs as well as differences among (groups of) consumers regarding the perception and processing of claims. Therefore, it is hardly feasible from a practical point of view. In addition, the regulatory costs of such a procedure would likely over-compensate by far the potential benefits.

The empirical results reveal that NHCs are important for consumers in the context of their food purchase decision. This relevance, however, differs significantly according to the confidence consumers have in claims made by producers. As trust in producers is low<sup>32</sup> the majority of consumers (65%) would appreciate a governmental approval of HCs based on scientific evidence, as is requested in the EU Regulation. Thus, the EU approach to prevent objective delusion may be appropriate as it can build up and strengthen overall trust in NHCs.

Furthermore, the results of the survey reveal the influence of NHCs on product perception of candies, a product with a negative nutrient profile. Though, 27% of respondents declare that claims on candies make them forget the negative nutritional profile, almost half of the respondents (47%) state that they use those claims to select the less harmful alternative. This underlines that with respect to the efficiency of purchase decisions the impact of limiting the use of NHCs on products with negative nutrient profiles differs between individual consumers. In addition, the majority of consumers (67%) is opposed to a ban of NHCs on candies. For salt this share is with 91% even much higher. Thus, the results of the survey reveal that the provisions of the EU Regulation addressing subjective deception might not reach its intended aim and will likely as a side effect reduce valuable information for at least some consumers.

There are two limitations that need to be acknowledged and addressed regarding the present study. The first limitation concerns the survey method applied: The standardised questionnaire allows the identification of problems that are consciously perceived and the investigation of governmental regulations that consumers would accept. However, this cognitive approach cannot predict actual behaviour because other influences, e.g. emotions are disregarded. So, many consumers might be seduced to eat more of e.g. candies with NHCs without being aware of it. Thus, there is a need for supplementing the results by other research methods (e.g. experiments). The second limitation has to do with the extent to which the findings can be generalized beyond the products studied. Important parts of the survey were linked to specific products in order to tailor it to market reality. Hence, conclusions are reliable for the setting of the questionnaire. Further empirical evaluations are needed to examine the generalisation of the findings.

## References

- AKERLOF, G. A. (1970): The Market for "Lemons". Quality, Uncertainty and the Market Mechanism. In: *Quarterly Journal of Economics* 84 (3): 488-500.
- ALDRICH, L. (1999): Consumer Use of Information: Implications for Food Policy. Economic Research Service (ERS) of the U.S. Department of Agriculture. *Agricultural Handbook* No. 715.
- ATTAS, D. (1999): What's wrong with "deceptive" advertising? In: *Journal of Business Ethics* 21 (1): 49-59.
- BEALES, H., R. CRASWELL and S.C. SALOP (1981): The Efficient Regulation of Consumer Information. In: *Journal of Law and Economics* XXIV (3): 491-539.
- CALFEE, J.E. (1997): Fear of Persuasion: A New Perspective on Advertising and Regulation. AGORA, Monnaz, Switzerland.
- CALFEE, J.E. and J.K. PAPPALADO (1991): Public Policy Issues in Health Claims for Foods. In: *Journal of Public Policy & Marketing* 10 (1): 33-53.
- CALFEE, J. E. and D.J. RINGOLD (1988): Consumer Scepticism and Advertising Regulation: What Do the Polls Show? In: *Advances in Consumer Research* 15: 244-248.
- CARSON, T.L., R.E. WOKUTCH and J.E. COX, JR. (1985): An Ethical Analysis of Deception in Advertising. In: *Journal of Business Ethics* 4 (2): 93-104.
- CAUDILL, E.M. (1995): Health Claims and Consumer Skepticism: The Influencing Effects of Information Type, Sponsor Reputation, and Information Channel. Thesis. University of Illinois at Urbana-Champaign.
- DARKE, P.R. and R.J.B. RITCHIE (2006 forthcoming): The Defensive Consumer: Advertising Deception, Defensive Processing, and Distrust. In: *Journal of Marketing Research* (forthcoming).

<sup>30</sup> The comprehension was tested on a five point scale at the following examples: (1) "Biological soft drink produced by fermentation of naturally raw material" (54% incomprehension); (2) "This spread contains a lot of vital poly-unsaturated fatty acids" (17% incomprehension); (3) "Folic acid plays a major role at the cell division and formation" (27% incomprehension).

<sup>31</sup> The significant Spearman-Rho correlation coefficients vary between  $0.133 \leq r \leq 0.175$ ,  $n = 793$ .

<sup>32</sup> 20.4% of the consumers trust producers, 37.2% neither trust nor distrust them, and 42.3% distrust producers.

- DIALEGO MARKET RESEARCH ONLINE (2004): Functional Food. In: [http://www2.dialego.de/uploads/media/040720D\\_Functional\\_Food\\_Dialego-LZ\\_01.pdf](http://www2.dialego.de/uploads/media/040720D_Functional_Food_Dialego-LZ_01.pdf)
- EDCOMS (2007): Review and analysis of current literature on consumer understanding of nutrition and health claims made on foods. London.
- FINKELSTEIN, E.A., I.C. FIEBELKORN and G. WANG (2003): National medical spending attributable to overweight and obesity: How much, and who's paying? In: *Health Affairs* W3: 219-226.
- FOOD STANDARDS AGENCY (2002): Health Claims on Food Packaging. Consumer-related Qualitative Research. London.
- FORD, G., D.B. SMITH and J.L. SWASY (1990): Consumer Scepticism of Advertising Claims: Testing Hypotheses from Economics of Information. In: *Journal of Consumer Research* 16 (4): 433-41.
- FRIESTAD, M. and P. WRIGHT (1994): The Persuasion Knowledge Model: How People cope with Persuasion Attempts. In: *Journal of Consumer Research* 21 (1): 1-31.
- FSANZ (FOOD STANDARDS AUSTRALIA NEW ZEALAND) (2003): A Qualitative Consumer Study related to Nutrition Content Claims on Food Labels. Prepared by NFO Donovan Research, Marketing and Communications Research Consultants.
- GARRETSON, J. and S. BURTON (2000): The Nutrition Facts Panel and Package Claims: The Role of Nutrient Values, Multiple Claims and Congruent Information on Attitudes. Disease-Related Risks and Consumer Trust. In: *Journal of Public Policy & Marketing* 19 (Fall): 213-227.
- GOLAN, E., F. KUCHLER, L. MITCHELL, C. GREENE and J. AMBER (2000): Economics of Food Labeling. Economic Research Service, U.S. Department of Agriculture. Agricultural Economics Report No. 793, Washington.
- GROSSMANN, S.J. (1981): The Informational Role of Warranties and Private Disclosure about Product Quality. In: *Journal of Law and Economics* 24 (3): 461-483.
- HAUCAP, J. and H. SCHMIDT (2002): Kennzeichnungspflicht für genetisch veränderte Lebensmittel: Eine ökonomische Analyse. Institut für Wirtschaftspolitik, Universität der Bundeswehr Hamburg.
- IFT (Institute of Food Technology) EXPERT GROUP (2005): Functional Foods: Opportunities and Challenges. Chicago.
- IPPOLITO, P.M. (2004): What can we learn from food advertising policy over the last 25 years? In: *George Mason Law Review Archives* 12 (4): 939-965.
- IPPOLITO, P.M. and A.D. MATHIOS (1990): The Regulation of Science-Based Claims in Advertising. In: *Journal of Consumer Policy* 13 (4): 413-445.
- IPPOLITO, P.M. and J.K. PAPPALARDO (2002): Advertising Nutrition and Health – Evidence from Food Advertising 1977 – 1997. Bureau of Economics Staff Report Federal Trade Commission, Washington, D.C.
- KAAS, K.P. (1991): Marktinformationen: Screening und Signaling unter Partnern und Rivalen. In: *Zeitschrift für Betriebswirtschaft* 61 (3): 357-370.
- KROEBER-RIEL, W. and F. ESCH (2004): Strategie und Technik der Werbung. 6. Edition. W. Kohlhammer GmbH, Stuttgart.
- KROEBER-RIEL, W. and P. WEINBERG (2003): Konsumentenverhalten. 8. Edition. Verlag Franz Vahlen, München.
- LENSCH, A.K. (forthcoming): Auswirkungen gesundheitsbezogener Ernährungsinformationen auf die Kaufentscheidung – Analyse am Beispiel funktioneller Lebensmittel mit Folsäure. Dissertation. Rheinische Friedrich-Wilhelms-Universität Bonn.
- LOUREIRO, M.L. (2004): Obesity: Economic Dimensions of a "Super Size" Problem. *Choices*, Fall 2004: 35-40.
- MACHO-STADLER, I. and J.D. PÉREZ-CASTRILLO (2001): An Introduction to the Economics of Information. Incentives and Contracts. 2. Edition. Oxford University Press, Oxford, New York.
- MASON, M.J., D.L. SCAMMON and X. FANG (2007): The impact of Warnings, Disclaimers, and Product Experience on Consumers' Perception of Dietary Supplements. In: *Journal of Consumer Affairs* 41 (1): 74-99.
- MATHIOS, A.D. and P. IPPOLITO (1999): Health Claims in Food Advertising and Labeling. Dissemination Nutrition Information to Consumers. In: Frazao, E. (ed.): *America's Eating Habits: Changes and Consequences*. Agriculture Information Bulletin No. 750: 189-212.
- MAZIS, M.B. and M.A. RAYMOND (1997): Consumer perceptions of health claims in advertisements and on food labels. In: *Journal of Consumer Affairs* 31 (1): 10-26.
- MUELLER, W. (1991): Who Reads the Label? In: *American Demographics* 13 (1): 36-40.
- MURIS, T.J. (1991): Economics and Consumer Protection. In: *Anti-trust Law Journal* 60 (1): 103-121.
- NATIONAL CONSUMER COUNCIL (1997): Messages on Food. Consumers' use and understanding of health claims on food packs. London.
- NELSON, P. (1974): Advertising as Information. In: *Journal of Political Economy* 82 (4): 729-754.
- PARKER, B.J. (2003): The Use of Nutrient Content, Health, and Structure/Function Claims in Food Advertisements. In: *Journal of Advertising* 32 (3): 47-55.
- REGULATION (EC) No 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods. Brussels.
- ROE, B., A.S. LEVY and B.M. DERBY (1999): Impact of Health Claims on Consumer Search and Product Evaluation Outcomes: Results from FDA Experimental Data. In: *Journal of Public Policy and Marketing* 18 (1): 89-105.
- RUBIN, P.H. (2000): Information Regulation (Including Regulation of Advertising). In: Boudewijn, B. and G. De Geest (eds.): *Encyclopedia of Law and Economics 3: The Regulation of Contracts*. Edward Elgar Publishing Ltd., Northampton: 271-295.
- (2004): Regulation of Information and Advertising. Emory University Department of Economics and Emory University School of Law, Emory University Department of Economics and Emory University School of Law. In: <http://ssrn.com/abstract=498683>.
- SCHÖLLING, M. (2000): Informationsökonomische Markenpolitik: zur Bedeutung der Informationsökonomik für die Markenpolitik von Herstellern. Europäischer Verlag der Wissenschaften, Frankfurt.
- SIMON, H.A. (1972): Theories of bounded rationality. In: McGuire, C.B. and R. Radner (eds.): *Decision and Organisation*. North-Holland Publ. Co., New York: 161-176.
- STATISTISCHES BUNDESAMT (2004): Datenreport 2004. Zahlen und Fakten über die Bundesrepublik Deutschland. 2. Edition. Wiesbaden.
- THRAMS, S. (forthcoming): Bewertung und Analyse staatlicher Eingriffe zur Regelung nährwert- und gesundheitsbezogener Angaben über Lebensmittel aus Konsumentensicht. Dissertation. Rheinische Friedrich-Wilhelms-Universität Bonn.
- TIETZEL, M. (1988): Zur ökonomischen Theorie des Betrügens und des Fälschens. In: *Jahrbuch für Nationalökonomie und Statistik* 204 (1): 17-35.
- TROMMSDORFF, V. (2004): Konsumentenverhalten. Verlag W. Kohlhammer, Stuttgart.
- WANSINK, B. (2003): How Do Front and Back Package Labels Influence Beliefs about Health Claims? In: *Journal of Consumer Affairs* 37 (2): 305-317.
- WHO (2004): Nutrition labels and health claims: the global regulatory environment. Geneva.
- WILLIAMS, P.G. (2005): Consumer understanding and use of health claims for foods. In: *Nutrition Reviews* 63 (7): 256-264.
- (2006): Can Health Claims for Foods Help Consumers Choose Better Diets? In: *CML-Clinical Nutrition* 15 (2): 25-30.

## Acknowledgements

The authors thank two anonymous reviewers for their helpful comments and suggestions.

Corresponding author:

**SYLVIA THRAMS**

University of Bonn, Institute for Food and Resource Economics  
Nussallee 21, 53115 Bonn

phone: 02 28-73 37 76, fax: 02 28-73 33 74

e-mail: [sylvia.thrams@ilr.uni-bonn.de](mailto:sylvia.thrams@ilr.uni-bonn.de)