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Deceptive packaging and missing ingredients: on the effect of qualifying packaging information

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Abstract

In order to prevent false impressions given by visual packaging elements and to provide legal protection, many manufacturers label food with qualifying verbal information, e.g. serving suggestion *("Serviervorschlag")* or fill quantity technically limited *("Füllhöhe technisch bedingt")*. The precise wording of these designations is not stipulated by law. Scientific research on how this information is understood and whether it changes product perception has not been available to date. This article examines consumer expectations from the perspective of consumer research on perception psychology, based on an approximately representative consumer survey. The study results show that consumer perception is not significantly influenced by either of these verbal qualifications. They are therefore rather empty phrases providing legal protection than meaningful guidance for consumers. In light of the plethora of information and labels on food packaging, the benefit of these designations is therefore open to question.

Keywords: food labelling, ingredient illustrations, serving suggestion, fill quantity technically limited, consumer research

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Introduction and objective

Consumers often make food purchasing decisions only in front of the supermarket shelf [1]. Verbal and visual packaging elements thereby deliver important information about the product [2]. To prevent false product expectations arising from visual impressions and to provide legal protection, food packaging is often presented with qualifying verbal specifications. The phrase "serving suggestion" aims to e.g. indicate that an ingredient is not contained in the form pictured. "Fill quantity technically limited" (UK close equivalent = "this product is packaged to weight not volume") aims to call attention to a high proportion of empty space within the packaging and to avoid disappointment over an unexpectedly low quantity. The experiences of consumer advice centres indicate that consumers do nevertheless make false estimations [3]. This article examines for the first time the influence of these two common designations on consumer perception and asks whether this information provides meaningful guidance. In the subsequent section, the article provides a general classification of the relationship between visual and verbal presentation elements from a market research perspective. Finally, the article considers the two designations – "serving suggestion" and "fill quantity technically limited" – and illustrates our empirical findings.

Consumer understanding of packaging labels

Habitual purchasing behavior and spontaneous purchasing decisions are widespread in the food industry. In the context of an extremely differentiated range of products, with approx. 170,000 items [4], the visual presentation of a product is a core marketing tool to trigger impulse purchases. The design of the front-of-package is seen as decisive, as it grabs attention in displays of goods on the shelf [5]. However, perception times for packaging elements are extremely short. Consumers focus on the information on the product's front-of-package on average no longer than 29–351 msec [6].

Images attract more attention, are retained in consumers' memories for longer and convey more information than text during the same period of observation [7]. They arouse emotions and associations [8] and thus make products appear more attractive [9]. Visual perception is dominant [10] and the influence of visual appeal on purchasing behavior is amply documented by existing research [11]. When asked about the most important information on the display side of food packaging, consumers rate the product image as crucial [12]. It is therefore to be expected that images, as well as the size of packaging, play an important role in the purchasing process.
Studies in the English-speaking world above all illustrated the relevance of attention-grabbing core information placed on the front-of-package, so consumers could grasp the nature of a food in a short time. This information should therefore be particularly reliable. Nutrition information [13], health-related information [14], the food traffic light system [15] and the impact of images and brand names [9] should be highlighted in particular.
Although the prominent influence of visual packaging elements in attracting attention can be considered as established, the interaction between visual and verbal elements on food packaging is not much researched. Broadly speaking, it is possible to narrow and direct the recipient's analysis of the image by means of text [16]. In the field of product advertising, we often find dependencies between text and image, which provide reciprocal substantiation, restriction, modification and extension of meaning [17]. However, understanding the correlation between text and image always requires interpretation by consumers [18], which may differ from that of the manufacturer. It should be noted that the visual appeal of text largely attracts the primary attention of the observer [19].
In recent years, public criticism of unrealistic product presentations has increased and food providers have faced accusations of deception [20, 21]. Not least in light of the food law banning deception (Regulation EU 1169/2011, art. 7, para. 1, LFGB § 11 [1]), the question must be asked as to what extent verbal clarifications restrict the interpretive possibilities of the visual appeal of packaging and qualify any potential false impressions given by the visual perception of packaging. The consumer survey discussed below delivers the first empirical findings in response to this question, based on two relevant yet to date not researched case groups.

Consumer perception of qualifying verbal information on food packaging

Case studies

Consumers draw conclusions based on product images, including those on processed ingredients, and are thereby also liable to draw the wrong conclusions [22]. In order to clarify which food is contained in the packaging, the product is often shown in the context of use [23]. Other foods which are usually associated with consumption of the product are often pictured alongside the product contained in the packaging.
The "serving suggestion" designation aims to indicate that the product/ingredient contained in the packaging is not in the form pictured. In practice, this causes problems when it is unclear which of the pictured raw materials are included and which could be prepared or consumed alongside the food.
This study gathered ingredient expectations for three sample products, on which the "serving suggestion" information was varied.
The second product example focused on the designation "fill quantity technically limited". The dimension is important for marketing purposes, alongside color and design [24, 25]. A large packaging surface is more readily perceived by consumers, particularly if it is surrounded by small product packages [23]. Even though fill quantity information is included on the food packaging in kg, g, L or mL as part of mandatory information, consumers extrapolate the fill quantity from the packaging size [26], and less filled packaging is sometimes criticized [27].
According to the German Weights and Measures Act, packaging must "be designed and filled in such a way that it does not feign larger fill quantities than is contained within it" (§7 para. 2 German Weights and Measures Act). Packaging which is "generally recognizably excessively elaborate in relation to content" is regarded as "deceptive packaging" [28]. A benchmark 30% limit is applied to the empty proportion in accordance with an administrative guideline [29]. However, this regulation does not affect packaging which includes an empty proportion as a result of technical necessity or for reasons of product quality [28].
Against this backdrop, this survey investigated the extent to which the "fill quantity technically limited" designation contributed to a realistic estimation of the packaging content in the event of a relatively high empty proportion.

Study design and methodology

The survey was a standardized, computer-assisted personal interview (CAPI) carried out with the help of a leading market research company in April/May 2014. 750 German consumers aged 16 and above took part in the survey. Based on quotas for age, gender, income, place of residence and education, the sample approximately corresponded to the composition of the German

population.
Fictional examples were tested. However, the dummy packaging illustrated was inspired by real examples, about which consumers had complained on the internet portal www.lebensmittelklarheit.de.

"Serving suggestion": influence on ingredient expectation

The test subjects were asked to indicate which of the illustrated ingredients they expected to find in the product (list template) for three sample products (pork stew, tofu fricassee, fresh cheese with herbs), based on a five-level Likert scale (+2 = "yes, definitely" to -2 = "no, definitely not").
The characteristics of the "serving suggestion" designation were varied in all examples (see ◆ Figure 1 for pork stew as an example). To this end, the sample group was divided into three similar-sized subgroups and each was faced with experimentally modified dummy products (front-of-package); the "serving suggestion" designation was displayed on the product packaging either as clearly visible information or as inconspicuous information. A third variant presented packaging without this information (◆ Figure 1).
These modified characteristics were randomized, so that each subgroup was faced with three different variants. The series of examples were also randomly questioned.

"Fill quantity technically limited": influence on consumer acceptance of voluminous packaging

The test subjects were shown an image featuring a biscuit packet, as found on the supermarket shelf, and adjacent to this the barely half-filled inner bag. A split sample design was also selected in this instance. Half of the test subjects were presented with the "fill quantity technically limited"

Fig. 1: **Dummy products for the pork stew example product**
[study illustration]
Illustrations smaller than in original

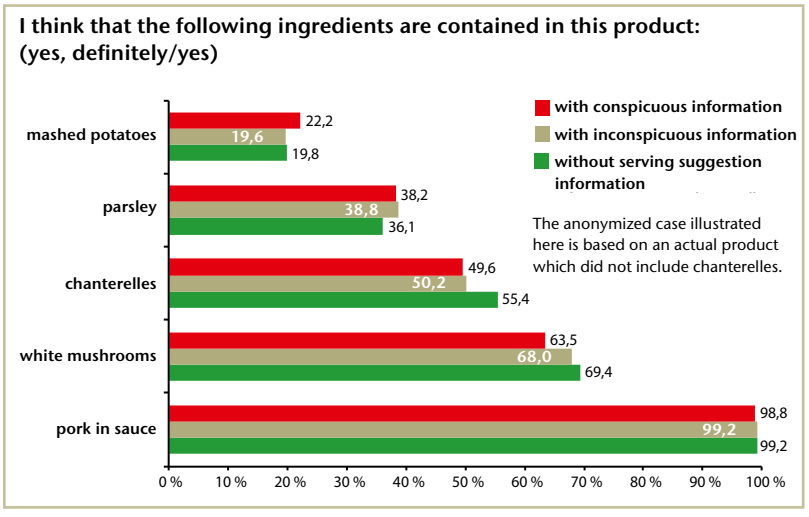

Fig. 2: **Ingredient expectations for the pork stew example product**
[study survey]
Data in % of all valid answers; five-level scale from "yes, definitely" to "no, definitely not".

information on the packaging (variant A). The information was missing (variant B) for the second group. All test subjects were asked to indicate the extent to which the relationship between product content and packaging size seemed appropriate according to a five-level scale (+2 = "entirely appropriate" to -2 = "entirely inappropriate").

Study results

"Serving suggestion": influence on ingredient expectation

The results for "Hunter's Pork Stew" are illustrated below as an example (◆ Figure 2). This sample is based on a real product which did not contain chanterelles, mashed potatoes or parsley. As a result of inspection of the front-of-package alone, between 49.6% and 55.4% (◆ Figure 2; $\mu_1 = 0.5$, $\mu_2 = 0.6$, $\mu_3 = 0.7$)[1] falsely estimated that chanterelles were an ingredient contained in the product; the "serving suggestion" information corrected this false estimation only slightly and not significantly. In the case of parsley, many respondents were "unsure" whether parsley was included ($\mu_1 = 0.1$, $\mu_2 = 0.2$, $\mu_3 = 0.1$). Most assumed that mashed potatoes were not included ($\mu_1 = -0.8$, $\mu_2 = -0.7$, $\mu_3 = -0.7$). In these cases, the ingredient expectations of the subgroups did not significantly differentiate (post-hoc tests).

Overall, the three sample products used show that side dishes (mashed potatoes, rice, bread) tend not to be expected in products. In contrast, if ingredients are pictured whose use is commonly associated with the product, a significant proportion of consumers expect these to be included.
The results barely differ between the sample subgroups in all the examples. The perception of product images was not significantly influenced by the "serving suggestion" information, and expectations of the presence of the food pictured were not significantly altered. The prominence of the placing of the information did not significantly alter the test subjects' estimation.

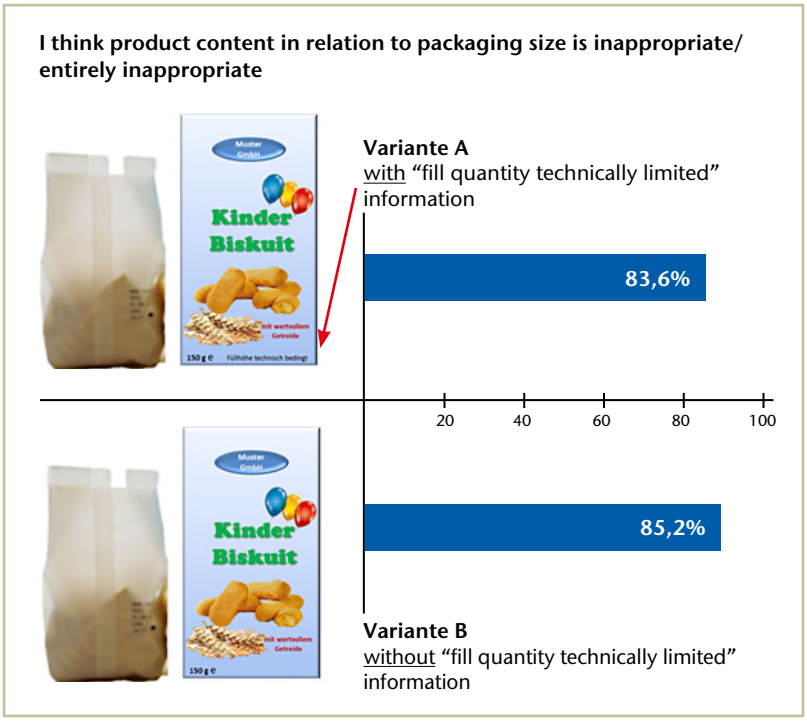

Fig. 3: **Comparison of consumer perception of fill quantity with and without the "fill quantity technically limited" information** [study survey]
Data in % of all valid answers, five-level scale from "entirely appropriate" to "entirely inappropriate"

"Fill quantity technically limited": influence on consumer acceptance of voluminous packaging

The dummy products and results are shown in ◆ Figure 3. The respondents felt that the large empty space in the biscuit packaging was inappropriate. The "fill quantity technically limited" information did not significantly alter consumer acceptance. In comparison, both groups made an almost identical estimation of the relationship between the packaging size and content (A: $\mu = -1.2$; B: $\mu = -1.3$). Mean comparisons (t-tests) show no significant differences between the groups.

Discussion

Although there are many studies on labels and health information, other food packaging designations are much less researched. The "serving suggestion" and "fill quantity technically limited" references are not regulated by food legislation, but are widely implemented in practice, in order to comply with the fraud prevention inscribed in food legislation. There has been no investigation to date on whether the potential for deception in food packaging can be lessened through the inclusion of such information. This representative consumer survey has found no significant differences in perception among consumers. The proportion of false expectations relating to ingredients included and the perception of a gap between packaging

[1] μ = mean value

size and content remained almost constant for the tested variants with and without printed information. These results indicate that the overall impression of packaging is dominated by visually prominent design features, such as product images or dimensions. The correction of mistaken impressions by the inclusion of this verbal qualification seems questionable.

Basically, larger information on packaging grabs more attention, as it is perceived as more important [23, 30]. 60% of German consumers also complain of too small writing on packaging [31]. At the same time, in our study, the more prominent variants with larger text, bold type and high-contrast placing in the field of vision did not lead to significant differences in ingredient expectation in relation to the "serving suggestion" information. Whether a further increase in the prominence of the lettering would have produced different results must remain unanswered at this point. In practice, however, there are limits to the attention-grabbing highlighting of such information from a marketing perspective.

In addition to perceptibility, understanding of the information is important. Both of these widespread and standardized formulations may be unclear, e.g. because it remains open as to which of the pictured ingredients are referred to or what is actually indicated by a technically-limited fill quantity. However, manufacturers have also adopted innovative approaches which present a graphic image of the actual fill quantity.

Irrespective of the question as to whether packaging is misleading in the legal sense, providers should examine their approach to packaging design. The overall impression of packaging is decisively shaped by visual elements; there are strict limits to verbal corrections. Disappointed customers, who, in light of the packaging, make false associations relating to included ingredients or fill quantity, hold conflict potential. The customer satisfaction survey stresses fairness as a core factor [32]. In this respect, it is in the interests of manufacturers to be careful not to give rise to unfulfilled expectations as a result of packaging design. Even if the information tested may provide successful legal protection for the manufacturer, which must remain unanswered as to our knowledge there have been no related judgements, it does not contribute to customer satisfaction.

Limitations

The study is an initial investigation on these two subjects. The explorative nature of the study must thus be regarded as a limitation; hence, for example, questions sometimes referred to expectations, and sometimes to the fulfilment of expectations. Further examples should also be investigated where applicable. A further study could also carry out target group analysis to find out more about differences among population groups.

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Conflict of Interest
The authors declare no conflict of interest.

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