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Credence and the effect on consumer liking of food – A review

Abstract

Credence characteristics play an important role in the modern food marketing system. Consumers' food choices are increasingly influenced by credence cues, as other links of trust and direct relations with the producers have vanished within the globalised food system. Labels and information signalling credence are thus important search attributes.

While credence cues cannot be accurately evaluated by consumers, the expectations they generate have an effect on consumers' perceived quality and sensory experiences. This paper reviews relevant literature from the period 2003-2012 and summarises research concerning the effect of credence cues on consumers' hedonic liking of food. A conceptual model based on a framework of consumers' quality perception process is presented and applied. Seven main categories of credence characteristics can be identified in the literature: a) health; b) organic food; c) origin; d) brand; e) production methods; f) ethics; and g) descriptive food names and ingredients. Theoretical and practical limitations and possible trajectories to future research are discussed.

1. Introduction

The direct link between producers and consumers vanished with the introduction of modern food distribution systems, so consumers today have to rely on other sources of information to gain trust in the food they purchase and eat. In determining the quality of a product, a distinction can be made between search qualities, which can be ascertained before consumption, and experience qualities, which can only be ascertained after consumption (Nelson, 1970). Credence, which cannot be evaluated in normal use, has been suggested as a third class of quality properties (Darby & Karni, 1973). It may involve labels or other kinds of information signalling, e.g. nutritional value, food safety, ethics or trust. Credence refers to the credibility of the seller in relation to the buyer (Grunert, 1997), but even after using a product, credence claims cannot be verified by the consumer due to lack of technical expertise or practical possibilities (Ford, Smith & Swasy, 1988). The inability of consumers to evaluate certain intrinsic qualities, for instance taste, before purchasing increases the importance of credence characteristics (Lobb & Mazzocchi, 2007). These characteristics are thus transformed into search attributes, often in the form of labels (Caswell & Padberg, 1992; Caswell & Mojduszka, 1996). The role of credence in the marketing of food is most probably increasing in importance in relation to other search and experience characteristics, as pointed out by Grunert, Bech-Larsen and Bredahl (2000).

Credence regarding food products is suggested to cover categories related to health, production methods, environmental and social orientation, local production and origin, certification systems and other labels (Moser, Raffaelli & Thilmany-McFadden, 2011). Brands, which are identified as significant extrinsic signals (Deliza & MacFie, 1996), fall within the definition of credence characteristics as they are built upon consumer trust and relationships (Kapferer, 2004).

1.1. Consumers' quality perception of food

External cues generate expectations about food products and influence consumer choice, sensory perception and hedonic liking of food, according to 'expectation theory' (Deliza & MacFie, 1996). The food quality perception process and choice behaviour of consumers have been studied and discussed based on several theoretical approaches (see e.g. Shepherd, 1989; Steenkamp, 1990; Furst, Connors, Bisogni, Sobal & Falk 1996; Grunert, Larsen, Madsen & Baadsgaard, 1995; Bernués, Olaizola & Corcoran, 2003). Using essential elements from these approaches, the conceptual framework depicted in Figure 1 illustrates how experienced food quality is influenced by: 1) intrinsic quality attributes of the physical product, which can only be ascertained through consumption (i.e. sensory properties, such as taste, leanness, tenderness) (Steenkamp & van Trijp, 1996); and 2) quality expectations. Expectations are formed by quality cues (Steenkamp, 1990), which in turn can be divided into intrinsic and extrinsic cues (Olson, 1977). Intrinsic cues are part of the physical product and can be assessed before consumption (e.g. colour, size, damage), while extrinsic cues are associated with the physical product, but not part of it (e.g. brand, label, price, packaging, retailer). Prior experience of a product also creates expectations (Deliza & MacFie, 1996; Grunert et al., 1995). To explain the role of credence in expectation formation, it is included as a special category of extrinsic cues in the proposed framework (Figure 1).

FIGURE 1 IS INSERTED HERE

Figure caption:

Figure 1. Effect of credence on consumers' experienced sensory quality of food. Grey areas represent factors covered by the studies reviewed here.

A widely used method for measuring consumers' experienced quality of food (i.e. liking and acceptability) is the hedonic scale (Lawless & Heymann, 2010). According to this, measured consumer liking of a food is defined as a dependent variable, while quality attributes and quality cues are defined as independent variables. The expectations generated are then interpreted as a mediating variable, representing a mechanism through which the focal independent variable is able to influence the dependent variable (Baron & Kenny, 1986).

Quality perceptions are also influenced by the personal and situational factors occurring in a contextual setting. These include factors such as personal values, beliefs, attitudes and demographics (Steenkamp, 1990). Meal preparation, consumption situation, context and environment can also be grouped into this category of factors (Furst et al., 1996; Grunert et al., 1995; Bernués, Olaizola & Corcoran, 2003; Köster, 2009). They can be referred to as moderating variables, i.e. variables that divide the independent variable into subgroups which establish its domains of maximal effectiveness with regard to the given dependent variable (Baron & Kenny, 1986).

1.2. Applying the conceptual framework

The applicability of the conceptual framework (Figure 1) can be tested on previous research findings. During the 1990s, a stream of research explored the effects of health information on consumers' hedonic liking. The health-related credence cue of fat content has been shown to affect consumer liking in several studies (e.g. Light, Heymann & Holt, 1992; Wardle & Solomons, 1994; Brochetti, Mason, Ball & Duncan, 1998), while more recent research has found effects of information about salt content (Liem, Miremedi, Zandstra & Keast, 2012). Associations with symbols signalling sensory properties can be learned, e.g. one study found that symbols signalling sugar content were learned by a consumer panel and subsequently generated expectations and influenced the responses of panel members (Kuenzel, Zandstra, El-Deredy, Blanchette and Thomas, 2011).

The introduction of a mediating variable, i.e. 'quality expectations', has revealed that consumer liking can move in the direction of expectations, e.g. after information on reduced fat pound-cake, crackers and American cheese (Tuorila, Cardello & Leshner, 1994) and sausages (Kähkönen & Tuorila, 1998).

Another finding following the introduction of subgroups based on moderating variables was that factors such as attitudes influence liking, e.g. health-conscious consumers rate reduced-fat labelled products more highly than the corresponding unlabelled products (Aaron, Mela & Evans, 1994; Kähkönen, Tuorila & Rita, 1996; Kähkönen, Tuorila & Lawless, 1997; Westcombe & Wardle, 1997). Wansink and Park (2002) showed that health-conscious consumers were not affected by soy labelling, but believed that candy bars labelled with health claims tasted better than they had expected.

Moderating demographic factors such as gender and age also modify consumer responses. Female consumers tend to give health-labelled products higher hedonic scores than men do (Kähkönen et al., 1996; Kähkönen et al., 1997; Westcombe & Wardle, 1997), while older consumers score health-labelled products higher than younger consumers do (Tuorila, Andersson, Martikainen & Salovaara, 1998).

Based on these examples, the conceptual framework in Figure 1 appears valid. This is corroborated by other studies addressing the issue, e.g. regarding descriptive food names (Tuorila, Meiselman, Bell, Cardello & Johnson, 1994; Lange, Martin, Chabanet, Combris & Issanchou, 1999), animal welfare (Oude Ophuis, 1996), organic production (Johansson, Haglund, Berglund, Lea & Risvik, 1999), production method (Lange, Rousseau & Issanchou, 1998; Siret & Issanchou, 2000), brand and origin (Guinard, Uotani & Schlich, 2001; Lange et al., 2002).

1.3. Aim and purpose

In recent decades there has been increasing research into credence as an extrinsic cue and its effect on consumers' quality perceptions, but there is no up-to-date review of the literature. Based on the conceptual framework and theoretical context described above, this study reviewed recent research on consumers' hedonic evaluation of food as affected by credence and examined the implications and possible trajectories to future research.

2. Materials and methods

An extensive search of the literature was conducted for papers relating to credence attributes and their effects on consumers' perceived quality of food. A broad search was conducted for relevant papers in the period 2003-2012 using major databases, e.g. Web of Science/CAB abstracts and Scopus, and three general categories of search words, which were combined: i)

parameters indicating consumer ‘liking’, ‘acceptance’ or ‘hedonic’ evaluation; ii) parameters indicating the presence of ‘information’, ‘extrinsic’ cues, ‘label’ or ‘credence’ (including refinements of the results based on the most common credence cues ‘health’, ‘organic’, ‘brand’, ‘origin’, ‘tradition’, ‘fair trade’ and ‘production method’); and iii) a refinement based on the words ‘consumer’ and ‘food’ in some searches. Related literature cited in the reference list of papers found in the search was also reviewed and added if relevant.

Only research papers written in English and published in scientific journals were included. Studies which did not separate the component parts of a bundle of factors (i.e. several credence cues presented at the same time) were not included. To further delimit the results and reduce the initial large amount of papers, only studies describing consumer panels using hedonic liking scales were included, as hedonic scaling is a widely used method to measure consumers’ experienced quality of food (i.e. liking and acceptability) (Lawless & Heymann, 2010). Other practical limitations, such as time and budgetary constraints, ultimately ended the active search for further papers.

3. Results and discussion

The review included 68 papers published 2003-2012, distributed over seven credence categories (Table 1): 1) Health-related components; 2) organic; 3) origin; 4) brands; 5) production method-related; 6) ethics-related; and 7) descriptive food names and ingredients. An overview of the papers is provided in the Appendix. The conceptual model was adhered to while reviewing each paper to check its relevance, allowing three different types of papers to be distinguished: i) Including one or several credence cues and a consumer evaluation; ii) including a mediating variable, following expectation theory (which includes both evaluation of expectations of liking and hedonic liking under blind and informed conditions); and iii) including moderating factors, either through analyses of consumer subgroups or the use of multivariate analyses, and possibly also including expectations.

TABLE 1 IS INSERTED HERE

3.1. Health-related credence

Taste is generally described as the most important factor in consumers’ choice, but health considerations are suggested to be another influential factor (Roininen, Lähteenmäki & Tuorila, 1999; Carillo, Varela, Salvador & Fiszman, 2011), and an important signal for consumers (Szykman, Bloom & Levy, 1997). In the present review, papers addressing health-related credence comprised the largest category (30/68). The majority of these (24/30) supported the notion that health-related credence, either alone or under the influence of mediating and moderating variables, affects consumer perceptions. The moderating factors of attitudes and/or health interest, gender and age were the most commonly occurring additional factors.

The theoretical hypothesis that credence affects consumers’ hedonic liking is confirmed by e.g. Annett, Muralidharan, Boxall, Cash and Wismer (2004), who found that health claims increased consumer liking of processed bread, and Bølling Johansen, Næs, Øyaas & Hersleth (2010), who showed significant positive effects of information about low sugar content on liking of yogurt. Carillo, Varela and Fiszman (2012b) presented evidence that nutrition and diet claims (non-sugar) had negative effects on hedonic sensory characteristics of biscuits, while Vidigal, Minim, Carvalho, Milagres and Gonçalves (2001) found that information on health benefits had a positive effect on hedonic evaluations of exotic fruit juices. However,

Roosen, Marette, Blanchemanche and Verger (2007) found only a relatively weak impact of health information on hedonic scores when testing liking of canned fish.

While these studies provide relatively clear evidence of the effects of credence on hedonic liking, other studies contribute more vague evidence, addressing interfering issues. Kihlberg, Johansson, Langsrud and Risvik (2005) found that information about a cholesterol-reducing effect of bread was a significant factor in hedonic liking, but only in an interaction with flour type (organic or conventional wheat), indicating that sensory properties are not overshadowed by extrinsic information. Cox, Melo, Zabaras and Delahunty (2012) concluded that health claims on *Brassica* varieties did not affect liking other than for Brussels sprouts and suggested that a more important approach to increase popularity would be to address taste dimensions.

Consumer liking has also been shown to be affected in different directions by credence depending on food type. In a cafeteria study, diet and health labels influenced taste perceptions positively for desserts but not for entrées, suggesting that such labels might affect the perceived taste positively in the case of more hedonistic foods (i.e. desserts and snack foods), but not in the case of more healthy utilitarian foods (Wansink, van Ittersum & Painter, 2004). Health-related information can have a negative effect on liking, e.g. information about alcohol-free wine (Meillon, Urbano, Guillot & Schlich, 2010), although factors such as product involvement, age and knowledge also significantly moderate the results. These findings indicate that consumer responses to health-related credence information are dependent on product type.

The majority of the 30 relevant papers reported significant effects of health credence on liking, but one group of studies reported the opposite. Health claims had no effect on liking in the case of chicken soup labelled with a 'healthy tick' compared with 'reduced salt' or a control (Liem, Toraman Aydin & Zandstra, 2012b). No significant effects were observed with cereals labelled 'smart choice' (Roberto et al., 2012), yogurts labelled with fat content (Bølling Johansen et al., 2010), health claims concerning soy in yogurt-like fermented soya drinks (Behrens, Villanueva & da Silva, 2007), health claims about consuming lamb meat (Prescott, Young, Zhang & Cummings, 2004) and health claims connected with soy products (Teh, Dougherty & Camire, 2007). Di Monaco, Ollila and Tuorila (2005) found no effect on liking of chocolate bars with health claims, but discovered through focus group interviews that healthiness might be irrelevant for chocolate products. As mentioned above, type of food seems to determine whether health information has an effect on hedonic liking. Earlier studies include cases where health aspects do not affect liking, suggesting that food which is already considered healthy is not affected by information about e.g. fat content (Kähkönen et al., 1996; Kähkönen et al., 1997; Westcombe & Wardle, 1997).

3.1.1. Effects of expectations generated by health-related credence

Expectations, generated by information provided, are reported to have an effect on hedonic ratings in the case of health and nutrition claims for biscuits (Carillo, Varela & Fiszman, 2012a; Carillo et al., 2012b), soup with a reduced salt health label (Liem et al., 2012a), and nutritional facts on milk and soybean beverages (Villegas, Carbonell & Costell, 2008). Expectations had no effect in two cases, one where nutritional facts were provided on yogurt and fermented milk (Bayarri, Carbonell, Barrios & Costell, 2010) and one where consumers were informed about alcohol-free wine (Meillon et al., 2010). Three previous studies tested the effect of repeated exposure, implicitly a variant of the mediating factor of expectations: Repeated exposure was tested by Luckow, Sheehan, Fitzgerald and Delahunty (2006) in a consumer assessment of probiotic orange juice and by Kuenzel, Blanchette, Zandstra, Thomas

& El-Deredy (2012) in an assessment of teas with claims of being energising or relaxing, with both sets of researchers finding an effect of information in combination with exposure. Stein, Nagai, Nakagawa and Beauchamp (2003) tested the effect of repeated exposure on a bitter beverage with health claims and found no increase in hedonic liking as an effect of time, but noted a behavioural change favouring the novelty beverage in the longer perspective. These three studies demonstrated significant effects of information in combination with repeated exposure, supporting the theoretical stance that expectations generated by previous experiences and repeated exposure can bias consumer evaluations.

3.1.2. Effects of attitudes, health interest and consciousness

Moderating factors, such as attitudes, health interest and consciousness, may play a role in consumer liking of foods with added health claims. Villegas et al. (2008) showed that type of information, i.e. beverage type (soymilk and milk) and nutritional facts, significantly affected hedonic rating, but with higher acceptability for soymilk among consumers interested in healthy eating. Similarly, Baixauli, Salvador, Hough & Fiszman, (2008) showed that information about fibre content in muffins had a positive effect on hedonic liking, with health-conscious consumers giving higher ratings and less health-conscious consumers lower ratings when fibre information was provided. However, in many other assessments of products such as yogurts (Bølling Johansen et al., 2010), tomato juice (Goerlitz & Delwiche, 2004), a blueberry-soy product (Teh et al., 2007), soup (Liem et al., 2012b), mayonnaise (Miele, Di Monaco, Cavella & Masi, 2010), lamb (Prescott et al., 2004), fish (Roosen et al., 2004), fruit juice (Sabbe, Verbeke, Deliza, Matta & Van Damme, 2009), and chilli paste (Toontom, Meenune & Posri, 2010), health attitudes, interest or consciousness had no significant effect on hedonic ratings. This could possibly depend on type of product tested and associations with the product, rather than on the information provided. However, the contradictory results cannot fully explain how, when and why health attitudes, consciousness and interest affect consumer responses to health-related credence.

3.1.3. Effects of gender

Gender appears to be an influential moderating factor when it comes to responses to healthy food. For example, Bowen et al. (2003) showed that women who expected low-fat milkshakes reported higher liking scores than those who expected high-fat milkshakes, while Bower, Saadat and Whitten (2003) and Behrens et al. (2007) observed that information on low calories had a stronger effect on females than on males. Bayarri et al. (2010) found no influence of information about compositional details (e.g. fat content) of yogurts and fermented milk on acceptability for a larger population, but detected differences for subgroups of different genders. Similarly, a study exposing information on the antioxidant content in chilli pastes found a significant effect of information on hedonic ratings only in an interaction with females interested in new healthy food (Toontom et al., 2010). Previous studies have also shown that women tend to be more interested in health and taste aspects of food than are men (Roininen et al., 1999). Two studies which included gender as a moderating variable, one testing tomato juice (Goerlitz & Delwiche, 2004) and one testing a novelty fruit juice (Sabbe et al., 2009), reported no effect or only a marginal effect of gender on experienced quality due to a health claim.

3.1.4. Effects of age

In an assessment where consumers tasted different teas, the majority of consumers favoured a black tea when tasting in blind conditions, whereas with information presented the acceptance ratings were generally higher for green teas, especially for consumers in their 20s and 50s (Cho, Chung, Kim & Kim, 2005). Bayarri et al. (2010) observed significant effects in liking

due to age on providing nutritional facts about yogurts. These results support the claim by Roininen et al. (1999) that younger consumers are less concerned about health and more interested in taste than are older consumers. However, in one study, younger consumers gave higher ratings than older consumers when testing wine with information concerning its alcohol-free status (Meillon et al., 2010). In two cases, one assessment of soy-enhanced tomato juice (Goerlitz & Delwiche) and one of a novelty fruit juice (Sabbe et al., 2009), age had no effect on liking.

3.1.5. Other moderating variables

Three studies which included consumption frequency of a product labelled with a health claim demonstrated significant effects of consumption habits on reported liking for organic bread and health information (Annett et al., 2008), health claims on *Brassica* (Cox et al., 2012) and consumption of tomato juice, where frequent consumers of tomato juice gave higher ratings to a soy-enhanced tomato juice in informed conditions (Goerlitz & Delwiche, 2004). This indicates that previous experiences of a product in combination with positive information raise sensory expectations. In a similar way, neophilic consumers are reported to give higher ratings for novelty food with health claims than do more neophobic consumers, e.g. in the case of mayonnaise (Miele et al., 2010) and fruit juice (Sabbe et al., 2009). This may indicate that a consumer who is more open-minded towards novelty foods is more easily affected by positive claims than are more neophobic consumers.

3.1.6. Health-related credence, summary

To summarise, the most commonly studied health-related credence characteristics to date are fat, fibre, salt and sugar content, and health claims. The effects of health credence on consumers' hedonic liking, i.e. the effect of label alone on liking based on a whole population, do not seem to be significantly greater than in cases where credence has no effect. With the introduction of mediating and moderating factors, significance is generally stronger based on subgroups of consumers, for example health attitudes, gender and age. However, only a few studies report a strong effect of health attitudes/interest/consciousness on liking in combination with health information, whereas many studies report no effect. The role played by these factors in consumer experiences is thus not fully understood. Food/product type also seems to have an effect, indicating a need for more research into how health credence affects consumer experiences of different types of food.

3.2. Organic

Organic production could refer simply to a credence of production method, but in practice it consists of a cluster of attributes ranging from food safety, nutrition aspects, ethic values, health and environmental concern to more production-specific issues such as pest management, fertiliser usage and soil treatment. Organic is a common credence food attribute and is often supported by a specific label or certification. Several studies on consumer behaviour in relation to the attribute 'organic' have found health to be the primary reason for consumers buying organic foods, followed by taste (Ekelund, 2003; Hughner, McDonagh, Prothero, Shultz II & Stanton, 2007). Values as motivators for organic food consumption include those of food security and health, hedonism (as good taste is one of the most important purchase criteria), stimulation (excitement, novelty and challenge in life) and universalism (environmental and social orientation) (Aertsens, Verbeke, Mondelaers & Van Huylenbroeck, 2009). Thus, organic is accounted for as a separate credence category in this review.

Overall, signals of organic appear to affect consumers' hedonic ratings in a positive direction, with all papers studying this credence (9/68) reporting significant effects due to the information. Kihlberg et al. (2005) found that an 'organic' label on bread had a stronger effect on liking than information on health effects and novelty, while Ekelund, Fernqvist and Tjärnemo (2007) showed that tomatoes labelled organic, regardless of origin, received significantly higher liking scores than tomatoes labelled with country of origin (imported). Annett et al. (2008) found that consumers liked organic bread more than conventional under both blind and labelled conditions. In an assessment of yogurts, organic yogurts gave no significant differences in liking with or without labels, but one of two conventional yogurts received higher scores when wrongly labelled as organic (Toschi et al., 2012), possibly indicating that products with appreciated sensory properties are less affected by labelling.

3.2.1. Effects of expectations

Two of the studies on the organic attribute used expectation theory and both indicated that liking is moved in the direction of expectations. In one of these studies, beverages with organic information led to higher liking scores than blind tests (Caporale & Monteleone, 2004), and in the second study expected and perceived liking were both higher for organic beef than for conventional (Napolitano et al., 2010).

3.2.2. Effects of moderating variables

Introducing moderating variables alters the effect on liking of attitudes toward organic, or environmental issues, or certain values. In a study on liking of bread, Annett et al. (2008) found that stronger attitudes towards environmental issues led to higher liking of organic bread, but that higher income, education and consumption frequency also played a role. In another study, liking of orange juice was increased with an organic label, and consumers attaching greater importance to the value of 'warm relationships with others' associated organic with a more favourable hedonic rating (Grankvist, Lekedal & Marmendal, 2007). Poelman, Mojet, Lyon and Seda-Dedeh (2008) concluded that organic affected hedonic ratings in a positive direction, as positive attitudes towards organic and fair trade led to a stronger sensory impact of pineapple, whereas the opposite was true for subjects with negative attitudes. Information about organic ingredients in soups has been shown to improve consumer acceptability and increase liking among consumers with low consumption frequency, with neophobic females being more reactive to organic information and males being unaffected (Di Monaco, Cavella, Torrieri & Masi, 2007).

3.2.3. Organic, summary

The literature shows that credence signalling organic affects consumer liking, mainly in a positive direction. Food labelled 'organic' may have an advantage in signalling taste to the consumer in comparison with other credence attributes. In addition, values, beliefs and attitudes play a role in expectations in these cases, while one study found that gender and education are also relevant factors. However, as only one of these studies was conducted after 2008, the topic of credence signalling organic could require additional up-to-date research. In addition, it remains to be determined whether there are any actual sensory differences between organic and conventional food, which could verify or disprove the common claim that 'organic tastes better'.

3.3. Origin

It is generally accepted that country of origin (COO) labelling has an effect on consumers' product evaluations. The literature on COO-effects has been reviewed by e.g. Bilkey and Nes (1982), Al-Sulaiti and Baker (1998) and Verlegh and Steenkamp (1999). Region of origin

(ROO) has also been shown to have an effect on consumers' quality experiences (e.g. Kuznesof, Tregear and Moxey, 1997; van der Lans, van Ittersum, De Cicco and Loseby, 2001; van Ittersum, Candel and Meulenberg, 2003).

The eight papers addressing origin as credence all report significant effects on consumer liking. The COO effect is evident as a clear tendency for domestic produce to be favoured over imports, and more local or regional food to be favoured over food with less specified origins. The majority of subjects surveyed by Dransfield et al. (2005) preferred pork labelled as originating from their own country to imports, and scores for appreciation increased for both French and British consumers. In a Swedish study, consumers gave significantly higher grades of liking to tomatoes labelled domestic than to imports (Ekelund et al., 2007). Information on local and regional origin is reported to have similar effects, with Spanish consumers rating cured ham from domestic products and Iberian breed pigs significantly higher than French imports. In that study regional origin was the most influential attribute, but only with specific origin attached, while official EU labels of origin had no influence on either blind or informed subjects (Resano, Sanjuán & Albisu, 2007). Locally produced ham received higher ratings from consumers originating from that area, as well as previous consumption of that product (Resano et al., 2007). Dekhili and d'Hauteville (2009) tested olive oils and found that regional image influenced expected overall quality regardless of the respondents' nationality, but that regional image had a real effect on hedonic scores in only one case. In a study focusing on export claims, Ngapo, Riendeau, Laberge and Fortin (2012) observed a COO effect but acting in the other direction, as consumers told that meat was intended for the domestic market gave it higher rating than when informed it was intended for a general export market. However, when those consumers were informed that the products were intended for a high quality export market (Japan), the ratings increased.

3.3.1. Expectations generated by origin

A label signalling domestic produce generally generates a positive expectation and higher liking than for imports. Caporale, Policastro, Carlucci and Monteleone (2006) confirmed that information signalling origin (local) affects product acceptability and increases hedonic expectations among familiar consumers of olive oils. Both origin and traditional method information on salami caused consumers to have the highest expectations for regional products with a traditional production method and hedonic ratings moved in the direction of expectations, showing that regional origin had an effect on consumers' liking (Iaccarino, Di Monaco, Mincione, Cavella & Masi, 2006). The consumers' own regional belonging, a moderating variable, also had an effect in this case. A narrower and more precisely defined area of origin (from national to local) increased both expectations and liking of the Italian speciality spelt among Italian consumers (Stefani, Romano & Cavicchi, 2006), indicating that the more 'local' a product is claimed to be, the more liked it is by consumers.

3.3.2. Origin, summary

The literature shows that signalling of national or regional origin has effects on consumers' hedonic liking and that domestic, or regional, products are favoured over products from elsewhere. Four studies following expectation theory showed that liking is moved towards expectations. Moderating factors such as consumers' origins appear to have a significant effect (van der Lans et al., 2001), suggesting that a feeling of belonging to a specific region creates positive emotions towards food from that area, enhancing the effect of origin.

3.4. Brands

In the modern food distribution system, brand has become an increasingly important quality signal. Keller's (1993) consumer-based definition of brand focuses on the consumers' associations, based on brand awareness and brand image. Brand adds to the consumers' perceived value of a product or service, and customer-based brand equity occurs when the associations are favourable, strong and unique (Keller, 1993), while trust develops and an emotional relationship follows (Kapferer, 2004). Thus, food brands play an important third-party role in the food marketing system through their impact on consumer confidence in food quality (Caswell & Padberg, 1992).

Of nine papers on this subject, all but one confirmed that brand has an effect on consumer liking for food. Di Monaco, Cavella, Iaccarino, Mincione and Masi (2003) found that brand name and colour of tomato puree seemed to be more important than taste and odour on hedonic perceptions, favouring the market-leading brand. According to Resano et al. (2007), a distributor's brand, when attached to superior quality attributes, had a higher impact on liking than the producers' brand in the case of cured ham, while brand loyalty as a moderating variable was significant for all of the samples tested. Allen, Gupta & Monnier (2008) tested brands of cola drinks and found evidence that brand affects consumer perceptions and is related to consumer value, suggesting that human value priorities and cultural symbols influence taste evaluation. Paasovara, Luomala, Pohjanheimo and Sandell (2012) also tested the effect of values on hedonic liking of branded products and found that a hedonic evaluation of a well-known domestic brand of yogurt increased when the brand was exposed and that personal values had a positive effect on experienced quality, with brands signalling the same values. The latter two studies indicate that value symbolism is an important signal of brands, and that personal values should be congruent with brand values to receive an effect of liking due to a credence signal. In one study, teenagers tested branded breakfast cereals and crackers with different brand concepts, but no significant effect of brands on liking could be found (Allison, Gualtieri & Craig-Petsinger, 2004).

3.4.1. Brands as generating expectations

Four papers confirm the validity of expectation theory as regards the effect of brands. Varela, Ares, Giménez and Gámbaro (2010) tested orange-flavoured drinks with available market brands, finding that brand and package had a large impact on consumers' liking scores only for well-recognised brands; informed liking scores were closer to expected liking than to blind, indicating that brand information was more important than sensory characteristics. Di Monaco, Cavella, Di Marzo and Masi (2004) showed that pasta brands resulted in different hedonic ratings in blind and informed tests, with ratings moving in the direction of expectations, while demographic factors and consumption habits had no effect. In an assessment of chocolate, Torres-Moreno, Tarrega, Torrescasana and Blanch (2012) found that consumers' expected liking of dark chocolate was mainly affected by brand, whereas in blind conditions it was due to type of product (a higher cocoa content was less preferred). Socio-economic background variables may have an influence on how brands are perceived according to a study in which children rated different brands of chocolate cake (Sosa and Hough, 2006). Children from low-income households showed no difference in rating between brands, whereas children from medium and high-income families rated the more expensive brand more highly and gave it higher expectancy scores.

3.4.2. Brands, summary

To summarise the effects of brands, a clear majority of the papers reviewed indicate that brand as credence has an influential effect on consumer perception. However, it is not fully clear what part of the brand generates the expectations. While branding is becoming even

more important as a signal of quality to the consumer, the mechanisms by which brand affects consumers hedonic liking of food are not fully explained. Brand research is a large field, but brand research including consumer acceptance studies related to the credence signalled by brand is a rather unexplored area.

3.5. Production method

The credence of production method may contain different dimensions. On the one hand it may attribute to culture and tradition, meaning traditional production methods related to specific regions or cultures. As food systems have become more globalised and industrialised, consumers are increasingly aware of food from many different places, but as the ‘link to nature’ has eroded, they show an interest in dedicated rather than generic products (Murdoch & Miele, 1999). Production method may also refer to modernity or science, as in the case of genetic modification (GMO), although GMO may also be attributed to food safety and ethics. GMO and the industrialisation of food production are described as important credence dimensions for consumers and their awakening interest in food production and lack of knowledge about it (Grunert, 2002). Previous research has found that GMO labels decrease liking of food compared with unlabelled conditions (Lähteenmäki et al., 2002).

Seven of the 68 papers reviewed here deal with the effect of credence signalling production method and how consumer perceptions are affected. All seven show significant effects of credence on liking. Signals of tradition appear to have a positive impact on consumers’ quality perceptions and liking of food, e.g. Siret and Issanchou (2000) found that ‘tradition’ labels significantly increased hedonic liking for patés. Di Monaco et al. (2007) observed no significant effects of information on soup stabilisation technology (chilled fresh, frozen or canned) on consumer acceptability scores, although high-frequency users showed the greatest decrease in acceptability when informed that the soup was frozen or canned, and gender and neophobia scores affected liking through interactions. Altintzoglou et al. (2012) tested liking of chilled fish after providing information about chilling technology and found that fresh cod fillets gave higher evaluation scores when labelled ‘fresh’ than when unlabelled, whereas the liking of thawed cod fillets decreased with labelling.

3.5.1. Expectations as generated by knowledge of production method

Caporale and Monteleone (2004) provided consumers testing beers with information on traditional brewing methods or the use of genetically modified yeast and observed significant effects on expected liking, with traditional information leading to higher liking scores and GMO information signalling leading to more negative scores. Liking thus moved towards expectations. Iaccarino et al. (2006) presented information about geographical origin and traditional production method for salami in a consumer assessment and found the highest consumer expectations for regional products with a traditional production method (which gave higher liking scores), while industrial products led to decreased liking. In an assessment testing the acceptability of novelty preservation techniques, Cardello (2003) found support for an assimilation of disconfirmed expectations, i.e. the worse chocolate puddings were expected to be due to a certain technology, the lower the ratings, and vice versa. Technologies associated with strong concerns (e.g. addition of bacteriocins) showed a larger decline in liking in informed conditions than technologies with low concern levels (e.g. pasteurisation and cold preservation), with females showing higher concern levels than men (Cardello, 2003). Van Wezemael et al. (2012) tested information about application of different beef technologies in hedonic tests and found that it enhanced consumers’ expectations and liking of beef, but the effects differed for three different countries, indicating that consumer origin, or culture, is a moderating variable giving different outcomes. Cerjak, Karolyi and Kovacic

(2011) showed that information about a particular pig breed used in sausages affected preferences in a positive direction for a traditional breed and in a negative direction for a modern breed, but with full assimilation towards expectations only for the modern breed, indicating that intrinsic cues have an impact even under informed conditions.

3.5.2. Production method, summary

To summarise, credence cues addressing production methods affect liking, while expectations are also affected by information and influence hedonic ratings. Cues signalling traditional production seem to affect liking in a positive direction, whereas signals of ‘modernity’ or ‘industrialised food’ seem to have a negative impact on liking. However, depending on the characteristics of the information about production method, the weight of the attributes may differ, and the number of papers found here was rather too limited to generalise consumer responses to a wide array of production-related factors, especially in novel production technologies.

3.6. Ethics

Organic is often referred to as a signal of ethics, although bundled with many other credence categories, but few studies examine other credence types in the category. Food labels signalling ethics, such as ‘organic’ and ‘fair trade’, are relatively new, so the body of research on consumer responses to these credence cues is limited. In this review we found two papers addressing the issue of fair trade in combination with organic, and four studies addressing the case of animal welfare.

3.6.1. Fair trade

Grankvist et al. (2007) showed that fair trade labels increased consumer liking for orange juice, with consumers attaching greater importance to the value of ‘warm relationships with others’ associating fair trade with a more favourable hedonic rating, while the value ‘security’ was positively associated with a taste preference for fair trade but not for organic. In another study, consumers evaluating pineapples also gave higher hedonic ratings to products labelled as organic and fair trade, with positive attitudes towards organic and fair trade leading to a stronger sensory impact, whereas negative attitudes gave the opposite effect (Poelman et al., 2008). In both these cases, values and attitudes seemed to be relevant moderating factors in the case of consumer responses to ‘fair trade’.

3.6.2. Animal welfare

Labels showing production methods for pigs (indoor or outdoor), signalling animal welfare, have been shown to have a significant effect on consumer liking, favouring pigs reared outside (Dransfield et al., 2005). Napolitano, Caporale, Carlucci and Monteleone (2007a) showed that consumers of beef were influenced by information about animal welfare and moved their actual acceptability in the direction of expected liking. Information induced a higher expected liking, which suggests that information on animal welfare may be used to differentiate between meat from competing industrialised and traditional firms. In another study, Napolitano et al. (2007b) assessed the effect of information about production system and animal welfare of lamb on acceptability and found that information about artificially reared lamb resulted in lower consumer ratings than when tested blind, even though expected liking were even lower than actual liking. Liking of meat from ewe-reared lambs was not affected by information, but both expected and actual liking were higher than for artificially reared lamb, indicating that this credence can be an important determinant of food acceptability. Maiorano, Kowalyszyn, D’Allesandro and Martemucci (2010) also tested lamb and feeding system and found that lamb fed with maternal milk from ewes reared on grass

received lower hedonic scores in blind conditions than lamb fed with milk from mothers reared in stalls, but that label information reversed these liking scores.

3.6.3. Ethics, summary

The results reported in the literature show that credence signalling ‘fair trade’ and ‘animal welfare’ has an impact on consumers’ hedonic liking in both cases. As moderating variables, attitudes and values seem to be important in the case of ‘fair trade’. As regards animal welfare, however, earlier research was unable to prove that animal welfare (e.g. free range) affects hedonic ratings, other than in interaction with previous experience (Oude Ophuis, 1996). Thus, more recent research indicates a shift in consumer responses, suggesting that consumers have become more aware of issues related to animal welfare. As pointed out by Bernués, Olaizola and Corcoran (2003), animal feed assurance is an indicator mainly of safety and associated with nutritious and healthy meat. Bearing in mind the different food scandals as regards meat production, as described by e.g. Berg (2004) and Bánáti (2011), consumer trust in the distribution chain and production systems for meat is decreasing. Consequently, signals of trust are probably becoming more important to the consumer. Knowledge of these responses of credence related to the distribution chain and production system is still limited.

3.7. Descriptive food names

The literature search identified a group of characteristics that is not an established credence category, but which has strong similarities to the previously described categories. This category includes descriptive food names, novelty food and names of ingredients, but it is debatable whether this category is actually a credence characteristic or whether it is related to something else. Descriptive food names have been shown to influence consumer liking and function as a signal of food quality (Wansink, van Ittersum & Painter, 2005). Furthermore, signalling sensory characteristics has been shown to influence food choice (Swahn, Mossberg, Öström & Gustafsson, 2012), which is a practice frequently used by the wine industry (Dimara & Skuras, 2005; Herdenstam, Hammarén, Ahlström & Wiktorsson, 2009). Depending on context, descriptive food names, flavour descriptors and names of food dishes and ingredients may signal credence and create expectations, in turn affecting hedonic liking. This may apply for example when introducing a novelty food, as consumers without previous experience must rely on a description of the food, or in a restaurant or catering setting, when the name on the menu is the only available information. This type of information has been shown to enhance the acceptance of both novel and familiar food (Tuorila et al., 1994). There is consensus in the studies included in this review that descriptive food names have an effect on consumer responses, with two of the studies including expectations, and two moderating variables.

The category includes two studies of descriptive food names. Wansink et al. (2005) tested restaurant food with descriptive food names and found that consumers rated foods with evocative names more highly than those with regular names. Focusing on ingredient names, a ‘dark chocolate’ label induced higher ratings of ‘chocolatey’ than samples labelled ‘milk chocolate’, though liking was not affected (Shankar, Levitan, Prescott & Spence, 2009). Parker and Penfield (2005) showed that vanilla ice cream labelled ‘natural’ was liked more than other labels and, when labelled, artificially flavoured ice cream was liked less than when unlabelled. Allison et al. (2004) found that flavour descriptors had an effect on teenagers testing new products of cereals and crackers, while Okamoto et al. (2008) observed that consumers who tasted samples of taste solutions with food name labels (e.g. lemon, coffee, jelly) rated them significantly more highly than those presented with random numbers. Vidigal et al. (2011) found that information on juice flavours influenced the liking of exotic

juices. All these cases suggest that this type of information influences consumers' taste perceptions. Kuenzel et al. (2011) tested the learning of new symbols associated with taste, i.e. sweetness and saltiness of yogurts, and concluded that predictive cues can lead to assimilation effects for liked food products if the cue is presented supraliminally and the products are liked, indicating that the sensory properties of the drink itself play a role in modulating assimilation effects.

3.7.1. Expectations

Two studies included expectations. Lee, Frederick and Ariely (2006) showed that consumers rated liking of beer lower when they were informed about an added ingredient, suggesting that preferences were influenced primarily through the effect of expectations. Yeomans, Chambers, Blumenthal and Blake (2008) tested different names for the same food product (a frozen fish dish) and found that 'smoked salmon ice-cream' generated dislike among consumers, while 'frozen savoury mousse' generated higher acceptance scores, including in the direction of expectations.

3.7.2. Moderating variables

In terms of moderating variables, Allen et al. (2008) reported that consumers testing beef sausages and a vegetarian alternative who endorsed values symbolised by the product evaluated it more favourably, suggesting that information and value endorsement interact and thus influence taste evaluations. When testing food descriptors for novelty foods with Americans and Koreans tasting Korean salad dressings and beverages, the labelling effect was relatively small compared with other factors, with moderating variables in this case (food attitudes, flavour preferences, food neophobia and nationality) having effects on liking (Chung et al., 2012). These results suggest that both values and attitudes towards novelty moderate consumer perceptions.

3.7.3. Descriptive food names, summary

To summarise, all of the studies reviewed here provide evidence of changes in consumer evaluations due to the information supplied, suggesting that in the absence of other claims, descriptive food names and ingredients may provide substantial information to the consumer about which food to trust. Thus, depending on context, descriptive food names and ingredients are suggested to count as credence and to have a significant impact on consumers' quality experiences, although these characteristics cannot always be properly verified by the consumer. However, factors such as the sender of the information, the trustworthiness of the claim or the situation where it is presented could all have an effect on consumer interpretation of this credence.

4. Methodological issues

Consumers' quality perception of food products is part of a complex process, and all parts are not fully understood. This review included only studies using consumer panels and hedonic evaluations of food in combination with exposed credence cues. Studies using other methods, such as conjoint analysis (e.g. Deliza, MacFie & Hedderley, 2003; Cox, Evans & Lease, 2010; Hoppert, Mai, Zahn, Hoffman & Rohm, 2012), which ranks different credence cues, or methods using willingness to pay (e.g. Napolitano, Pacelli, Girolami & Braghieri, 2008), combined with tasting, were excluded. Some labels are well known, while others are more anonymous. Some credence factors seem to have a strong impact, while others have a weaker impact. Meanwhile, in a real situation, many products present more than one type of credence together with many other extrinsic and intrinsic quality cues. The complexity of consumer

responses when several interfering factors are available make these challenging to describe and evaluate.

Another important aspect in understanding consumer perception processes is knowledge of how the human brain works and how cognitive processing might modulate neural responses to taste and odours. By using functional magnetic resonance imaging (fMRI), McClure et al. (2004) found that two separate brain systems were involved in generating preferences when consumer tasted cola drinks. Sensory information was found to lead to brain activity in the ventromedial prefrontal cortex, whereas brand knowledge (in this case) biased preference decisions and recruited the hippocampus, the dorsolateral prefrontal cortex and the mid-brain, systems that appear to function independently. Other studies using fMRI (e.g. Plassmann, O'Doherty, Shiv & Rangel, 2008), have shown that taste expectations increase and that brain activity increases in the medial orbitofrontal cortex when consumers are exposed to the information about the price of a wine. De Araujo, Rolls, Velazco, Margot and Cayeux (2005) describe how cognitive, semantic information modulates olfactory representations in the brain by providing visual word descriptors of odours. These studies using fMRI provide important insights on the complexity of consumer perceptions and brain processes, and indicate a need for understanding how these processes interact and generate consumer responses.

Most of the evidence in this review is based upon short-term studies (i.e. often using no more than one trial). A few studies are based upon repeated exposure, although within at most a couple of weeks. The long time perspectives needed when establishing new products, brands or certifications to build consumer trust and relationships indicate that the effects of such signals on consumer responses, e.g. taste perceptions of food products, need to be studied over longer time periods.

5. Conclusions

This review on the effect of credence cues on consumer liking of food identified seven clear categories of credence in the existing literature. The significant effects found on consumers' hedonic liking based on credence cues provide relatively strong evidence for accepting the conceptual framework presented in Figure 1. The review showed that consumer associations with credence characteristics generate sensory expectations, so that theories on consumers' quality perception process are validated and strengthened. The mediating variable 'expectations' has been tested in several studies and shows significant strength in predicting consumer responses in many cases. There is clear evidence of how sensory expectation is generated by external cues and how it affects perception and hedonic ratings. This suggests that the inclusion of expectations in consumer sensory studies is important for understanding consumer responses and that methodological issues can be further developed, e.g. to make results from different studies more comparable. Moderating variables have been shown to have significant effects in most cases, but less strong or even insignificant effects in other cases.

The 'health-related' credence is the most widely studied type so far, perhaps unsurprisingly, as much of the recent literature focuses on credence cues in this category, and public interest in health is strong. The complexity of health-related credence, the effect on consumer responses and the sometimes contradictory results (not least as regards consumer attitudes to health, health interest and consciousness) indicate that the knowledge base needs to be broadened. Several of the papers reviewed here suggest further studies. Generally, the literature studying the effect of health credence presents somewhat ambiguous results depending on product. Suggestions that specific types of foods already perceived as healthy

are not affected by health claims need to be verified and explained. Moderating variables, such as gender and age, have been shown to have an effect on liking, but the correlation between health attitudes, consciousness, interest and consumer liking is not equally strong, indicating that this relationship needs to be further examined.

The credence category of 'organic' contains health-related components, but also includes an ethical dimension. Consumers generally associate organic food with better taste, and signalling of 'organic' has a high impact on consumer liking. However, it is less clear why consumers have higher sensory expectations for organic food. There is evidence that 'organic' is a strong credence cue, but more up-to-date research is needed to understand its impact and how it works. The common notion that 'organic tastes better' also needs to be verified or disproved through consumer assessments covering a broader range of food products.

All studies including 'origin' as a credence cue report a strong COO and regional effect on consumer liking, favouring domestic and regional food over imports. The more regional or local the product is believed to be, the higher the evaluation scores. This effect is moderated by origin or belonging to the specific area, which tends to increase liking for products from the same region.

'Brand', a credence category relying strongly on trust and relationships with the consumer, has a strong effect on liking, particularly in the case of market-leading brands. However, it is not fully clear what part of the brand generates the sensory expectations. Combining brand research with consumer acceptance studies may be a fruitful approach to gain a deeper understanding of how consumers' sensory perceptions are affected by brand.

Studies focusing on 'production method' show that consumers tend to trust traditional and natural production methods more than methods associated with modernity and industry. Signalling production method has strong effects on consumer perceptions, especially if combined with specific regional origins. These results might indicate consumer distrust in more industrial production systems. When marketing 'taste' in particular, 'traditional' seems to be a strong signal, generating expectations, which are generally assimilated in the consumption situation. As technology develops in the food sector, GMO products are introduced and many new innovative solutions enter the market, knowledge of consumer responses to novel technologies will become an area of great interest for science and industry.

The credence category of 'ethics' mainly includes the effects of fair trade and animal welfare, where the credence has an effect on liking in all cases. The most widely studied topic in this category is 'animal welfare', supporting the notion that consumers are becoming more aware of meat quality and animal welfare after a series of food scandals related to the meat industry, particularly in Europe. In general, however, the field of ethical credence and the effect on consumer responses needs more study.

In the absence of brands and other sources of information, 'descriptive food names and ingredients' generally have a strong effect on consumer liking. This is suggested as a credence category in this review, but with some question marks. Context most probably determines the applicability, and factors such as the sender of the information, the trustworthiness of the claim and the situation could all have an effect on this credence category.

Studies on other credence categories than those described in this review, such as food safety and other types of quality certifications, were not found through the literature search, indicating gaps in this research field.

One question that arises is how associations with credence are developed, and how long it takes to build up consumer trust with certain credence characteristics before it affects sensory expectations. It has been shown that symbols can be learned and associated with specific tastes and that generated expectations due to a learned signal have the greatest effect on liking if the food product is already liked. This implies that associations are learned, but also that a product must have good sensory properties to have a positive impact on future expectations. Hence, for credence to work as a taste signal towards the consumer, and to enhance quality experiences from a marketing perspective, it is necessary to meet consumer expectations with high sensory qualities of the food product, not to erode positive associations and expectations.

Consumer behaviour is a complex issue and consumers are confronted with a massive amount of information in the purchasing situation and in a context of manifold personal and situational factors. However, some findings on the effects of credence on consumer liking can be applied by practitioners. Firstly, taste is one of the most important factors for consumers when choosing food, meaning that regardless of credence, food products must have a good taste and appearance, i.e. attractive intrinsic attributes, to be accepted. Secondly, a competitive advantage could be reached by applying credence cues if they are known to have an effect on consumer behaviour, and if consumer expectations can be met. However, as this review shows, we know very little about the credence cues in relation to each other and to other search cues. To gain more knowledge about consumer perceptions of food quality in real life settings, a wider approach of research is recommended, for example through the use of different multi-attribute model approaches in consumer response evaluations. The main finding of this review is clear: Credence cues are important factors in explaining consumers' perceived quality of food, and the fact that the 'label has a taste' is reason to study the issue further in order to provide a deeper understanding of consumer responses and behaviour.

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Appendix

Credence cue categories - effects on consumer hedonic ratings. Reviewed literature.

Reference	Country, no consumers	Physical product	Credence 1) 2)	Expectations	Moderating variables 3)
Health related					
Annett et al. (2008)	USA, n=384	Bread	Organic/health info* Org./environment info*		E*, F* I*, V*
Baixauli et al. (2008)	Spain, n=102	Muffin	Fibre content*		H*
Bayarri et al. (2010)	Spain, n=120	Yogurt, Fermented milk	Nutritional facts*	X	A*, G*
Behrens et al. (2007)	Brazil, n=53	Fermented soyamilk	Health claim*	X*	G*
Bølling Johansen et al. (2010)	Norway, n=153	Yogurt	Fat content Sugar content*		H
Bowen et al. (2003)	USA, n=192	Milk shake	Fat content*		
Bower et al. (2003)	UK, n=70	Fat spread	Health claim*		F, G*, A, H
Carillo et al (2012a)	Spain, n=90	Biscuits	Health claim*	X*	
Carillo et al. (2012b)	Spain, n=120	Biscuits	Nutrition claims* Sugar content*	X*	
Cho et al. (2005)	South Korea,	Tea	Health claim*		A*

Cox et al. (2012)	n=500 Australia, n=200	Brassica	Health claim*		F*
Di Monaco et al. (2005)	Finland, n=79	Chocolate bar	Health claim		
Goerlitz & Delwiche (2004)	USA, n=100	Tomato juice	Health claim*		A, G, H, F*, N
Kihlberg et al. (2005)	Sweden, n=480	Bread	Health claim* (Organic)* (Novelty)*		
Kuenzel et al. (2012)	UK, n=148	Tea	Health claim*		Exp*
Liem et al. (2012a)	Australia, n=50	Soup	Health label (salt)*	X*	
Liem et al. (2012b)	NL, n=46	Soup	Health label		H
Luckow et al. (2006)	USA, n=116	Probiotic orange juice	Health claim*		A, Exp*
Meillon et al. (2010)	France, n=194	Wine	Alcohol content*	X	A*, G*, K*, PP*
Miele et al. (2010)	Italy, n=82	Mayonnaise	Health claim*		Neo*, A*, H
Prescott et al. (2004)	Singapore, n=246; New Zealand, n=246	Lamb	Health claim		H, N
Roberto et al. (2012)	USA, n=216	Cereals	Health claim		
Roosen et al. (2007)	France, n=115	Fish	Health claim*		H
Sabbe et al. (2009)	Belgium, n=86	Fruit juice	Health claim*		A*, G*, Neo*, H
Stein et al. (2003)	USA, n=27	Bitter beverage	Health claim		Neo, V, Exp
Teh et al. (2007)	USA, n=52	Soy product	Health claim		V
Toontom et al. (2010)	Thailand, n=129	Chilli paste	Health claim*		G*, H, V
Vidigal et al. (2010)	Brazil, n=106	Fruit juices	Health claim* (Ingredient)*		
Villegas et al. (2008)	Spain, n=108	Milk and soybean beverages	Nutritional facts*	X*	H*
Wansink et al. (2004)	USA, n=324	Cafeteria food	Diet/health label*		
Organic					
Annett et al. (2008)	USA, n=384	Bread	Organic/health info* Org./environment info*		E*, F* I*, V*
Caporale & Monteleone (2004)	Italy, n=105	Beer	Organic* (Tradition)* (GMO)*	X*	
Di Monaco et al. (2007)	Italy, n=109	Soup	Organic* (Prod. technology)*		A, F*, G*, Neo*
Ekelund et al. (2007)	Sweden, n=186	Tomatoes	Organic* (Domestic)* (Imports)*		
Grankvist et al. (2007)	Sweden, n=64	Orange juice	Organic* (Fair trade)*		V*
Kihlberg et al. (2005)	Sweden, n=480	Bread	Organic* (Health claim)* (Novelty)*		
Napolitano et al. (2010)	Italy, n=145	Beef	Organic*	X*	
Poelman et al. (2008)	UK, n=55; NL, n=51	Pineapple	Organic* (Fair Trade)*		V*

Toschi et al. (2012)	Italy, n=60	Yogurt	Organic*		F
Origin					
Caporale et al. (2006)	Italy, n=34	Olive oil	Origin*	X*	
Dekhili & d'Hauteville (2009)	France, n=82, Tunisia, n=128	Olive oil	Origin*		N*
Dransfield et al. (2005)	UK, France, n=144	Pork	Origin* (Prod. system)*		N*
Ekelund et al. (2007)	Sweden, n=186	Tomatoes	Domestic* Imports* (Organic)*		
Iaccarino et al. (2006)	Italy, n=80	Salami	Origin* (Trad. prod. method)*	X*	N*
Ngapo et al. (2012)	Canada, n=96	Pork	Intended for export Int. for home market*		
Resano et al. (2007)	Spain, n=213	Ham	Intended for Japan* Origin* Certification (Brand distributor)*		B, N*, F*
Stefani et al. (2006)	Italy, n=77	Spelt	Origin*	X*	
Brands					
Allen et al. (2008)	Australia, n=160	Cola drinks Sausage	Brand* (Ingredient)*		V*
Allison et al. (2004)	USA, n=300/300	Cereals Crackers	Brand concept (Flavour descriptor)*		
Di Monaco et al. (2003)	Italy, n=90	Tomato puree	Brand*		
Di Monaco et al. (2004)	Italy, n=45	Pasta	Brand*	X*	A, F, G, H, V, W V*
Paasoara et al. (2012)	Finland, n=86; 76	Yoghurt	Brand*		
Resano et al. (2007)	Spain, n=213	Ham	Brand distributor* (Origin)* (Certification)		B, N*, F*
Sosa & Hough (2006)	Argentina, n=127	Chocolate cake	Brand*	X*	I*
Torres-Moreno et al. (2012)	Spain, n=109	Chocolate	Brand*	X*	
Varela et al. (2010)	Uruguay, n=108	Orange drinks	Brand*	X*	
Production methods and tradition related					
Altintzoglou et al. (2012)	UK, n=133	Cod filets	Fresh/thawed*		
Caporale & Monteleone (2004)	Italy, n=105	Beer	Tradition* GMO* (Organic)*	X*	
Cardello (2003)	USA, n=42/46	Chocolate pudding	Preservation technology*	X*	V*, G*
Cerjak et al. (2011)	Croatia, n=100	Sausage	(Trad.) breed*	X*	
Di Monaco et al. (2007)	Italy, n=109	Soup	Prod. technology* (Organic)*		A, F*, G*, Neo*
Iaccarino et al. (2006)	Italy, n=80	Salami	Trad. prod. method* (Origin)*	X*	N*
Van Wezemael et al.	Belgium,	Beef	Prod. method*	X*	N*

(2012)	n=108; Norway, n=110				
Ethics-related					
Dransfield et al. (2005)	UK, France, n=144	Pork	Prod. system* (Origin)*		N*
Grankvist et al. (2007)	Sweden, n=64	Orange juice	Fair trade* (Organic)*		V*
Moirano et al. (2010)	Italy, n=20	Lamb	Feeding system*	X*	G
Napolitano et al. (2007a)	Italy, n=84	Lamb	Animal welfare*	X*	
Napolitano et al. (2007b)	Italy, n=145	Beef	Animal welfare*	X*	F*
Poelman et al. (2008)	UK, n=55; NL, n=51	Pineapple	Fair Trade* (Organic)*		V*
Descriptive food names and ingredients					
Allison et al. (2004)	USA, n=300/300	Cereals Crackers	Flavour descriptor* (Brand concept)		
Allen et al. (2008)	Australia, n=160	Cola drinks Sausage	Ingredient* (Brand)*		V*
Chung et al. (2012)	S. Korea n=87, USA, n=106	Dressing Beverage	Food name*		Neo*, V*
Kuenzel et al. (2011)	UK, n=39	Yogurt drinks	Learned symbols*		
Lee et al. (2006)	USA, n=90; 139; 159	Beer	Ingredient*	X*	
Okamoto et al. (2008)	Japan, n=46	Aqueous solutions	Food name*		
Parker & Penfield (2005)	USA, n=150; 60	Ice cream	Ingredient*		
Shankar et al. (2009)	UK, n=48	Chocolate m&m	Ingredient*		
Vidigal et al. (2010)	Brazil, n=106	Fruit juices	Ingredient* (Health claim)*		
Wansink et al. (2005)	USA, n=140	Restaurant food	Food name*		
Yeomans et al. (2008)	UK, n=32; 44; 60	Savory mousse	Food name*	X*	

*Indicates a significant effect, $p < 0.05$

1) Credence within parenthesis not covered under subheading. Asterisk indicates significant effect of credence alone, or with an effect of mediating and/or moderating variables.

2) X indicates the inclusion of expectation theory. These studies also include blind testing. *Indicates significant effect of expectations.

3) Letters indicates that moderating variables are used in the model. *Indicates a significant effect either alone or in interactions. Letters are: A=Age, B=Brand/store loyalty, E=Education, Exp=Repeated exposure, F=Consumption frequency/habit, G=Gender, H=Health consciousness/attitude, HS=household size, I=income, K=knowledge about product/previous experience, L=Location of test (home, laboratory), N=Nationality/regional/ethnicity belonging, Neo=Neophobia scales, P=Product involvement, PP=Price/maximum price paid, S=Store/place of purchase, V=Values, attitudes, beliefs, concern, W=Workplace/employment