

A better understanding of consumer perceptions of the naturalness of food products in relation to their degree of processing.

Résumé :

La perception de la naturalité par les consommateurs joue un rôle crucial dans leurs choix et leur propension à privilégier les aliments. Les travaux de Roman et al. (2017) nous fournissent un cadre théorique permettant de catégoriser les différents attributs qui interviennent dans cette perception. Bien que de nombreuses études se basent sur cette catégorisation (Staub et al., 2020), peu d'entre elles contribuent à faire évoluer ce cadre en apportant de nouveaux éléments évaluant la perception de la naturalité par les consommateurs (Schirmacher et al., 2023). Cette recherche a pour objectif de préciser les dimensions de la naturalité et d'étudier les perceptions relatives aux procédés et aux formulations d'aliments permettant un gain de naturalité en termes de conservation. Pour cela, cinq groupes de discussion ont été réalisés, impliquant en tout 34 personnes. Notre étude prolonge et complète le cadre présenté par Roman et al. (2017), en introduisant de nouveaux attributs de la naturalité. Elle précise la manière dont la confiance influe sur les attributs "locaux" et "transformation traditionnelle", révélant que leur impact sur la perception de la naturalité est en réalité indirect et lié à la confiance que les consommateurs accordent aux produits alimentaires.

Mots Clés : Naturalité, Conservation, Culture, Élevage, Alimentation, Transformation

Abstract :

Consumers' perception of naturalness plays a crucial role in their choices and propensity to prefer foods. The work of Roman et al. (2017) provides us with a theoretical framework for categorizing the various attributes involved in this perception. Although many studies are based on this categorization (Staub et al., 2020), few contribute to evolving this framework by providing new elements assessing consumers' perception of naturalness (Schirmacher et al., 2023). The aim of this research is to clarify the dimensions of naturalness and to study perceptions relating to food processes and formulations enabling a gain in naturalness in terms of preservation. To this end, five focus groups were conducted, involving a total of 34 people. Our study extends and complements the framework presented by Roman et al. (2017), introducing new attributes of naturalness. It clarifies how trust influences the "local" and "traditional processing" attributes, revealing that their impact on the perception of naturalness is actually indirect and linked to the trust consumers place in food products.

Keywords: Naturalness, Preservation, Growing, Farming, Food, Processing

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Introduction : The naturalness of food products is one of the most desirable attributes in the eyes of consumers (Roman et al., 2017). However, although much work has been undertaken since the early 2000s on naturalness (Rozin, 2005, 2006; Rozin et al., 2012; Roman et al., 2017; Etale & Siegrist, 2021), consumer attitudes and perceptions of naturalness can be hardly developed. As part of a systematic review, Roman et al. (2017) identifies the perceived importance of the naturalness of food by consumers, in 3 distinct categories (appendix 1) : the way the food is grown (relating to its origin), the way the food is produced and prepared and the properties of the final product (representing the result or outcome). This study provides us with a theoretical framework grouping together the different attributes (14) of food naturalness for consumers. Roman et al. (2017) also define that among these categories, the perceived degree of processing is the key to naturalness for consumers. It is interesting to note that much of the current (Schirmacher et al., 2023) and previous work on naturalness deals more with the second category (processing) than the other ones, and is based on studies of finished products often presented in their final packaging. Our intermediate approach, focusing mainly on categories 1 (cultivation) and 2 (processing), stands out by taking into consideration the various levels of processing to which consumers are exposed (fresh product, frozen product, etc.). The aim of this study is to complete this body of knowledge by specifying the dimensions of naturalness perceived by consumers (perception of food processes, animal welfare, packaging, etc.) in a context of more or less advanced food product processing. Based on the framework defined by Roman et al. (2017), we will focus more on categories 1 (cultivation) and 2 (processing) during this study. In order to meet these objectives, 5 focus groups were conducted with a sample of 34 people. The results improve on Roman et al. (2017) categorization by proposing new sub-categories and new attributes of food naturalness for consumers, within the three existing broad categories (cultivation, processing and finished product). Our results also suggest that the perception of naturalness associated with a local and/or traditionally produced food is actually influenced by the consumer's trust in these two attributes. Thus, local and traditional would not directly define the naturalness of a product in the eyes of the consumer. This original contribution needs to be taken further and confirmed by more quantitative approaches.

Perceived naturalness : The concept of naturalness is considered abstract (Roman et al., 2017) and has no universally accepted definition. In this study, we define perceived naturalness as the cognitive attitude of consumers towards the different attributes (how the food is grown, how the food is produced and the final product) on which their assessment of whether a food product is natural or not is based. Although attitude is commonly conceptualized as comprising three distinct dimensions in a three-dimensional model - cognitive, affective and behavioral (Girandola & Fointiat, 2016) - our study will focus specifically on the cognitive dimension. Cognitive attitude can be defined as the set of beliefs, including the evaluation, positive or negative, of an object on the basis of relevant attributes that consumers use to evaluate products (Eagly & Chaiken, 1993; Fishbein & Ajzen, 2010). These attributes (belief-evaluations) refer to the "subjective probability" that a product possesses a particular trait or characteristic (Fishbein & Ajzen, 2010). Previous studies have shown that the naturalness of a food product has a positive influence on consumer attitudes and intentions. For example, Govaerts & Olsen (2023) demonstrated that the perceived naturalness of seaweed-based food products elicits a positive response from Norwegians.

How food is grown: clarifying the 'local' attribute and integrating 'animal welfare'. To date, research into naturalness has focused on two attributes: whether products are organic or non-organic and whether they are local (Roman et al., 2017). Other studies report links between the notion of animal welfare and the perception of the naturalness of food products (Bertrandias et al., 2021 ; Spooner et al., 2014). As Bertrandias et al. (2021) point out, this natural behavior is associated with a representation of traditional farming where the mother cares for the baby, and where the animal develops in a natural environment conducive to play and social interaction (evoking the image of vast natural spaces and a lost paradise). The impact of the scale of a farm on the perception of animal welfare also seems to have an effect on consumer perception (Spooner et al., 2014). Consumers believe that a healthy or satisfying life for farm animals is more likely to be achieved through 'small family farms' (Spooner et al., 2014). For Alonso et al. (2020), consumers consider organic farming systems and the food produced from them to be more respectful of animal welfare. In terms of growing and farming, Yu et al. (2017) suggest that millennials are more likely to support local food production. Recently, Jorge et al. (2020), have confirmed these results. These new attributes enrich the framework established by Roman et al. (2017) and provide us with clarifications on the interactions between categories 1 (growing and rearing) and 2 (processing).

How food is produced: the impact of the nature and scale of processing on the perception of the naturalness of food products. Etale & Siegrist (2021) identify that perceptions of the naturalness of food processing techniques are more strongly associated with the traditional nature of a process than with the nature (chemical or physical) of the transformations produced. In particular, their study shows that wine processing techniques are perceived as natural despite the fact that its production involves chemical transformations, unlike irradiated foods, which involve physical processes and are hardly perceived as natural. Again according to Etale & Siegrist (2021), small-scale production increases the perception of naturalness in the eyes of consumers, despite whether the product is organically or intensively grown. Alongside these results, Etale & Siegrist (2021) provide a new attribute sought by consumers, for whom a food product composed of organic ingredients increases the perception of naturalness. Other studies moderate the impact of certain attributes within category 2. Research by Jorge et al. (2020) indicates that the 'traditional' aspect of production methods does not seem to be associated with 'the way food is produced' for millennial consumers. In a study comparing differences in perceptions of wine naturalness between Swiss and Australian consumers, Staub et al. (2020) found cultural differences between participants from different countries, demonstrating the importance of taking this factor into account in our analyses.

The final product : consumers' new attributes of packaging. The research conducted by Roman et al. (2017) does not appear to include the impact of packaging in its framework. However, it does appear that packaging has an effect on the natural appearance of a food product. Transparent packaging lends an impression of naturalness to the product, which influences purchase intention (Lunardo & Saintives, 2013; Pal et al., 2018). Similarly, simple packaging, which preserves the raw appearance of the food, is associated with an artisanal production method and a natural product composition (Thomas, 2014; Lith, 2015).

Methods : This study aims to gain a better understanding of how consumers perceive the naturalness of food products, depending on their level of processing. In this context, a qualitative approach was carried out through 5 focus groups, with a sample of 34 individuals (sample structure appendix 3). Focus groups are recommended for exploring broad topics and phenomena such as those in our study, namely the notions of perception and attitude. In addition, this method offers us the opportunity to distance ourselves from previous work using more quantitative methods (e.g. Etale & Siegrist, 2021) and to focus the notion of

naturalness around conservation methods. For this purpose, an interview guide was formalized, including the different themes that have emerged from the literature : (1) consumers' attitudes to natural foods, (2) and the definition of naturalness, (3) as well as a more specific focus on these themes around one sector. Five sectors were defined and presented during the interviews: meat, fish, fruit and vegetables, dairy products and bakery/pastry. For all of these sectors, we determined the different preservation methods specific to each of them (example meat sector, appendix 4). Each interview was dedicated to a different sector and was conducted face-to-face. The fully transcribed interviews (6 hours and 15 minutes of recordings, 108 pages of transcripts) were then coded and a thematic content analysis was carried out using Nvivo analysis software.

Results : *How food is grown: new dimensions of attributes in terms of the origin of raw materials.* Our study differs in that it focuses on the different processing methods. This choice means that the discussions focus more on the first category (cultivation and breeding methods). Of the 5 focus groups, only the participants discussing the bakery-pastry sector did not mention the first category. Of the 5 focus groups, only the participants discussing the bakery/pastry sector did not mention the first category. For consumers, it seems that the more a product is processed, the less they question the origin of the raw materials making up that product: *"When I make recipes with lots of ingredients, I ask myself far fewer questions than I would for a raw product"* (focus 5, Céline). Consumers are therefore interested in the origin of fresh or raw products (meat, fish or fruit and vegetables, for example) as opposed to processed products (wheat with bread, for example) or ultra-processed products (ready meals). This difference lies in the fact that when they buy processed products, consumers focus on the natural aspect of the product they have in their hands at the time. They are not interested in the origin or naturalness of all the components of the product, but rather in the product itself. These results could explain the fact that a large volume of the corpus dealing with naturalness focuses on the second category and the relative importance given to the first category in terms of naturalness in the eyes of consumers.

Secondly, our results enrich and confirm the attributes present within the first category defined by Roman et al. (2017). For consumers, attributes in terms of organic farming and rearing extend beyond the framework imposed by the label. Indeed, it is increasingly apparent that there is a greater demand for more sustainable farming, free from additives and pesticides: *"in the sense that the colour of the farmed salmon we buy is due to the additives we add to their feed because they are grey"* (focus 4, Céleste). Our results show that the notion of animal welfare is present in consumers' perception of naturalness. The idea of a natural living environment and natural food is expressed through the representation of free-range farming, in a habitat similar to the wild, as well as through healthy food: *"in this case, what the hen eats and what it does with it afterwards inevitably has an impact on the natural aspect"* (focus 2, Coralie). The association between local and natural food is reflected in our results: *"If I'm told I'm eating beef from Germany or Romania, I'm less confident and it seems less natural to me, even if the processing conditions are correct"* (focus 2, Alice). However, even if initially the local aspect is favoured in a comparison with foreign products, the way in which the product is reared and grown is considered more important than the origin, when it comes to assessing the naturalness of a product: *"For me, it's just a question of confidence in the provenance; when it's local, I have more confidence"* (focus 5, Mariane). These results show that perceived naturalness is reinforced by the concepts of local and traditional, but trust plays a crucial role in mediating between these concepts and the perception of naturalness.

The way food is produced: ever fewer additives and processing. Analysis of our interviews confirmed the presence of the "additive-free" attribute. It would seem that, for

consumers, the naturalness factor lies more in the presence or absence of additives than in the various preservation methods presented during our study (freezing, drying, cooking, etc.): *"If a vegetable is just cut up and frozen, for me there aren't necessarily any additives, it's still natural"* (focus 1, Salomé). We were also able to confirm the belief placed on the attribute "minimal processes". In opposition to ultra-processed products, consumers associate the naturalness of a product with minimum processes, which preserve the original and therefore natural appearance of the food: *"It's ultra-processed. It doesn't look anything like leftover fish"* (focus 2, Céleste). The processing methods presented during our focus groups (particularly salting, smoking and drying) enabled us to identify a new attribute in this second category: "natural processing". These processes involve transforming and preserving raw materials using natural elements such as fire or salt, for example: *"It's a natural transformation. We're not going to add chemicals on top of that"* (focus 1, Salomé). For consumers, processing using natural elements maintains or even enhances natural attributes, particularly in terms of taste.

The final product: the conditions for natural packaging. On reading our results, the analysis seems to indicate that consumers identify packaging conditions that have a positive impact on the naturalness of a food product. These conditions are based on health and environmental attributes. First of all, the packaging must protect the contents of the product (no ingredient contamination or from outside r): *"I'd take a brick because it's not altered by UV rays and I think it's safer than a glass bottle"* (focus 2, Oscar). Similarly, some containers such as plastic can cause a transfer between the packaging and its contents, resulting in a reduction in the naturalness of the food they contain: *"We know very well that with all plastic containers there is an exchange between the plastic container and it's less natural"* (focus 2, Alice). So for these first two conditions, packaging that preserves the contents of its product is considered healthy and natural. The environmental notion also plays an important role for consumers, who demand that packaging be reusable : *"As far as glass is concerned, it always seems positive to me because you can reuse it and that also plays a part in what you do with this packaging. Recycling is also important to me"* (focus 2, Alice). The interviews revealed 2 types of packaging perceived as reusable and recyclable by consumers: glass and cardboard. Still in this environmental spirit, it appears that foods with minimal packaging are perceived as being more natural. *"It's all about minimal packaging"* (focus 2, Pierrick). Lastly, we found that fresh products, that is those with no special preservation methods, were perceived as more natural across all the sectors tested: *"the most natural is fresh"* (focus 4, Charlotte).

Integration of the processing and distribution scale dimension in consumer perception. Our study confirms and complements the initial results of Etale & Siegrist (2021), noting the presence of the notion of scales of processing and distribution in consumers' perceptions of naturalness. With regard to processing scales, our results corroborate those of Etale & Siegrist (2021). Indeed, it appears that consumers perceive processing as more natural when the scale is reduced: *"I think that I see naturalness in the small producer"* (focus 1, Salomé). This link between small-scale and natural is reinforced by the place of processing: *"If it was made in a factory, it wouldn't be natural"* (focus 5, Sandrine). For consumers, food produced on a small scale, for example on a farm or by a craftsman, will therefore be considered more natural. Our results also enrich this notion of scale by including distribution as a new attribute. As with category 2 (processing), a small scale of distribution increases the naturalness of a food product: *"If you buy it from a butcher, you know you're going to buy it because it's natural"* (focus 1, David). It would appear that butchers, bakers, fishmongers and other craftsmen represent, for consumers, distribution outlets that reinforce the natural aspect of food. Conversely, supermarkets are associated with processed and industrial products: *"We don't want any more of the processed products you find in supermarkets"* (focus 1, Salomé). These attributes add new sub-categories to the framework

initiated by Roman et al. (2017). However, it seems that this effect of scale can be mitigated by the notion of the local: *"In particular, there's the big Bigard factory next door to my parents' house. Incidentally, I know it's strange that it's a big factory, but I also know that the animals come from neighbouring farms, so I've always been pretty confident"* (focus 2, Alice).

Discussion and conclusion :

This research provides us with a new interpretation of the framework established by Roman et al. (2017), presented in Appendix 1. Our results (illustrated in Appendix 2), enrich this model by revealing new attributes (dotted boxes in Appendix 2) as well as raising some confusions around the concepts of local and traditional (black boxes in Appendix 2). Initially, our study enriches the initial work of Roman et al. (2017) within the three categories constituting its theoretical framework (dotted boxes in Appendix 2). The first category (how food is grown), initially composed of two attributes, organic and local, now seems to be opening up to new, broader attributes, and in particular towards more reasoned agriculture, without pesticides or additives. In this context, organic is no longer enough to define a food as natural; other considerations are being taken into account by consumers. We also find that consumers continue to pay significant attention to animal welfare in their perception of the naturalness of food products. Our results extend the work of Spooner et al. (2014) and Alonso et al. (2020) by demonstrating that where animals live (free-range or wild) and how they are fed (organic, health food, etc.) appear to be determining attributes in the eyes of consumers in their perception of a natural food. Natural processing (food preservation methods such as salting or smoking) is one of the attributes that have a positive impact on consumers' perception of a product's naturalness. In the third category (final product), packaging is also considered an attribute. Consumers define four characteristics that, in their opinion, constitute natural packaging: it must protect the product without altering its components or exterior, have no impact on the product, be reusable and minimalist. Consumers also perceive differences between packaging materials when it comes to evaluating a product as natural (cardboard, glass, etc.) or artificial (plastic). Extending the work of Etale & Siegrist (2021), our research highlights the presence of processing and distribution scales in the perception of the naturalness of food products. These new sub-categories highlight the fact that consumers make a link between small-scale production, natural products and the places they represent. For example, products made by food factories and distributed by supermarkets are perceived as industrial and therefore unnatural. Nevertheless, the impact of scale can be mitigated by taking into account proximity and the trust consumers place in this attribute. Our study highlights the confusion between the notions of local and traditional (black box in Appendix 2). Indeed, our analysis suggests that trust is a central, mediating notion for consumers to associate local/traditional actors or products as natural. In managerial terms, our study confirms that consumer attitudes to perceived naturalness represent an important challenge for the food industry, and ignoring it could prove risky for these players. Our results also attest to the fact that naturalness has consequences for all players in the food chain, and that a synergy between these players seems necessary to adapt to new consumer demands. In the light of our results, we encourage the agri-food industries (mainly large-scale, e.g. supermarkets and major food brands) to communicate on the origin of raw materials, the farming techniques used, going beyond the considerations specific to the various organic labels (sustainable agriculture), and on the notion of animal welfare. Finally, this study has its limitations, some of which offer pointers for further research. Firstly, our field of study (France) does not differ from previous work carried out in developed countries. It would be worth exploring whether a marked inclination towards natural foods is also found in developing countries. Another line of research would be to investigate the foundations and

interactions between the notion of perceived naturalness and trust, in order to understand how trust might intervene as a mediating concept. With this in mind, studies have been carried out on consumer trust in food system actors and food products, in different contexts, but to date, very few studies have looked at these two notions simultaneously.

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Appendix 1 : perceived naturalness for consumers (categorization taken from Roman et al., 2017).

| HOW THE FOOD IS GROWN | HOW THE FOOD IS PRODUCED | | | THE FINAL PRODUCT |
|-----------------------|----------------------------------|---------------------|---|--|
| | Ingredients used | | Production process | |
| | Free from | Presence of | | |
| Organic | Artificial ingredients | Natural Ingredients | Minimally processed | Healthy |
| Local | Preservative | | Traditional production (methods / homemade) | Tasty |
| | Additives | | | Fresh |
| | Artificial colors & flavors | | | Eco-friendly / in accordance with nature |
| | Chemicals, hormones & pesticides | | | |
| | GMOs | | | |

Note: categorization taken from Roman et al. (2017).

Appendix 2 : perceived naturalness for consumers.

| HOW THE IS GROWN | HOW THE IS PRODUCED | | | THE FINAL PRODUCT | | |
|--|----------------------------------|---------------------|---|-------------------|--------------------|--|
| | Ingredients used | | Production process | Processing scale | Distribution scale | Production process |
| | Free from | Presence of | | | | |
| More than organic farming, a sustainable agricultural system. | Artificial ingredients | Natural Ingredients | Minimally processed | Small-scale | Small-scale | Healthy |
| | Preservative | | Traditional production (methods / homemade) | | | Tasty |
| Local | Additives | | Natural processing | | | Fresh |
| Animal welfare: living environments, nutrition, free-range/ nature farming | Artificial colors & flavors | | | | | Eco-friendly / in accordance with nature |
| | Chemicals, hormones & pesticides | | | | | Packaging |
| | GMOs | | | | | |

Note : the categorization is taken from Roman et al. (2017), supplemented by our results.

Appendix 3 : sample structure.

| | N = 34 | | |
|--------------------------------|----------------------------|------------------|----------|
| Age | Categories | Effective | % |
| | 18 - 24 | 12 | 35,29% |
| | 25 - 34 | 7 | 20,59% |
| | 35 - 44 | 5 | 14,71% |
| | 45 - 54 | 4 | 11,76% |
| | 55 and more | 6 | 17,65% |
| Gender | Girls | 21 | 61,76% |
| | Boys | 13 | 38,24% |
| Professional categories | Students | 16 | 47,06% |
| | Managers and professionals | 10 | 29,41% |
| | Intermediate occupations | 8 | 23,53% |

Appendix 4 : meat industry survey.

Meats



Drying



Freezing



vacuum-packed



meat in oil



salting



fresh



cooked



smoking