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Appetite 45 (2005) 47–50

Appetite

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Research Report

Perceived naturalness and acceptance of genetically modified food

Petra Tenbült[a,*], Nanne K. de Vries[a], Ellen Dreezens[b], Carolien Martijn[b]

[a]*Department of Health Education and Health Promotion, Maastricht University, P.O. Box 616, 6200 MD Maastricht, The Netherlands*
[b]*Department of Psychology, Maastricht University, P.O. Box 616, 6200 MD Maastricht, The Netherlands*

Received 15 October 2004; received in revised form 1 December 2004; accepted 1 January 2005

Abstract

This study examines people's acceptance of genetically modified (GM) food. Results suggest that GM acceptance depends most on how natural the genetically modified product is perceived and not directly on how natural the non-GM product is seen. A GM product that is perceived as more natural is more likely to be accepted than a GM product that is perceived as less natural. The extent to which GM affects the perceived naturalness of a product partly depends on the kind of product.

Keywords: Genetic modification; Acceptance; Naturalness

Introduction

More and more products are either genetically modified or organically grown. The change of hereditary material by transferring properties of one organism (e.g. plant, animal) into another organism is referred to as genetic modification (GM). With this technique, varieties of plants and animals can be created that are, for example, more resistant to herbicides or richer in vitamins. Opinions towards GM differ strongly and this issue is heavily debated. Grunert, Bredahl, and Scholderer (2003) showed that consumer attitudes are negative towards GM in food production. The authors suggest that the negative attitudes are embedded in a system of more general attitudes (e.g. towards nature). Dreezens, Martijn, Tenbült, Kok, and de Vries (2005) showed that specific values play a role in predicting participants' attitudes towards genetic modified foods. It appears that interpersonal differences are related to different attitudes towards GM. Other studies (Gamble, Muggleston, Hedderley, Parminter, & Vaughan, 2000; Tenbült, de Vries, Dreezens, & Martijn, unpublished manuscript) have also shown a negative attitude towards GM. Consumers reject it for ethical reasons. They are afraid of the long-term effects of consuming genetically modified foods; they believe that it will disadvantage developing countries or that it disturbs the ecological balance et cetera.

Acceptance of genetic modification in food production varies over different consumer categories. GM acceptance has been related to socio-demographic factors (Hossain, Onyango, Adelaja, Schilling, & Hallman, 2002; Onyango, & Nayga Jr., 2004), trust and confidence in science, government and biotechnology companies (Frewer, Howard, & Shepherd, 1998; Hossain et al., 2002; Onyango et al., 2004), nature of the GM technology that has been used (Burton & Pearse, 2003; Frewer et al., 1998; Onyango, & Nayga Jr. 2004) and information provided about GM (Grunert et al., 2003).

Only a few studies relate GM acceptance to the type of food products. Research by Gamble et al. (2000) suggests that acceptance of genetic modification in foods is product-specific. The authors show that consumers are more interested in labels when they are purchasing a 'healthy' item for others, than when they want to buy a snack, like chocolate, for themselves. Consumers believed that the way tomatoes are produced is more important than, for example, the quality, taste and price of the product. Interestingly, this pattern is reversed when they are presented with chocolate biscuits. The authors suggest that the chocolate biscuits are already seen as being unhealthy, so consumers do not care whether the production technology is

* Corresponding author.
E-mail address: p.tenbult@gvo.unimaas.nl (P. Tenbült).

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doi:10.1016/j.appet.2005.03.004

also regarded as unhealthy. Apparently, the basis for evaluations of products differs between product categories. Genetic modification can be a feature that influences this evaluation and it is therefore likely that acceptability of genetic modification depends on product categories.

In the study by Gamble et al. (2000), the perceived healthiness of products was investigated as the decisive characteristic. More in general, evaluations of products can also be determined by other criteria, for example, the extent to which a product is seen as less important or less necessary for people's diet or whether the product is seen as less natural or not. Rozin, Spranca, Krieger, Neuhaus, Sunllo, Swerdlin, & Wood (2004) showed that people have a substantial preference for natural over processed or artificial products. When people are confronted with two products that are chemically identical, but one of the two is natural and the other is artificial, people prefer the natural one. If GM is perceived as an artificial procedure in food production, it follows that GM products are seen as less natural, and will therefore be less well accepted.

The present research aims to investigate whether GM acceptance is product-specific and whether the perceived naturalness, healthiness or necessity of the products determine the acceptability of genetic engineering in different product categories. We expect that the perceived naturalness rather than the perceived healthiness or perceived necessity of products influences GM acceptance and that differences between categories with regard to perceived naturalness account for differences in GM acceptance.

Method

Food products. In a pilot study, 10 participants were asked to generate food products that differed on two dimensions, 'healthiness' and 'necessity'. The participants were asked to name products that were healthy and necessary, healthy and not necessary, not healthy but necessary and not healthy and not necessary. They were also asked to underline the products that they thought were natural. Based on this pilot study, we chose the food products in each category that were generated most frequently (and at least by 50% of the respondents). These products were: 'butter', 'mars', 'tomato', 'crisps', 'fish fingers' and 'bread' (see Table 1).

Sample. One hundred and forty-four undergraduate students (114 women, 30 men) at the University of Maastricht participated in this study. The mean age of the subjects was 19.80 years (SD = 2.09, range: 17–33). Before the start of a lecture, participants were asked to fill out a questionnaire. They were told that it contained some questions about genetically modified food products and that they would have the opportunity to fill it out during the break, or just after the lecture. About 50% of the undergraduates responded. The subjects participated on a fully voluntary basis and received no reward for their participation.

Table 1
The chosen products (the underlined products were seen as natural by the subjects)

	Healthy	Not healthy
Necessary	Tomato Bread	Butter
Not necessary	Fish fingers	Crisps Mars

Questionnaire. Participants were asked to imagine each of the seven products one at a time and to answer three questions. These questions measured the extent to which the products were seen as being 'natural', necessary, 'healthy' (e.g. 'I believe bread is healthy') on a five-point scale ranging from 1 (totally disagree) to 5 (totally agree). Subsequently, participants were asked to imagine genetically modified variants of the products and three questions were posed. Two questions dealt with the acceptance of the just imagined genetic modified product (e.g. 'Eating this (GM) bread is morally wrong', and 'I have trust in this (GM) bread'); one question was about the extent to which the GM product was seen as unnatural (e.g. 'This (GM) bread is unnatural'). These questions were also rated on a five-point scale ranging from 1 (totally disagree) to 5 (totally agree). We did not measure perceived naturalness, healthiness or necessity of the GM food products.

Results

'Necessary' and 'less necessary' category of products

In the pilot study, 'tomato', 'butter' and 'bread' were classified as necessary (see Table 1). From now on we will refer to these products as the 'necessary' category of products. 'Fish fingers', 'crisps' and 'mars' will be referred to as 'less necessary'. The mean ratings of both categories of products were calculated for all further analyses.

Product specificity

The two categories were compared with regard to the perceived naturalness of the non-GM variant, the perceived unnaturalness of the GM variant and acceptance of the GM product. A paired samples *T*-test showed that the 'necessary' category of products is perceived as being more natural than the 'less necessary' category of products [$t(143) = 23.24$, $p < 0.001$]. Besides this, paired samples *T*-tests also showed that in general for products in the 'necessary' category, it was more accepted when they were genetically modified than for products in the 'less necessary' category [$t(143) = 2.05$, $p < 0.05$ (for means see Table 2)]. No significant difference was found between the two categories with regard to GM unnaturalness. The 'necessary' category is perceived as being more natural in its original state, and is also more accepted when it is genetically modified