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# Determinants of Choice Regarding Food with Nutrition and Health Claims

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**Abstract— Health is an increasingly important topic in the food market. The regulation (EC) No 1924/2006 on nutrition and health claims is meant to facilitate healthy food choices of consumers. However, research studies about claim perception and choice behaviour are scarce in Europe up to this point, especially those focusing on revealed preferences or a close-to-realistic study design. This contribution reports findings of realistically designed choice-tests accompanied by video-observation and followed by a face-to-face questionnaire. Logistic regression analysis was applied in order to determine the influencing factors on purchase behaviour of food products with claims. Perception of relative healthiness of the product with a claim, credibility of the claim and extent of information acquisition were found to influence choice positively, while claim format and product category were of no importance.**

**Keywords—** Consumer behaviour, health claims, choice tests.

## I. INTRODUCTION

Health is becoming an increasingly important buying motive where food choices are concerned. The food industry has reacted to this trend by offering so-called functional food products and including the topic of health and well-being in their communication strategies. However, which are the most effective instruments in order to encourage people to lead a healthier lifestyle remains an open question and is often hotly disputed. The regulation (EC) No 1924/2006 on nutrition and health claims (called ‘claims’ in the following) made on foods results from the ongoing debate about this topic between the government, the food industry and various consumer organisations [1]. It is meant to harmonise the regulatory environment for such claims in the EU and ensure that all claims are scientifically substantiated, non-misleading and credible. In order to assess the impact of the regulation, research is needed about how

and to what extent consumers react to such claims in their food product evaluation and purchasing behaviour. Up to now, few consumer studies regarding claims have been conducted in Europe as compared to the USA, where claims have been regulated since the introduction of the Nutrition Labeling and Education Act (NLEA) in 1990 [2]. In addition to that, studies in which the focus is on the actual choice behaviour in experimental conditions relatively close to the point-of-sale situation are scarce.

## II. RESEARCH QUESTION AND MODEL

The research aims to answer the following question: “Which factors can explain purchase behaviour regarding food products carrying a claim?” Several determinants of consumer behaviour in the presence of claims on food have already been established or are discussed in the literature. Results of an experimental laboratory study by Roe et al. indicated that the extent of information acquisition behaviour might be influenced negatively by claims, suggesting that the claim serves as an information chunk [3]. In contrast, some people expressed that a claim might stimulate their interest in further nutritional information in qualitative interviews conducted by Svederberg [4]. Health is an important buying motive. Therefore, the interaction between claims on the product packaging and perceptions of the healthiness of the product has been of particular interest in previous research. The results of several studies show that claims increase the perceived healthiness of the product, especially when presented as the sole health information on the packaging [5, 6, 7, 8, 9, 10]. Subjects in a series of studies tended to over-generalise the health effect of the claim, beyond the specific effect actually stated in the claim [3, 11, 7]. Researchers therefore concluded that the claims induced a halo-effect in the consumer’s perception. Another important factor influencing consumer behaviour regarding products with claims is

the credibility of the claim itself. Credibility had a positive influence on purchase intention in a study by van Kleef et al. [12]. Above all, inconsistencies between claims and other nutrition and health related information on food products led to a lower credibility of the brand and the claim [13, 7, 9]. Subjects regarded claims naming a specific substance as more credible as claims stating the product to be generally healthy or healthier [14, 11].

Involvement has not been investigated in the context of consumer behaviour regarding claims so far, even though the findings indicate that motivation and personal relevance, both concepts which are related to involvement, influence the processing of nutrition and health related information and the perception of claims, or of products with claims [13, 4, 15, 16, 10]. In particular, involvement might be an important moderator of consumer behaviour regarding claims due to the interaction considered to exist between involvement and credibility. In a high involvement situation, low credibility of the information on a product is regarded to lead to rejection of the product in question as a result of reactance [17, 18, 19].

Results about the impact of claims on purchase decision outcome are mixed up to this point. The presence of a claim increased purchase intention in experiments conducted by Roe et al. [3] and Tuorila and Cardello [8] as well as in a conjoint-analysis carried out by Bech-Larsen et al. [20]. However, no such influence was observed in experiments carried out by Garretson and Burton [7] and in a survey conducted more recently by van Trijp and van der Lans [10].

On the basis of the previous research, hypotheses about the influence of several determinants on purchase decisions regarding products with claims have been generated. The hypotheses lead to the development of a model (see Figure 1) explaining purchase decisions concerning products carrying a claim (the dependent variable Y) by various influencing factors. These factors are (1) extent of information acquisition behaviour, (2) perception of healthiness of a product with a claim, (3) credibility of the claim, (4) involvement towards the product, (5) product category and (6) claim type.

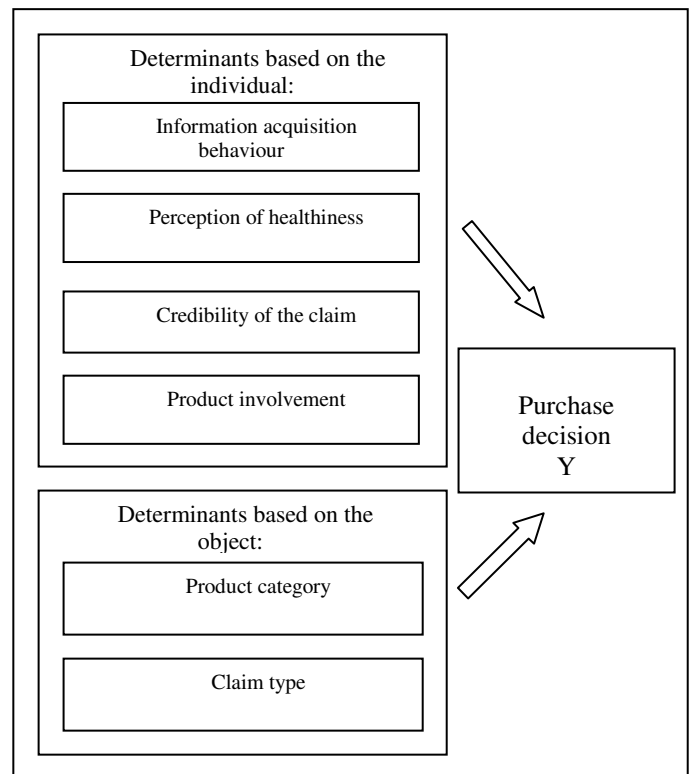


Fig. 1 Model explaining purchase decision for a product with a nutrition or health claim

### III. METHODS

Claims have been an important topic in consumer research in the USA for the past fifteen years. The introduction of the NLEA, several changes in the legal handling of claims and the fact that nutrition and health information is a sensitive and conflictive issue in US society [21] lead to interest in knowledge about actual consumer reactions. Thenceforth, studies focused on the effect of different claim formats, the interaction of claims with nutrition fact panels and possible misdirection of consumers. Most researchers chose quantitative, experimental between-subjects designs and conducted interviews in the laboratory or close to the point of sale. In the interviews, subjects were exposed to varying conditions of the claim presentation and asked to assess the information, the products, and their purchase intention or, in some cases, to come to a hypothetical product decision. In Europe, researchers began studying the topic in the

wake of the increasing importance of functional food. The few existing studies which included claims were of quantitative nature and mainly non-personal. Researchers remarked that the main drawback of the studies so far is the possible lack of external validity due to the discrepancy between the study conditions and point of sale conditions. It has been mentioned that in experiments subjects are, compared to the real purchase situation, forcefully exposed to the claims and that claims and product information is presented only in two-dimensional format. Furthermore, there is no experience of time- or budget-constraint in the experimental choice decision [5, 13, 6, 3, 11, 7, 9, 10].

It should be noted that studying the actual consumer behaviour at the point of sale or tracking the purchase behaviour by analysing scanner-data would probably lead to the most valid results regarding external validity. However, the regulation (EC) No 1924/2006 is far from being fully implemented and the claims according to the regulation are not yet used on food products in the market. What is more, the multitude of uncontrollable influences at the point of sale makes establishing determinants of consumer behaviour very difficult, especially for food. Furthermore, a personal interview at the point of sale is often not possible or has to be very brief at least. We therefore opted for a laboratory surrounding, all the same trying to approximate the realistic situation as much as possible.

The core method used for the purpose of this research was a choice test (also called choice experiment), in which subjects were asked to choose one product out of a range of alternative product stimuli in the same way as they would do at the point of sale. The information acquisition behaviour preceding choice was observed by video recording and the subjects went through a personal face-to-face-interview afterwards. Therefore, three methods have been combined in a multi-measurement-approach. Approximation of the real purchase situation was reached by the following measures: pre-selecting subjects who regularly buy the products in question, allowing a no-choice option [22, 23], using three-dimensional real products and brands with the claim unobtrusively added onto the product packaging, increasing the perceived relevance of the decision by handing out the selected stimuli itself [23] and creating a budget constraint by paying a participation

reward from which the price of the selected stimuli was subtracted [24]. In order to prevent answers distorted by social desirability or reactance [17, 19], the aim of the study was not revealed to the subjects prior to respective questions asked in the interview.

Video-observation was selected to trace the information acquisition behaviour. In comparison to other process-tracing-methods such as eye-tracking, information display matrix and think-aloud protocols, its influence on the behaviour is the least considerable [25]. At the same time, it allows more exact, more and revisable results about the information search behaviour when compared to simultaneous note-taking [26, 25, 27, 28].

The questionnaire was divided into three phases, which consisted of questions regarding choice, information search and involvement (1), rating of relative healthiness of products (2) and assessment of claims (3). From one phase to the other, the awareness of the claims was increased by inviting subjects to observe the products more closely and the more detailed topic of the study was revealed. Product involvement for each product in the study was measured by a translated and adapted version of the involvement scale developed by Knox et al. [29] on the basis of the widely known Mittal and Lee scale [30].

Strawberry yoghurt, fruit muesli and spaghetti were selected as product examples. The widespread use of claims is currently and will, for the foreseeable future, be more likely for yoghurt and muesli as 'healthy' food categories. Spaghetti, which has no such image, serves as a reference category for comparison. For each product, five articles from different brands were chosen which were as identical as possible in terms of ingredients and type of packaging. Their point-of-sale prices were, however, on different price-levels. The claims were unobtrusively added to the packaging with the help of professionally designed adhesive labels covering e.g. the whole yoghurt pot or the front side of the muesli package. For each product, claims were phrased in three formats which are the nutrition claim (1), the health claim (2) and the health risk reduction claim (3). Each subject was confronted with the five brands, of which two carried a claim in one of the three above mentioned formats. The claim format and the brands carrying a claim were rotated. Because

the presence or absence of the claim was equally distributed between the brands, we assumed the brand influence to be ruled out.

#### IV. RESULTS

The empirical research, funded by the German Research Foundation, was conducted in March and April 2007. Subjects who stated that they regularly bought the three products in question were selected by quota-sampling according to their age and gender and assigned to the varying experimental conditions at random. 210 valid interviews, with three cases (one decision per product) each were completed in this manner. The no-choice-option was chosen in only 5% of the cases. Of the sample, 50.5% were 45 years or older and 71.4% female. Slightly more than a quarter (26.7%) of the subjects had children of up to 18 years living in their household. Household size was nearly evenly distributed between single-household (31.5%), two-person-household (33.3%) and households of more than two members (35.3%). Persons with a higher education level were over-represented: 52.9% had a university degree or a school leaving certificate qualifying for university admission [31]. The variables which have been used for our model are described more in detail in Table 1.

Table 1 Variables recorded and their description  
Source: own

Variable (VARIABLE NAME)	Operationalisation
Purchase decision for a product with a claim (IFCLAIM)	No, yes (one out of five stimuli, of which two carry a claim)
Information acquisition behaviour (SEARCH)	Synthetic variable on the basis of extent and duration of information search
Perception of healthiness (HEALTHY)	Average rating of stimuli with a claim compared to average rating of stimuli without a claim
Credibility of the claim (CREDIB)	1 item, 7-point rating-scale
Product involvement (PRODINV)	8 items, 7-point rating-scale
Product category (PRODCAT)	Yoghurt, muesli, spaghetti
Claim format (CLAIMFORM)	Nutrition claim, health claim, health risk reduction claim

We applied binary logistic regression [32, 33] in order to predict the choice decision outcome, given that the dependent variable is a categorical, binary variable. Variables were checked for statistical outliers and multi-collinearity. Five cases with Pearson Residuum greater than |2| were omitted as outliers. PRODINV was dropped from further analysis due to possible multi-collinearity with CREDIB. Multi-collinearity between the remaining variables can be ruled out because the VIF-values are all below 2. Results of the logistic regression are given in Table 2. The resulting model differs significantly from the constant-only model (Likelihood-Ratio Test:  $\chi^2$  58.766\*\*\*<sup>1</sup>). Correct classification is achieved in 62% of the total cases observed. Classification results are compared with the constant-only model as well as with the proportional change criterium (PCC)<sup>2</sup>. The comparison shows that the model classifies better than the constant-only model (44%), even when the uneven distribution of cases in the groups of the dependent variable is taken into account by the PCC (51%). Therefore, it is clear that one or more of the variables contribute to the explanation of choice behaviour regarding products with claims in the sample.

Table 2 Logistic regression for purchase decision of products with a claim

Note: Dummy-variables of PRODCAT and CLAIMFORM are not given. N = 594. Cox & Snell  $R^2 = .094$ , Nagelkerke  $R^2 = .126$ . Source: own

Predictor	B	SE B	Wald $\chi^2$	df	p
Constant	-1.316	.360	13.351	1	.000
SEARCH	.045	.015	8.883	1	.003
HEALTHY	.534	.085	39.345	1	.000
CREDIB	.136	.060	5.054	1	.025
Test:			$\chi^2$	df	p
Likelihood-Ratio-Test			58.766	7	.000
Hosmer & Lemeshow			6.566	8	.584

Nagelkerke  $R^2$  shows that only 13% of the variance of the dependent variable IFCLAIM is explained by the independent variables in the model. According to the common interpretation of the Pseudo  $R^2$  measures in logistic regression [32], the overall model cannot be

1. <sup>1</sup>  $p \leq .001 = ***$ ;  $p \leq .01 = **$ ;  $p \leq .05 = *$ .

2. <sup>2</sup>  $PCC = a^2 + (1 - a)^2$ , with (a) being the ratio of one of the two groups of the dependent variable.

regarded as satisfying with  $R^2$  below 0.2 (Cox & Snell  $R^2$  .094, Nagelkerke  $R^2$  .126). The regression coefficients indicate that three variables contribute to predicting purchase behaviour for products carrying a claim. The variables HEALTHY, SEARCH and CREDIB (in decreasing strength) have a significant and positive influence on purchase, while no influence can be established for the variables named PRODCAT and CLAIMFORM. Thus, the probability of choosing a product with a claim is higher when dealing with persons who regard the product carrying a claim as relatively healthy, who conduct a more extensive information search and who believe the claim to be credible. The likelihood of choosing the product with a claim is not significantly influenced by product category or claim format. It should be noted that including variables describing socio-demographic factors (age, sex, education level and children) does not alter the results of the logistic regression analysis.

In the bivariate results, the three variables HEALTHY, SEARCH and CREDIB significantly influence IFCLAIM (Mann-Whitney-U 32462\*\*\*, 39029\* and 39729\*), while no significant influence can be established for PRODINV. Regarding the interrelations of the independent variables themselves, apart from the correlation between PRODINV and CREDIB, PRODINV is significantly higher for yoghurt and muesli than for spaghetti ( $\chi^2$  31.479\*\*\*) and CREDIB is significantly lower for the claim format health risk reduction claim ( $\chi^2$  11.572\*\*).

## V. DISCUSSION AND CONCLUSION

The results of the study do not suggest that claims serve as informational chunks. On the contrary, it can be hypothesised that claims either induce more information acquisition behaviour, are chosen by those persons who usually look for more information, or have solely been noticed by the latter. It can be shown that the credibility of a claim is an important determinant of purchasing behaviour regarding products with claims. Remarkably, credibility is lower for the health risk reduction claim. It might be hypothesised that the probability of purchase for products with such a claim format is lower, because people might regard these claims as advertising slogans lacking in substance. Additionally, the results

show that credibility of the claim is higher when the subject has a high involvement towards the product. The strongest determinant of purchase behaviour in this study, however, is the perception of relative healthiness of the products with a claim compared to the other product stimuli in the choice set. It can be concluded that subjects regard products with claims as healthier. The model itself proves to be dissatisfying and not sufficiently explaining the purchase behaviour regarding products with claims. It has to be taken into account that a close-to-realistic research design goes hand in hand with the influence of various immeasurable factors, just as in the real-world situation. We therefore conclude that at the point of sale these other factors have a much greater combined influence on purchase behaviour than the determinants analysed in the study.

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