



Identification of new food alternatives: How do consumers categorize meat and meat substitutes?

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ARTICLE INFO

Article history:

Received 4 November 2009

Received in revised form 20 December 2010

Accepted 24 January 2011

Available online 31 January 2011

Keywords:

Meat substitutes

Meat replacers

Categorization

Free sorting

Grouping

New products

Vegetarian

Consumers

ABSTRACT

New meat substitutes need to be recognized as alternatives to meat. We therefore investigated which category representations consumers have of meat and meat substitutes. Thirty-four non-vegetarian participants performed a free sorting task with 17 meat products and 19 commercially available meat substitutes, followed by similarity and typicality ratings. Results indicated that categorization was largely influenced by the taxonomic classification of meat, so by categories that refer to the animal source like 'pork', 'beef' etc. Hence, meat substitutes were grouped separately from *non*-processed meat products. However, there were categories (e.g. 'pieces' and 'sausages') that contained both meat substitutes and processed meat products, as these products were perceived to be very similar.

New meat substitutes should have a certain resemblance to meat in order to replace meat on the plate. This can be achieved by either similarity in appearance or by referring to shared scripts/goals, such as a similar application in meals.

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1. Introduction

1.1. The need for alternative food products

Having meat for dinner is nowadays under debate and is referred to as an environmentally unfriendly food choice due to an inefficient use of land and energy, and emission of gases by meat production (McMichael, Powles, Butler, & Uauy, 2007; Pimentel & Pimentel, 2003; Tilman, Cassman, Matson, Naylor, & Polasky, 2002). Policy makers and organisations involved with sustainable consumption and production are hoping to see consumers making a shift to a more sustainable product (e.g. Aiking, De Boer, & Vereijken, 2006; De Bakker & Dagevos, 2010; Swedish National Food Administration, 2009; United Nations, 2007). There are certain alternative products for meat on the market, so called meat substitutes or meat replacers. However, the market shares of these products are still very low compared to meat, estimated only 1–2% of the meat market (e.g. Anonymous, 2004; De Bakker & Dagevos, 2010). Current meat substitutes are obviously not a real alternative for non-vegetarian consumers.

An explanation for the lack of a success of meat substitutes is, among other things, a lower sensory quality (Elzerman, 2006; Hoek et al., submitted for publication; McIlveen, Abraham, & Armstrong, 1999; Sadler, 2004) due to current technological constraints to mimic a meat-like taste and texture. An option is to develop radically new meat substitutes, so called Novel Protein Foods, which are not necessarily meat-like (Aiking et al., 2006; Jongen & Meerdink, 2001). However, this approach is accompanied by other issues: Can a product that is totally different from meat, replace meat on the plate? Will people recognize Novel Protein Foods as an alternative to meat? It is therefore important to make sure that new alternative products for meat are recognized as such.

1.2. How consumers identify an alternative product

How consumers perceive a certain product does not depend only on that particular product, but also on how the product relates to other products (e.g. Antonides & Van Raaij, 1998; Berlyne, 1960; Carpenter & Nakamoto, 1989; Shocker, Bayus, & Kim, 2004). A possible alternative product is compared to other products on certain characteristics: is it more similar or dissimilar to a reference product? (Dahr & Glazer, 1996; Medin, Goldstone, & Markman, 1995). Consequently, a set of product alternatives is formed based on shared characteristics. Consumers usually choose the preferred option from alternatives from the same product category

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(Antonides & Van Raaij, 1998; Lynch, Marmorstein, & Weigold, 1988; Nedungadi, 1990). It is therefore relevant for development of new product alternatives, such as meat substitutes, to understand how consumers classify products in categories (as reviewed by Felcher, Malaviya, & McGill, 2001; Van Trijp & Van Kleef, 2008). This involves the process of categorization.

1.3. Background on categorization

Categorization implies that consumers group products into certain categories. A category is defined as a set of similar objects that have one or more characteristics or functions in common. So there are different ways to form a category: i.e. objects can be grouped based on similar attributes or because they lead to similar outcomes (Antonides & Van Raaij, 1998; Felcher et al., 2001). When a category is formed based on similar attributes, the objects or products within this category share certain physical characteristics that are relevant to consumers, for example a category of red fruits (based on similarity in color) or round cookies (based on similarity in shape). Within this type of categorization there are so called taxonomic categories which is a hierarchical system based on naturally occurring relationships, such as bananas and strawberries are both fruits (Rosch & Loyd, 1978; Rosch & Mervis, 1975). The shared features on which taxonomic categories are based do not necessarily have to be clearly visible, and can be based on an agreed classification (scientific or professionally based) and learned by consumers to organize information about alternatives (e.g. Johnson & Mervis, 1997; Sujun & Dekleva, 1987). For instance, a taxonomic category such as 'vegetables' represents foods that share their origin and nutritive content, while this is not obvious from the outside (Nguyen & Murphy, 2003).

Besides categorization on similar attributes, products can also be placed in one category because they lead to similar results or outcomes. These types of categories are called goal-derived categories; e.g. chewing gum and toothpaste both have the outcome of a fresh breath. Although members of goal-derived categories can have some physical attributes in common (for instance a mint flavor), these categories are primarily created with respect to the fulfillment of certain goals (e.g. Barsalou, 1983; Ratneshwar, Barsalou, Pechmann, & Moore, 2001). Another type of categorization for which similar physical attributes are of less importance is the use of script categories. These categories include products that play the same role in a routine or event, such as products used for breakfast time or at a birthday party (e.g. Mandler, Fivush, & Reznick, 1987; Nelson & Nelson, 1990).

In addition to the type of categories, it is also of relevance to consider the arrangement of products within a category. What constitutes a category is in fact not very strict; category membership is more a matter of degree. This is called 'the family resemblance' approach (Rosch & Loyd, 1978; Rosch & Mervis, 1975). Some products are better examples of a category than others, for example a chair is a more typical example of furniture than a bookcase. Categories thus have a graded structure, with the most representative members in the center and weaker members on the outside (Barsalou, 1985; Viswanathan & Childers, 1999). In the center of a category is the prototype. This is a kind of ideal that consumers have in mind based on previous experiences. It combines the most important properties of a category but *does not have* to exist in the real world (Antonides & Van Raaij, 1998; Rosch & Loyd, 1978). An exemplar or specimen is a concrete product or item which is a typical example for a category, which *does* actually exist (Antonides & Van Raaij, 1998; Medin, Altom, & Murphy, 1984). The prototype theory and the exemplar model complement each other, and both stress the importance of similarity between products in categorization. These theories are of relevance for new product development because it is important to know which existing (the 'exemplar') or

ideal (the 'prototype') products consumers consider as very representative for a particular category. After all, a new product is easier identified as belonging to a particular product category when it is more similar to a very typical product from that category (Loken, Barsalou, & Joiner, 2008). In the case of new meat substitutes, a meat substitute is thus more likely to be identified by consumers as an alternative to meat when it resembles a typical meat product.

1.4. Categorization of foods

How food products are categorized probably differs from categorization of other types of products. Food seems to be the only domain that has both taxonomic and script-based categories. As a consequence food products are sometimes cross-classified into many categories (Nguyen & Murphy, 2003; Ross & Murphy, 1999). For example, foods are related to other foods because they are in the same script-based category (e.g. eggs and toast are both breakfast foods) and/or by shared properties (e.g. toast and muffins are both made from wheat) (Ross & Murphy, 1999). The category meat is such an example of a strong taxonomic category, which is of relevance for meat substitutes. Since new sustainable meat substitutes should be replacers for meat in the diet, the first step is to find out how consumers perceive and categorize these types of products. We were interested whether meat and meat substitute products are seen as completely separate categories or whether shared categories exist and if so, on what basis these categories are formed. This information is valuable for product design and marketing of Novel Protein Foods. After all, when meat substitutes share a certain category with meat it will be more likely these will be chosen as an alternative.

The objective of this work was therefore to examine which category representations consumers have about meat and commercially available meat substitutes.

2. Methods

To get insight in which category representations consumers have about meat and meat substitutes, at first the generation of categories is required, followed by an assessment of category structure and how the products relate to each other (see also the study procedures in Ross & Murphy, 1999). The study therefore consisted of two subsequent steps, which are described below as Step 1 and Step 2.

2.1. Step 1

The first step involved the generation of categories focussing on the following questions: Which products, both meat and meat substitutes, are placed together in groups? What types of labels are used to describe the formed groups? This was done by a free-sorting task, which is especially suitable for unravelling consumers' cognitive structures of low involvement products such as food products (Bech-Larsen & Nielsen, 1999). It uses a procedure in which participants group stimuli (e.g. products or picture cards) based on their perceived similarities. The method assumes that how the stimuli are sorted into categories represents the consumer's underlying mental processes how products are perceived and which associations people have with these products [see literature on this technique reviewed by Blake, Bisogni, Sobal, Devine, and Jastran (2007)].

2.2. Step 2

In this step the validity and structure of the individually generated categories from Step 1, was investigated in more detail: Which products are considered to be typical for the generated

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