



Genetically modified food versus knowledge and fear: A Noumenic approach for consumer behaviour



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ABSTRACT

The theme of genetically modified organisms is very important for modern consumers, especially when they approach novel foods. In this paper, we have attempted to assess the impact of genetically modified foods on the consumers' preferences, considering a new vision of ours: however, the conclusions also form a topic for further discussion. We conducted an investigation on a sample size survey. The analysis was carried out in a representative sample of more than 900 Italian families, selected based on a functional relationship to the objectives of the work. The aims of the present study were: firstly, investigating consumers' preferences regarding genetically modified food consumption and developing a quantitative model to formalize the origins of behaviours regarding consumers' preferences toward genetically modified food consumption; secondly, detecting the drivers of their purchase, underlining that only by reasoning it is possible to ensure that specific variables do not condition purchasing behaviour.

1. Introduction

Genetically modified organisms (GMOs) in the agri-food system continue to be a topic of controversy and debate all over the world. Continued opposition to them is affectively based, with several studies documenting a robust link between GMO and fear. For instance, some authors found that people's general neophobia (anxiety toward new events or things) was correlated with their concerns and negativity regarding novel food technologies. Opposition to other forms of new technology has its roots in fear and, accordingly, fear and general distress are highly inter-correlated (Royzman, Cusimano, & Leeman, 2017).

Despite a substantial body of work testifying to the prevalence of food neophobia in humans (Pliner & Hobden, 1992) and classic studies linking opposition to new technology with fear, others (Scott, Marsden, & Slusarski, 2016) did not explicitly assess fear. Therefore, it remains unclear which affective sensitivities (fear versus normative disapproval), if any, are genuinely at work when people oppose GM food.

The consumption of GM foods appears to be the cause of particular doubts and hesitations among consumers, especially in Italy and other parts of Europe. Italy is a country free of transgenic production, where traditional values, such as the Mediterranean diet, might reduce the diffusion of GM foods (Costa-Font & Gil, 2009).

One study (Boccaletti & Moro, 2000) showed that Italian consumers

had a low level of knowledge of the issue, but an overall positive attitude toward GM foods. Another study (Soregaroli & Boccaletti, 2003) demonstrated that the likelihood to purchase GM foods was lower for individuals who were more averse to risk, older, with higher education and less confidence in institutional guarantees. Another study underlined that Italian consumers were more sensitive to the potential risks that GM foods may pose to human health and the environment compared to American consumers (Harrison, Boccaletti, & House, 2004). Moreover, approximately 50% of Italian people do not consider GM food technology as useful or ethically acceptable. However, despite the enormous importance of the subject, reliable information about the consumption of GM foods in Italian people is scarce (Montuori, Triassi, & Sarnacchiaro, 2012).

From a marketing perspective, foods can be separated into three useful classes: search, experience and credence products (Nelson, 1970). Search products have attributes consumers can readily evaluate before they purchase. Well-informed buyers are aware of the substitutes that exist for these types of products and thus are likely to be more price sensitive than other buyers, unless there exists some brand reputation or consumer loyalty. This sensitivity, in turn, induces sellers to copy the most popular features and benefits of these types of products. Price sensitivity is high with respect to products with many substitutes, and because most buyers are aware of their alternatives, prices are held within a competitive band. Therefore, the first category contains the

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goods whose attributes can be made the object of research by the consumer (the physical characteristics of a product, for example). Experience products can be evaluated only after purchase. The consumer cannot pass judgment on value until he has experienced the service. These types of products tend to be more differentiated than search products, and buyers tend to be less price sensitive, especially if it is their first purchase of such products. However, because they will form an opinion after the experience, if it is not favourable, no amount of differentiation will bring them back. Product brand and reputation play an important role in experience products due to consistency of quality and loyalty. Therefore, products belonging to the second category have attributes that are revealed through experience of the product itself (the taste, for example). In the end, credence products have attributes buyers cannot confidently evaluate, even after one or more purchases. Thus, buyers tend to rely on the reputation of the brand name, testimonials from someone they know or respect, service quality and price. Credence products are more likely than other types to be customised, making them difficult to compare to other offerings because there are fewer substitutes to a customised product, and there is more risk in purchasing these kinds of products, price sensitivity tends to be relatively low. Therefore, the third category classifies goods whose attributes are difficult to detect in the short term, and the case of transgenic foods could be a particularly fitting example, even if it is not true from the price viewpoint.

However, this manuscript suggests a new approach that goes beyond the previously explained vision, whereas (more precisely) GMOs may be considered from a noumenic point of view (Boccia). Practically, GM foods cannot be perceived in a tangible way (because they are substantially equivalent to conventional products); they can be understood only through reasoning and, therefore, knowledge. Knowledge could be the variable that dampens the effect of fear and consequent behaviour.

The aim of this research was to identify factors relevant to consumers' preferences regarding GM food consumption, considering those main variables. The starting point was an important theoretical model of health education, which asserts that behaviour change is affected by knowledge and attitude: knowledge, attitude and behaviour (KAB) (Bettinghaus, 1986). To the best of our knowledge, no such study has yet examined that model for the analysis of consumers' preferences toward GM food consumption, particularly considering the fear toward this kind of consumption that is able to influence the consumer's behaviour. Therefore, in order to study the influencing factors of consumers' preferences toward GM food consumption, a new model has been introduced: knowledge, fear and behaviour (KFB). For this purpose, a survey was conducted to validate the model. The considered sample was 923 families in the main Italian cities. The data were then analysed through a structural equation model (SEM) that allowed us to validate the hypothesised model. The paper concludes by outlining the significance of the results and reflecting on the study limitations.

2. Materials and model

In recent decades, extensive investments have been spent in the development of genetically modified organisms, even if only a few of these have entered the market (Finucane & Holup, 2005; Rommens, 2010). The transformation of new findings into end consumer's products depends not only on scientific knowledge among scholars but also on legal, social, moral, ethical, and religious issues (Lazarowitz & Bloch, 2005). Thus, finding and evaluating any factors which can affect the acceptability of GMOs can be regarded as important.

Modern biotechnology, especially when linked with GMOs in food products, is considered by public opinion both opportunity and threat (Christoph, Bruhn, & Roosen, 2008; Pardo, Midden, & Miller, 2002). Previous studies (Allum, Surgis, Tabourazi, & Brunton-Smith, 2008; Šorgo & Ambrožič-Dolinšek, 2010) have shown that a correlation exists between knowledge of biotechnology and acceptance of GM foods, but

it is weaker than the correlation between attitudes toward and acceptance of them, confirming the importance of attitudes and emotions.

Between the perceived risk by GMOs and the real risks of implementing safety policy under the aegis of the emotion that distorts and ignores evidence, the latter is likely the most dangerous of the two. The emotions that everyone has toward various risks are an innate part of human cognition. Everyone interprets the perception of risk through instinct and emotion and, moreover, is more afraid of the imposed risks. This is why, for example, people want labels, so it is possible to know what is in food (Deisingh & Badrie, 2005; Jagadeesan & Salem, 2015).

The problem is that these emotional filters sometimes lead to altered or incorrect perceptions. Once those thoughts are in place, no amount of evidence or reason change them. Instead, people cherry pick and distort the evidence, or ignore it altogether, to support the views they already have, perceptions they have established that help them feel safe (Yang & Chen, 2016). GMOs are only one of the risk factors in which emotion and fear have overwhelmed the evidence (Kim, Jang, Kyoung, & Kim, 2014).

In a global world where risks have immense and long-term consequences and risk factors have become increasingly complex and demand more careful analysis, food safety and health are at stake (Devos, Dillen, & Demont, 2014). This explains how the emotional nature of risk perception can blind someone to evidence and lead to decisions which, while made from a safety point of view, can actually make things much worse (Ribeiro, Barone, & Behrens, 2016).

Emotions are often secreted in related perceptions, such as moral acceptability (Črne-Hladnik, Peklaj, Košmelj, Hladnik, & Javornik, 2009), concern (James, 2004), uncertainty and general or personal risk (Christoph, Bruhn, & Roosen, 2008; Ronteltap, Van Trijp, Renes, & Frewer, 2007). The most reported emotions concerning GM foods are negative ones, such as worry (Yunta et al., 2005), fear (Laros & Steenkamp, 2004) and anger (Stewart & Mclean, 2005). Emotions can most often be defined in terms of emotional participation (Spence & Townsend, 2006) from a care perspective, in which anxiety and empathy for the well-being of others lead to decisions or main lines of action (Sadler & Zeidler, 2005a). Reports of fear regarding genetically modified food often appear in the mass media (Jaušovec & Jaušovec, 2010). Fear of GM food is positively influenced by consumer apprehension for the environment and negatively affected by their faith in new food production technology. Consumers who are more fearful of GM foods have a more negative attitude toward them and exhibit greater interest in information related to food production. Because of their commercial importance, emotions are often evaluated in relation to GM food products (Finucane, 2002). One interesting finding is that people expressing worry accumulate more information before deciding against or for a choice, but those who express anger are likely to take immediate action. Positive emotions are reported less frequently.

In this context, intelligence is of great importance. It represents the individual's overall level of intellectual ability and encompasses several groups of intellectual abilities. One of the most famous divisions of intelligence is the following one: verbal, performance and social intelligence (Thorndike, 1920). Even if a widely accepted definition of intelligence does not exist, it usually refers to the aptitude to solve new problems, adaptation to the environment, basic mental processes and higher order thinking, such as reasoning, problem solving and decision making (Sternberg & Detterman, 1986).

Globalised food systems are increasingly affected by anxiety related to food consumption. This issue arises from the growing industrialisation of foods on one side, and inadequate information on the other (Bauman, 1995; Coutant, De La Ville, Gram, & Boireau-Ducept, 2009). With respect to food industrialisation and scientific innovation, enhancements in both the production of raw materials, and in food processing, give rise to potentially increasing neophobia on the consumer's side, linked to the necessity of continuously facing uncertainty and doubts, meaning that that individuals (consumers) feel more responsible and pressured in their own risk management. With respect to

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