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# A BRAVE NEW WORLD

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The Influence of Personality on Consumer Acceptance of New Food Technologies





BSc Business and Consumer Studies

Marketing and Consumer Behavior

**Literature Review**

*The Influence of Personality on Consumer Acceptance of New Food Technologies*

By

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## Abstract

With a rapidly expanding world population, come problems such as resource shortages. So the development of alternative resources and new technologies to produce food seem necessary. But the consumer acceptance of new food technologies such as insect food products, food irradiation, food nanotechnology, genetically modified food and cultured meat is low. The aim of this study was to find out what the influence of personality was on the consumer acceptance of new food technologies. A systematic search of the scientific database Scopus was conducted to identify papers in order to answer the research question. Multiple personality traits were found to have an influence on the acceptance of new food technologies. Food neophobia and food technology neophobia were most often found and results showed that they have a significant decreasing influence on the consumer acceptance, as well as the personality trait trusting. Additional personality traits were also found in some conducted studies, though not supported by multiple papers. The study showed that personality traits have an influence on the acceptance of food products produced with new food technologies, but that this field remains largely unexplored with the exception of food neophobia and food technophobia.

## Introduction

We live in a rapidly expanding world. Predictions are that by the year 2060 we will have reached a global population of ten billion people (Dawson & Johnson, 2017). This comes with certain benefits, but it also brings a set of problems with it, such as environmental pollution and resource shortages (Dawson & Johnson, 2017). Income and wealth are increasing worldwide as well. So there will be a higher consumption demand and suppliers will need to increase their production. While at the same time receiving pressure to produce more sustainable and to decrease negative environmental effects of production (Tilman et al, 2001). On top of that, producers are dealing with a decrease in availability of resources (Godfray et al, 2010) and in some parts of the world the farming of certain crops will be effected negatively by climate change (Rosenzweig & Parry, 1994). So in a world where we face on one hand a growing global population and on the other hand a limited availability of natural resources, the development of alternative resources and new technologies to enable us to maintain our current and future consumption patterns seems inevitable.

These developments of alternative resources and new technologies come in many forms. An example of a situation where an alternative resource could be used is cattle farming, which faces problems such as extensive land use and high greenhouse-gas emissions, which have a negative effect on the environment (Devun, Agabriel, Moreau & Manneville, 2016). An efficient and sustainable substitute for beef is the edible insect, which is high in protein, fat, minerals and vitamins and thus has a comparable nutritional value to meat. The farming of insects is a lot cheaper and takes up a lot less space than the farming of cows (Nijdam & Westhoek, 2012). It is also less harmful to the environment, because of lower greenhouse-gas emissions (Oonincx & de Boer, 2012). But while this a very convenient development in the food market, you probably won't find many people close to you, actually willing to incorporate insects into their daily menu. A side note is also that for mass production of insects as food, harvest and post-harvest technology must be further developed (Rumpold & Schlütler 2013). Multiple cultural and psychological barriers such as unfamiliarity and feelings of disgust, cause the low consumer acceptance of entomophagy in the Western world (Tan, van den Berg & Stieger, 2016).

Another example of a food technology is the genetic modification of food. For instance potatoes that are genetically modified to be resistant against late blight. A study on the consumer acceptance of these potatoes conducted in Ireland showed that a majority of the respondents had a preference for non-genetically modified potatoes (Thorne, Fox, Mullins & Wallace, 2016). According to a study on attitudes towards GM foods, 27.7% of the respondents showed negative attitudes towards GM foods, in comparison with only 19.8% positive attitudes (Popek & Halagarda, 2017).

Entomophagy (the eating of insects) and genetically modified potatoes are just two of many examples of innovative food resources that are not (yet) widely accepted by consumers. Other examples of innovative food technologies are cultured meat as a replacement of livestock meat (Post, 2012), genetic modification of crops (Kamthan, Chaudhuri, Kamthan & Datta, 2016), cloning of animals and crops (Passantino, 2012), nanotechnology in the food industry (He & Hwang, 2016) and

food irradiation (Ehlermann, 2016). Many new technologies in the food segment face a market full of skeptical consumers.

A lot of research has been conducted on the topic of new food technology acceptance and resistance. Rejection or acceptance of new technologies and alternative resources can stem from many things. Explanations vary from economic interests to intuitive factors such as disgust and anger (Trembatch, 2017). In many previously conducted researches, personality was also one of the possible determinants of consumer acceptance. For instance in a study that Kahan, Braman, Slovic, Gastil and Cohen conducted in 2012, they found that public attitudes towards nanotechnology were likely to be shaped by psychological dynamics, associated with cultural cognition. Cultural cognition posits that personality has influence on consumer attitude or consumer acceptance towards new food technology.

A term that also comes up a lot as an underlying part of consumer acceptance is *neophobia*, which is defined by the Merriam-Webster dictionary as ‘the dread of or aversion to novelty’. This can be in relation to new technology as well as in relation to food. In this review neophobia will be viewed as a personality trait, even though it is sometimes viewed as a behavior.

In spite of these studies highlighting the relevance of personality for acceptance of new food technology, a comprehensive overview of the impact of personality is lacking.

So personality is the determinant that will be the main focus of this review. The aim of this paper will be to give a clear overview on the effect of personality of consumer acceptance to new food technologies. It will answer the question ‘*What is the influence of personality on the response to new food technologies?*’ This review will exist of a critical evaluation of existing literature.

A large number of articles have been published on a diversity of new food technologies, but in this review there will only be looked at the influence of personality on the following technologies:

- cultured meat
- genetic modification of food products
- crops and farm animal cloning
- nanotechnology in food
- food irradiation
- Insect food products

These topics (mentioned in no particular order) are chosen based on an orientating search conducted on the online database Scopus. These are the food technologies that were apparent in literature studies and thus are chosen based on the availability of literature.

Consumer acceptance or their attitudes towards new technologies and their end products are very important to understand if you want to develop products or bring them to the market. There are many determinants to look at and hopefully this review will tell if ‘personality’ is a determinant that can be neglected in future researches and in the introduction of new products, or should receive more focus.

## Method

To answer the question ‘what is the influence of personality on the response to new food technologies?’ a search for relevant papers was conducted in the database of Scopus. Access to this database was granted through the Wageningen University and Research center. To find relevant papers, search terms were based on two blocks of keywords. Block 1 focused on ‘Personality’ keywords. A variety of synonyms for personality and related terms were added to find the papers that included personality in their researches. Block 2 focused on ‘New food technologies’ keywords. The before mentioned selected technologies (cultured meat, genetic modification, cloning, nanotechnology, food irradiation and Insect products) were added, but also the broad term ‘food technology’ itself. The latter was added to include some broader papers on the topic that perhaps could offer some more general knowledge and insight.

These two blocks of keywords were used to create search terms. Several searches have been executed, to optimize the search terms in terms of synonyms, abbreviations and use of wildcards. After every search, titles and abstracts of the search result were scanned and then the search term were adjusted where needed. After several attempts a third block was added, containing the keyword ‘food’. This block was added because it was necessary to filter out irrelevant papers. This addition reduced the number of search results from N=2142 to N=105.

A final Boolean expression was formulated (see figure 1) and entered in the advanced search function of Scopus. The final search was refined to only include *articles* and *reviews*, from *journals* and which were written in *English*. These refinements were made to make sure the papers were peer reviewed and thus had a certain insurance of quality. The results were refined to papers written in an understandable language, which is English. The final search on Scopus yielded 105 documents.

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### Block 1: Personality

personality OR "Personal traits" OR neophobia OR technophobia OR "need for cognition" OR "personal values" OR "big five" OR "individual traits" OR "personal attitudes" OR "openness to experience" OR "conscientiousness" OR "extraversion" OR "agreeableness" OR "neuroticism"

**AND**

### Block 2: New Food Technologies

insect\* OR nanotechnolog\* OR gm\* OR "genetic modification" OR "cultured meat" OR irradiat\* OR clon\* OR "edible insects" OR entomophagy OR "irradiated crops" OR "food technology"

**AND**

### Block 3: Food

Food

**AND**

### Restrictions

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( LIMIT-TO ( LANGUAGE , "English" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) OR LIMIT-TO ( DOCTYPE , "re" ) )
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Figure 1: Final Boolean expression entered in the advanced search function of Scopus

The list of documents was exported to Excel and the titles and abstracts were read to make a selection on which articles were relevant and which should be excluded. Eventually N=87 papers were deemed either irrelevant or unavailable and thus were excluded. Resulting in a final set of N=27 useable papers.

### Data analysis

To make sure the relevant information for the aim of this review could be retrieved from the remaining papers in an efficient manner, the papers were read systematically. The following scheme shows how the papers were reviewed:

1. Identification (i.e. author, authors, journal, year of publishing),
2. Type of technology addressed (i.e. nanotechnology, genetic modification, cultured meat, cloning, insect products, food irradiation, other...),
3. Type of response addressed (i.e. behavior, willingness to pay, willingness to buy, attitude)
  - a. How the response is measured,
  - b. What the response is (i.e. positive, negative, neutral, ambivalent ),
4. What type of personality traits are addressed (i.e. big 5, other...),
  - a. How personality is measured (i.e.. Five factor model),
5. Influence of personality (i.e. strong positive influence),
  - a. How the influence is determined

This scheme was tested on a few papers, to see if it was sufficient for data extraction.

## Results

As mentioned above, a final set of 27 papers was studied for this literature review. These 27 papers were all published in rather recent years, with the oldest being published in 2004 and the rest published from 2007 up till the most recent one in 2017. The most papers were published in the journal 'Food Quality and Preference', 8 papers stemmed from this journal. No other journals provided a significant number of papers for this review. The data from the papers came from all over the world, from a case study in Hungary (Gere, Székely, Kovács, Kókai, & Sipos, 2017) to a research conducted in the araucanía region of Chile (Schnettler, Crisóstomo, Mills, Miranda, Mora, Lobos & Grunert, 2013).

The majority of the papers focused on either insect food products (N=9) or on genetic modification (N=9), closely followed by nanotechnology (N=8). On both cloning and irradiation only 1 useable paper was found. Some of the papers looked at multiple technologies, for instance to make comparisons. The findings in these papers on non-relevant subjects for this review were left out in the data analysis.

The personality traits addressed in the papers did vary, but the main focus was neophobia, with the majority of the papers focusing on food neophobia (N=13) and food technology neophobia (N=6). Other personality traits specifically addressed were 'being trusting/trust' (N=6), consideration of future consequences (N=1), openness (N=1), satisfaction (N=1), risk taking (N=1) and values and beliefs (N=1). Some papers focused on a broader spectrum of personality traits or preconceptions, these results will be addressed further on in this review. Table 1 provides an overview.

The type of responses measured varied slightly; *willingness to buy* (N=8) and *attitude* (=8) were used most frequently, followed by *willingness to try* (N=5) and *willingness to eat* (N=5). Table 2 provides an overview.

These responses were mostly measured by questionnaires (N=18), but also by hedonic testing (N=3), literature reviews (N=2) and the use of a Functional MRI (N=1).

The personality traits food neophobia and food technophobia were measured with the use of the Food Neophobia Scale (N=11) and the Food Technophobia Scale (N=3). The personality trait openness was measured with the use of the Five Factor scale. These three scales were specifically designed to measure these constructs. The Food Neophobia scale is a scale developed to measure reluctance to eat or avoid novel foods. It is a test, consisting of 10 items (Pliner & Hobden, 1992).

**Table 1** Personality traits measured x food technology

Personality trait	Insect products	GM foods	Nanotechnology	Other*	Total
Food neophobia	9	1	2	1	13
Food technology neophobia	1	2	3		6
Trust		3	2	1	6
Other**		3		1	4

\*Cloning, food irradiation, cultured meat

\*\*CFC, risk-taking/sensation seeking/ambitious/altruistic/peace seeking, confidence, openness

**Table 2** Measurement approach x food technology

Measurement	Insect products	GM foods	Nanotechnology	Other*	Total
WTE <sup>1</sup>	4	1			5
WTB <sup>2</sup>	2	2	3	1	8
WTT <sup>3</sup>	2	2	1		5
Attitude		5	2	1	8
Other**	4	2	1		7

\*Cloning, food irradiation, cultured meat

\*\*Willingness to pay, Willingness to adopt, product preference

<sup>1</sup> Willingness to eat

<sup>2</sup> Willingness to buy

<sup>3</sup> Willingness to try

## Results of insect products

As mentioned earlier in this review, using insect as a substitute for meat is seen as a sustainable solution for problems we might face in the future. But in the western world it might not be that simple to convince the consumers to adopt this in their daily diets. The reviewed papers on this subject have provided some interesting insights on the reasons behind this.

As stated before, the acceptance of entomophagy is *low* (Caparros Megido, et al., 2016). Verbeke conducted a research in 2015, in which he found that the personality trait *neophobia* decreased the willingness to consume insects as food products significantly and was the most important factor in the willingness to adopt insects as a meat substitute. The majority of the other reviewed papers on entomophagy used the findings of Verbeke in 2015 and thus also focused on food neophobia as the main influencing personality trait of low consumer acceptance of insect products.

### *Food neophobia*

In line with Verbeke (2015), Gere, Székely, Kovács, Kokai and Sipos (2017) found that food neophobia is a barrier for the consumption of insects in Hungary. Other researches had similar findings, for instance the finding that individual traits such as taste familiarity had little effect on the acceptability, but that food neophobia had a relatively strong influence (Tan, van den Berg & Stieger, 2016). These results were supported by several more papers (Hartmann & Siegrist, 2016; Laureati, Proserpio, Jucker & Savoldelli, 2016; Hartmann, Shi, Giusto & Siegrist, 2015;).

Tan, Fischer, van Trijp & Stieger (2016) did find that individual traits of food neophobia had an influence on the evaluation of insect products (burgers in this specific case), but that they had a minor role in comparison with effects of labels (packaging). Their study also showed that neophobia predicts willingness to try or taste it, but that it is a poor predictor of the purchase intentions of consumers. According to Caparros Megido, et al., (2016) the willingness to solely try eating insects depends the most on neophobia (negative effect on the willingness) and level of interest or curiosity (positive effect on willingness). It is important to note that there is a big difference between being willing to *try* a product and to be willing to actually *buy* a product and incorporate it into your diet and food neophobia is a better predictor of willingness to try than of willingness to buy.

In a study conducted by Laureati, Proserpio, Jucker & Savoldelli (2016) they looked at the willingness to actually *adopt* insects as food. Their study showed that only 21.1% of their respondents was willing to incorporate insects in their diet and they also found the negative effect of the personality trait food neophobia. They found that people with a high level of food neophobia were significantly less willing to accept insects as food than people with a medium level of food neophobia.

### *Food technology neophobia*

An interesting finding of Verbeke (2015) is that food technology neophobia also has a significant effect on the readiness of trying insect products. Indicating that consumers perceive insect products as products which are produced by unfamiliar food technologies. Even though there isn't much technology involved in the production of insect products, in comparison with for instance the use of nanotechnology on food. This means that there are misconceptions about 'insect products', which isn't very surprising considering the fact that insect products aren't standardized food products in the west. It could however also mean that informing consumers might decrease food technology neophobia, which in turn could increase the readiness to try insect food.

### *Other personality traits*

It is obvious that the main theorem is that when it comes to low consumer acceptance of entomophagy, it comes from food neophobia. But it could also be related to other personality traits. Deroy, Reade and Spence (2015) conclude in their study that negative attitudes towards entomophagy come from cognitive disgust (viewing insects as a source of contamination) and fear, '*deeply rooted in people's psyche*'. This study does suggest that the low acceptance roots from people's personality, although it doesn't state what causes feelings of fear or disgust, or what kind of personality traits influence it. Unfortunately the papers used for this review mainly focused on neophobia, instead of other possible personality traits. One paper by Megido et al., (2014) did however mention the personality trait *adventurous* to have an influence on eating insects, but stated that future investigations were necessary.

## Results of genetic modified food

Although genetically modified food could provide benefits on the food supply side, it is safe to say that consumers aren't too enthusiastic about it. There is an overall negative consumer attitude towards new technologies used in food production (Jezewska-Zychowicz, 2015) and this negative attitude is also directed towards genetic modified. The perception of GM food, which is considered a new food technology, is influenced by a complex set of personal values and attitudes (Lucht, 2015) and personality is also part of this complexity.

### *Food neophobia*

As was the case with insect products, papers studied the effect of food neophobia and food technology neophobia on the acceptance of GM foods. There is an overall low willingness to try GM foods and results suggest that food neophobia and food technology neophobia are important predictors of this (Vidigal et al., 2015; Kim, 2014). According to a study conducted by Schnettler et al., (2013) food neophobia increases rejection of genetically modified food products. This confirms the previous findings. Siegrist (2008) however contradicted this by stating that there is no significant correlation between food neophobia and attitudes towards GM technology or the willingness to try GM foods.

### *Food technology neophobia*

Consumers with higher levels of food technology neophobia make negative evaluations of products produced by unfamiliar technologies (Schnettler et al., 2013). This implies that the personality trait food technology neophobia influences the acceptance of genetic modified food negatively.

### *Trust*

A study by Lu & Gursoy (2017) answered the question if consumers would pay more for non-genetically modified menu items than for genetically modified menu items. GM foods in this case refers to crop plants that are genetically modified via biotechnology for human consumption. The results showed that 75% of their respondents would be willing to pay more (13% more) for non-genetically modified menu items. This percentage displays the low consumer acceptance of genetically modified food. The study researched the influence of social trust (being trusting). The study shows that trust has only a limited influence on the consumer buying behavior of GM foods, but consumers with low levels of social trust are more likely to hold negative attitude towards GM. The influence of trust is supported by a study of Knežvić, Dugum & Frece (2013), who found that the aversion to GM crops comes from consumer attitudes. These consumer attitudes are influenced by two main perceived risks (health risk and social risk) and which can be lowered by building confidence. A study by Siegrist (2008) supports the importance of trust.

### *Other personality traits*

The study by Lu & Gursoy (2017) that was mentioned above, not only studies the influence of trust, but they also looked at the personality trait *consideration of future consequences (CFC)*, which is a trait that defines to what extent an individual considers the future outcomes of their behavior. Tge

results showed that CFC has a limited influence on the behavior of consumers of GM food consumption, but it does show that people with a higher score in CFC are likely to hold negative attitude towards GM.

Tsakiridou, Tsioumanis, Papastefanou & Mattas (2007) conducted a study on the willingness to buy GM food in relation to the personality traits being risk-taking/sensation seeking and being ambitious. Those traits positively affected the willingness to buy GM foods. They also found that being altruistic (considering the welfare of others important) and being peace seeking lowered the willingness to buy. A sidenote is that only 17% of the respondents were willing to buy GM foods.

Bäckström, Pirttilä-Backman & Tuorila (2004) also found some personality traits that influenced the willingness to try GM foods. Their results showed that suspicious consumers had a reserved position to GM foods and a strong positive correlation with food neophobia. Having an adherence to technology had a positive effect and was the strongest predictor of the willingness to try GM foods.

## Results of nanotechnology

### *Food neophobia*

Food produced with nanotechnology is new as food product group and also produced by a unfamiliar food technology. So it doesn't come as a surprise that most of the papers researching the consumer acceptance of it, looked into food technology neophobia or food neophobia. Vidigal et al. (2015) for instance found that food technology neophobia is an important determinant in explaining consumer behavior regarding nanotechnology. This finding was supported by several more papers (Schnettler et al., 2013; Schnettler et al., 2013).

### *Food technology neophobia*

Sodano, Gorgitano, Verneau and Vitale (2016) also confirmed that when it comes to nanotechnology, the reluctance to buy stems from food technology neophobia. According to Matin et al., (2012) food technology neophobia was significant in explaining attitudes towards nanotechnology in general and in foods.

### *Trust*

The personality trait of being trusting was also found to have an influence on low consumer acceptance, having a low level of trust will lower the acceptance of nanotechnology (Sodano, Gorgitano, Verneau & Vitale, 2016). Matin et al., (2012) also stated that food buying behavior is related to general trust, but in their analysis the general trust variable didn't show much explanatory power on the consumer attitudes towards food produced with nanotechnology.

### *Other*

The personality trait *confident* could also have influence on low consumer acceptance of nanotechnology foods. As having confidence implies the idea that everything is under control and that there is low uncertainty, which seems to lower the influence of perceived risks (Siegrist, 2008).

Risks of food technologies are a main barricade in the acceptance of new food technologies, so when there are less perceived risks, consumer acceptance could be higher.

### Results of irradiation, cultured meat and cloning

On the subjects of cultured meat, food irradiation and cloning, not many studies have been executed. In the final analysis of this study only one paper per subject has been used.

Verbeke, Sans & van Loo (2015) stated that in the particular case of consumer acceptance of cultured meat, food neophobia and food technology neophobia could reinforce each other and thus influence the acceptance negatively.

According to a study conducted by Bruce et al., (2014) on farm animal cloning, people who score high on the food neophobia scale, focus more on food product attributes than on price. Consumers with high food neophobia are more afraid of the way food is produced and care less about other attributes such as product price. This paper doesn't state how significant this effect is.

A paper on food irradiation stated that food neophobia doesn't seem to be an important factor for the acceptance of new food technologies (Siegrist, 2008). General confidence does seem to have a positive influence on the consumer acceptance.

## Summary of results

The diversity of the subjects, approaches and conclusions of the reviewed papers can be seen in the summary table 2. In this table an alphabetic summary of the reviewed papers and their main findings is provided.

**Table 3** Reviewed papers main conclusion about the role of personality

Article	Conclusion
<i>Bäckström, A., Pirttilä-Backman, A. -, &amp; Tuorila, H. (2004).</i>	Suspicious consumers had a reserved position to GM foods and a strong positive correlation with food neophobia. Having an adherence to technology had a positive effect and was the strongest predictor of the willingness to try GM foods.
<i>Bruce, A. S., Lusk, J. L., Crespi, J. M., Cherry, J. B. C., Bruce, J. M., McFadden, B. R., . . . Martin, L. E. (2014)</i>	People who score high on the food neophobia scale, focus more on food product attributes of products of farm animal cloning than on price.
<i>Caparros Megido, R., Sablon, L., Geuens, M., Brostaux, Y., Alabi, T., Blecker, C., Drugmand, D., Haubruge, É. and Francis, F. (2014),</i>	Insect food products seem to induce neophobia among some consumers, but a pretest survey about this is necessary to confirm the hypothesis.
<i>Caparros Megido, R., Gierts, C., Blecker, C., Brostaux, Y., Haubruge, É., Alabi, T., &amp; Francis, F. (2016).</i>	Willingness to try depends more on neophobia than on expectations of sensory experiences.
<i>Deroy, O., Reade, B., &amp; Spence, C. (2015)</i>	Negative attitudes towards entomophagy come from cognitive disgust (viewing insects as a source of contamination) and fear, 'deeply rooted in people's psyche'.
<i>Gere, A., Székely, G., Kovács, S., Kókai, Z., &amp; Sipos, L. (2017)</i>	Food neophobia significantly decreases the willingness to consume insects as food products.
<i>Hartmann, C., &amp; Siegrist, M. (2016)</i>	High food neophobia was a predictor of a low willingness to eat insect products.
<i>Hartmann, C., Shi, J., Giusto, A., &amp; Siegrist, M. (2015).</i>	Food neophobia is a barrier for the consumption of insects.
<i>Laureati, M., Proserpio, C., Jucker, C., &amp; Savoldelli, S. (2016)</i>	Consumers with a low food neophobia level were more willing to accept insect food products than consumer with a medium level of food neophobia.
<i>Kim, Y.G. (2014)</i>	Consumers with a high level of food technology neophobia are less likely to consume GM foods than people with a low level of food technology neophobia.
<i>Knežević, N., Dugum, J., &amp; Frece, J. (2013).</i>	Confidence has an influence on the acceptance of GM food.
<i>Lu, L., &amp; Gursoy, D. (2017).</i>	CFC and social trust are key determinants of consumers' overall attitudes towards GM foods. Low CFC or trust are likely to hold negative attitudes towards GM foods.
<i>Lucht, J.M. (2015)</i>	The perception of new food technologies is strongly affected by a complex and deeply rooted set of personal values and attitudes.
<i>Matin, A. H., Goddard, E., Vandermoere, F., Blanchemanche, S., Bieberstein, A., Marette, S., &amp; Roosen, J. (2012).</i>	Food technology neophobia is significant in explaining attitudes towards nanotechnology and general trust doesn't.
<i>Siegrist, M. (2008)</i>	Food neophobia doesn't seem to be a very important factor for the acceptance of new food technologies, but is a valid predictor for the willingness to try.
<i>Schnettler, B., Crisóstomo G., Mills, N., Miranda, H., Mora,</i>	Food neophobia in consumers is related to the rejection of GM and nanotechnology use in food production.

<i>M., Lobos, G., Grunert, K.G., (2013).</i>	
<i>Schnettler, B., Crisóstomo, G., Sepúlveda, J., Mora, M., Lobos, G., Miranda, H., &amp; Grunert, K. G. (2013).</i>	A higher level of food neophobia correlated with a lower level of willingness to buy nanotechnology food products.
<i>Tan, H. S. G., van den Berg, E., &amp; Stieger, M. (2016).</i>	A higher food neophobia score was significantly related to lower acceptability of insects as food.
<i>Tan, H. S. G., Fischer, A. R. H., van Trijp, H. C. M., &amp; Stieger, M. (2016).</i>	Food neophobia effects on willingness to buy are significant, but small in comparison to label effects.
<i>Tsakiridou, E., Tsioumanis, A., Papastefanou, G., &amp; Mattas, K. (2007)</i>	Being risk-taking, sensation seeking and ambitious have a positive effect on the willingness to buy GM foods. Being altruistic and peace seeking lowered the willingness to buy.
<i>Valeria Sodano, Maria Teresa Gorgitano, Fabio Verneau, Cosimo Damiano Vitale, (2016).</i>	Reluctance to buy foods produced using nanotechnologies is due to higher perception of risks associated, low trust, a certain degree of food technophobia.
<i>Verbeke, W. (2015)</i>	Food neophobia is found to be the most important factor in determining the readiness to adopt insects as a substitute for meat.
<i>Vidigal, M., Minim, V., Simqueli, A., Souza, P., Balbina, D.&amp; Minim, L. (2015)</i>	Food technology neophobia is an important factor in explaining the behavior of consumers in relation to nanotechnology.

## Discussion

The aim of this paper is to answer the following question by conducting a review of already existing literature: 'What is the influence of personality on the response to new food technologies?' Several personality traits were found to have an influence on the acceptance of new food technologies. The majority of the papers showed the personality trait *food neophobia* to have a significant influence in either decreasing willingness to buy or willingness to try new food technologies. This influence was not found for irradiated food. The related personality trait *food technology neophobia* was also found to have a negative effect on the consumer acceptance of new food technologies, especially for genetically modified food and nanotechnology food products. Besides neophobia, the personality trait *trusting* also has an effect on the consumer acceptance of genetically modified food and nanotechnology food products, the less trusting a consumer is, the lower the acceptance. The novelty of the food, in combination with a lack of knowledge and information about it, appear to be aspects of the food that relate to the found to be influential personality traits.

Additional findings for insect products were that *curiosity* increases willingness to try, *food technology neophobia* decreases willingness to try, *fearfulness* creates a negative attitude and being *adventurous* increases willingness to eat insect products. For genetically modified food the personality trait *consideration of future consequence* has a negative influence on attitudes. Results also showed that for GM foods *being risk taking*, *sensation seeking* and *ambitious* increased willingness to buy, whilst being *altruistic* and *peace seeking* decreased the willingness to buy. According to a study about nanotechnology food products, the personality trait *confident* has a positive effect on the consumer acceptance. The effect of *confidence* was also found for irradiated food.

### *Limitations and future research*

In the reviewed papers, several personality traits were found to be influential on the consumer acceptance of foods produced with new food technologies. However, it wasn't always clear how these traits influenced the consumer acceptance precisely and what the consequences of these findings are. Future research should dive deeper into the influence of personality traits, not only confirm a positive or negative influence, but also explore when and how personality comes into play and what it implies for new food technology product implementation on the market.

Although the research question is answered, this study still has its limitations. One limitation is that by limiting the review on food, food neophobia became the dominant determinant. As almost all the reviewed papers chose to study the influence of food neophobia. The use of the food neophobia scale is apparently very incorporated into this research field. There is almost no research on for instance the influence of the big five personality traits: openness to experience, conscientiousness, extraversion, agreeableness and neuroticism. This could be interesting for future research.

Another thing the results of this review showed that there is indeed a difference between the willingness to buy and the willingness to try. Although this is not something this review explains thoroughly, it is an interesting study to find out the distinctions between them and what it implicates for the consumer acceptance of new food technologies, not just in relation to personality traits.

### *Theoretical and social significance*

Besides confirming that food neophobia and the related trait food technology neophobia have an influence on the consumer acceptance, it is also made apparent by this review that it is not clear yet what this influence exactly entails. When it is larger or smaller and with what other determinants of acceptance it interacts.

As it is likely that new food technologies will be a necessity in the future, it is very important that consumers are willing to try and eventually also willing to buy the food and incorporate it in their regular diet. This paper investigated the role of personality traits and in particular neophobia as a part of the psychological barrier that stands in the way of consumer acceptance. The reviewed papers show that personality traits have an influence on the acceptance of food products produced with new food technologies, but that this field remains largely unexplored with the exception of food neophobia and food technophobia. It also shows that when dealing with new food technology products, food neophobia is very important, but food technology neophobia is as well when introducing foods based on new technologies.

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**Note: The papers used in the data analysis are *italic* in this reference list.**

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