

Consumer's Attitude Change When Confronted with Attribute Change in
Familiar Products



M.Sc. Thesis Marketing and Consumer Behaviour at Wageningen University

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Abstract:

When product attributes change people adapt their attitudes towards them. This change is influenced by attribute salience, the strength of the attitude and the familiarity with the product brand.

In this paper attitude change was measured after manipulations of products and shopping situations have taken place. The results show that when the prior attitude towards a product was strong, the attitude changes less than when the attributes of the product are changed.

When a well-known product is changed the attitude towards that product is also changed less than when it is from a less well-known brand. This implies that attitudes towards products are less prone to change when they are previously strong and when the products are well-known.

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Introduction

Nanotechnology is increasingly present in people's diets. It is part of everyday products such as mayonnaise and coffee creamer or candies like Mentos. It can not only be used to change the texture and taste of food but also to make meals healthier and increase the functionality of packaging (Kampers, 2013). Because it is still not widely distributed, it is not exactly clear how people will respond to nanotechnology. It is interesting to investigate how consumers react to the presence of nanotechnology in their food and how their attitudes are formed and changed when products are altered. Although it's huge potential, there is little knowledge about nanotechnology and therefore only little direct experience with products containing it, which leads to weak evaluation links in people's mental constructs (Fazio et al., 1982).

Social psychology aims at understanding behaviour by investigating underlying attitudinal constructs of a person's beliefs and their interpretations (Fishbein & Ajzen, 1976). Martin Fishbein (1963) developed a formula that states that an attitude towards an object is the weighted sum of all beliefs about a certain object and their evaluations. A product is evaluated by its salient attributes and an attitude is formulated. This explains the stability of a person's behavioural patterns but it does not account for the variable evaluations of situations in different contexts (Schwarz, 2007) because evaluation and behaviour are often inconsistent.

Research on attitude formation has changed from trying to explain a person's attitude in its entirety to focusing on moderating factors that influence attitude change (Lord et al., 2004). Olson & Mitchell (2000) have shown that product attribute beliefs are a major influence on brand attitudes, it is therefore important to investigate this in the case of nanotechnology in food products.

Attitudes are variable constructs. They change depending on new objects of influence and their elaboration, at the same time as being relatively stable over time. This is important for the case of nanotechnology in food because changes in an existing product can lead to new evaluations and different attributions by the consumer. When existing salient attributes of a product are changed, consumers have to re-evaluate their attitudes toward these products. The change in salient product attributes can be so extensive that it leads to an overhaul of existing beliefs and their evaluations and therefore change attitudes. Nanotechnology may not only be a small addition to existing products but for many consumers it is a manipulation of food (Rozin, 2005), which can be seen as tampering with nature (Frewer, 2014). This makes a food product less appealing to consumers. The process that explains such attitude change because of salient attribute change was so far not convincingly explained by the current literature.

This leads to following research questions that are answered by this study:

RQ1 *How stable are people's attitudes when the salient attributes of existing products are changed?*

RQ2 *How do attitudes change when confronted with a change of attributes?*

RQ3 *How does the addition of nanotechnology to certain foods change people's attitudes towards that food?*

Theoretical Background:

According to Lord et al. (2004) attitude inconsistencies are central to attitude change. When presented with new attributes people have to react to them. This leads to discrepancies in a person's evaluations, which generates cognitive dissonance that has to be resolved. When a solution for these incongruities is found a new attitude is formed or an existing attitude is changed. This explains why people change their attitude about objects but it does not explain what motivates such attitude change because not every change of an attribute leads to a change in attitude. An *attitude object* can be any stimulus that is associated with an attitude function or varying the function of an attitude (Shavitt, 1990).

For an object to be relevant enough to influence an attitude, it needs to have certain intensity to reach a threshold of recognition. Many objects do not reach that threshold and are ignored. A person's response to relevant objects depends on the perceived properties of that object, the context and the subjective representation of the object by that person. Duckworth et al. (2002) show that a person is constantly judging situations and refer to these analyses as evaluative judgements or attitudes. Attitudes are said to be constructed in response to contextual cues that alter the accessibility and applicability of available information, as well as by temporary factors such as current feeling states and situational constraints (Schwarz, 2007). These judgements are not always consistent with already formed evaluations and cause conflict, which has to be resolved by the person.

In the case of food that is altered by nanotechnology, it remains unclear whether the threshold of recognition is reached to change a person's attitude towards a familiar object. When the object changes the attitude becomes more susceptible to change (Lord & Lepper, 1999). This can be due to changes in the internal consistency of a person's judgements. A temporal

instability of evaluative responses to an attitude object promotes both attitude and behavioural inconsistency, which makes the attitude prone to change. When nanotechnology is added to a certain food product, a person's evaluation of that product might change and therefore an existing attitude will have to be changed or a new attitude constructed, depending on whether the change in the product is deemed large enough. There are a lot of complex factors that influence consumers when making purchasing decisions, such as marketing, competitive activity of brands or the heterogeneity of consumers (Czellar, 2003). To be able to analyse how people form attitudes and how attitudes are changed it is important to understand how attitude change is generated.

Attitude change

There are multiple paradigms of attitude change in the scientific literature. An object or stimulus is processed by a person who then infers meaning by evaluation and judgement. Cohen and Reed (2006) identify mechanisms of attitude creation. To gain a better understanding of attitude change, three different paradigms are mentioned that simplify the complex constructs that attitudes are, but lead to construals that can be researched.

First, direct experience of the attitude object or a simulated direct experience, which is the imagination of a certain situation or object, leads to an interpretation of an attitude object and attitude generation. Second, the attitude can be created analytically, when it is stored in memory as the sum of all beliefs and their evaluations about a certain object (Fishbein & Ajzen, 1975), which is called attribute based induction. Third, attitudes can be generated by categorisation when comparing differences and inducing meaning from contrasting interpretations (Osherson et al., 1990). Eagly and Chaiken (1995) discovered that there are object-attribute and object-attitude linkages that create intra-attitudinal structures, which can

prevent changes because of the strength of these networks. Depending on the context and the attitude object, attribute based induction and categorisation most probably complement each other to create intra-attitudinal structures (Eagly & Chaiken, 1995). So far there is no proof that they exclude each other (Fiske et al., 1987).

Categorising attitude objects is the fastest and easiest way for a person to infer meaning in situations when confronted with new objects. The cognitive processing needed for categorisation is low, therefore most supermarkets have clear distinctions between different food categories. This helps the consumer choose the desired products. When categorising, similarities between objects are compared and areas of coverage as well as discrepancies are weighed against each other (Miller et al., 2005). There are multiple ways categorisation is performed.

For the purpose of this research, attribute based induction on the basis of Fishbein and Ajzen's (1975) work is used to interpret attitudes. It is advantageous to use such a model in the frame of this research, because although a product including nanotechnology might be categorised within its original class due to its similar salient attributes, according to function and context a new attitude will have to be created if the changed attributes become more salient and leads to a change in attitude. This model is also useful in the context of attitude change because it is quantifiable and obtainable. For an attitude object to become the focus of evaluation it has to have certain features that lead to a person analysing it. This depends on the salience of the attributes of these attitude objects and how well they overlap with a person's intention in certain situations.

Attribute salience

Attribute salience is a central topic that needs to be analysed when considering attitudes towards food with nanotechnology. Attributes become salient when they are congruent with a consumer's goal in a situation where many attributes of products are available (Fazio, 1989; Lee and Shavitt, 2006). Salient attributes help the consumer select products and work as selection criterion in shopping environments that offer large numbers of other products (Brauti et al., 1997).

On the one hand it is not clear whether the attribute change in an existing product is intense enough to be recognised by the consumer, on the other hand people might not be able to identify it in a product. Extrinsic and intrinsic features are used when identifying a product. Intrinsic cues, taste, texture and aroma might not change when nanotechnology is added, whereas extrinsic cues such as price, brand name, packaging, colour and description might identify a product as being altered by nanotechnology. Many applications of nanotechnology in food products will be found in packaging, such as milk cartons that change colour when the milk goes sour, instantly visible to the consumer. Since 2014 nanotechnology in food has to be indicated in the ingredients by the word Nano in brackets, according to EU legislation (Regulation (EU) No 1169/2011 of the European Parliament and of the Council).

Fazio and colleagues (1989) have pointed out that when an attitude is not easily accessed, the evaluation of the object is achieved through the most salient attributes of the object. This has important implications, because if nanotechnology is not the most salient feature of a product, the consumer might not recognise it and keep their attitude about that product. On the other hand, if packaging is altered by nanotechnology, it becomes a more salient feature.

The question what exactly makes an attribute salient is not entirely explained by current literature. According to Lee and Shavitt (2006) and Brauti et al. (1997) a cue in an object or a situation becomes salient when it is congruent with the consumer's goal in that situation.

When looking for product attributes, consumers rely on measures of product quality that can be different for every consumer depending on their expectations. Attributes that a consumer expects of a product automatically become more salient (Brucks et al., 2000). Brucks, Zeithaml and Naylor (2000) identified six dimensions of product quality for consumer durables that work as cues when choosing a product: ease of use, versatility, durability, serviceability, performance and prestige. They have proven that when consumers care more about prestige attributes, such as product price and brand name, these attributes will be more salient to them. It is plausible that when a product is changed only marginally, this change will not be deemed important enough by the consumer because it is neither salient nor connected to any goal the consumer wants to achieve or expects from a product. It might rather be seen as a desirable but not essential feature.

H1: When an attribute of a product is changed, the attitude towards that product will change more if it is a more salient attribute than when it is a less salient attribute.

Even if an attribute is salient for the threshold of recognition to be reached, an attitude is not changed immediately. Depending on the attitude object and situation there are vast differences in the strength of an attitude that lead to longer lasting connections of attitude and behaviour or on the contrary be of shorter duration when the connection is weak.

Attitude strength

An important feature of attitudes is that they can be relatively stable over time. Once an initial attitude judgement is made, the formed attitude provides a reference for subsequent judgements (Lingle & Ostrom, 1980). This steadiness is referred to as *attitude strength*. Fazio (2007), for example, considers attitudes to be so strong that even when confronted with counter-attitudinal information, attitudes will not change. Fazio and colleagues (1982) also show that most attitudes are resistant to contextual information. Several researchers have identified aspects, or levels of attitude strength for measurement. Krosnick and colleagues (1993) distinguish nine dimensions that are representing the internal structure of attitude strength. According to these dimensions an attitude can be rated and an approximate score of attitude strength created.

In more current research, originating from the original meaning of the word attitude strength, Petty et al. (2014) determined four aspects that are pillaring the concept of attitude strength, which summarise Krosnick et al. (1993). First, *persistence*, the constancy with that an attitude is held over time. Second, *resistance*, the protection of one's own attitude against other influences. Third, the *impact on cognition and knowledge*, better the influence on information processing and judgements, which can be shown by the ease of retrieval of object-evaluation linkages. Fourth, the impact on or *guide to behaviour*, which differs widely between attitudes held. These aspects of strength determine the framework for attitude strength measurement.

According to these dimensions a person's attitude towards an attitude object, which can be any stimulus that is associated with an attitude function or varying the function of an attitude (Shavitt, 1990). It can be analysed how important certain attributes of an attitude object are for the consumer. The stronger an attitude towards a certain product, the more tolerance is

given for changes in that product. Strong attitudes guide behaviour most of the time but are not always predictors of behaviour due to situational constraints, nor are they easily and unbiasedly obtainable from persons in real-world situations (Lord, 2004; Schwarz, 2007). It is therefore important to not only analyse the strength of the attitude but also the associations a person makes when confronted with an unfamiliar attitude object, in this case a new attribute to an existing product.

It is difficult to predict attitudes and subsequent behaviour regarding attitude objects where preferences are not stable and can fluctuate from favourable to unfavourable by external influences. When consumers have little or no experience with products their evaluations are between undecided to slightly negative due to neophobia (Pliner & Hobden, 1992). When an existing product is changed due to technological progress or change in consumer demand, people will have to re-evaluate their existing attitudes. The question is how big the change of an object, or which attributes of an object have to change be to be able to alter one's attitude about that object.

H2: When the existing attributes of a product are changed the attitude change is smaller if the prior attitude was strong, similarly the attitude change is greater if the prior attitude was weak.

The consumer needs more attention to detail and higher motivation to classify a given object when it is not easily identified by its salient attributes as a member of an existing category (Czellar, 2003). This leads to either the creation of a new category or the object is evaluated as a single non-category member with its own attributes. Brand extensions are usually categorised according to their parent brand, but when attributes, form, function and context

are sufficiently different a new evaluation will take place (Miller et al., 2005). When a brand is well-liked, attitudes towards brand extensions are frequently favourable (Czellar, 2003).

Brand familiarity is in this case also influencing attitude strength through consumer goal congruence. If a brand cannot fulfil the consumer's expectations, they will change their attitude towards that brand. This effect will be weaker for strong attitudes.

Brand familiarity

Brands and products frequently change to adapt to new tastes, fashions or to incorporate technological improvements. Most of the time these variations are marketed as brand extensions under the same name as the parent brand. Consumers evaluate brand extensions based on their attitudes towards the parent brand and the extension category (Czellar, 2003). Companies can also choose their product to be compared at the product level, asking for an across attribute comparison, but this makes it more difficult for the consumer that has to evaluate each alternative according to every attribute (Miller et al., 2005). If the parent brand is unknown, evaluation is based on experience with the category. When parent brand and extension category are known, the attitude is based on perceived fit between the two (Sheinin, 1998). When the fit is seen favourably by the consumer, the new extension is also seen more favourably, when the fit is bad the consumer will have a less positive attitude towards the extension product. Brand positioning is another factor influencing consumer attitude change when existing products are changed, because more experientially positioned products are less likely to be affected negatively by the addition of new technologies, since consumers buying these products are more willing to try novelties and are less sensitive to risk (Kim et al., 2001).

Brucks et al. (2000) have shown that when the brand name as an attribute is more important to a consumer, it becomes more salient and therefore evaluation of the product will be based on the brand, less on other attributes, which could be nanotechnology. Goal congruence influences attribute salience and brand knowledge because as a measure of product quality it affects these measures and can lead to attitude change. Attribute salience is manipulated when a consumer's goal leads to a different evaluation of a product and the focus on goal congruent salient product attributes. When consumers are, for example, looking for the cheapest option, price will be the main attribute they search for while disregarding other cues (Karmakar et al., 2015). If that attribute cannot be found or only to an unsatisfactory extent, the attitude towards that product or category will be affected.

As mentioned previously, nanotechnology will soon be part of products and their packaging and will therefore extend brand categories. It is not clear how it will affect people's attitudes towards these products, but well-known brands are more resistant to change than weaker brands.

H3: When nanotechnology is added to an existing well-known product, it will change a consumer's attitude towards that product less than when it is a less well-known product.

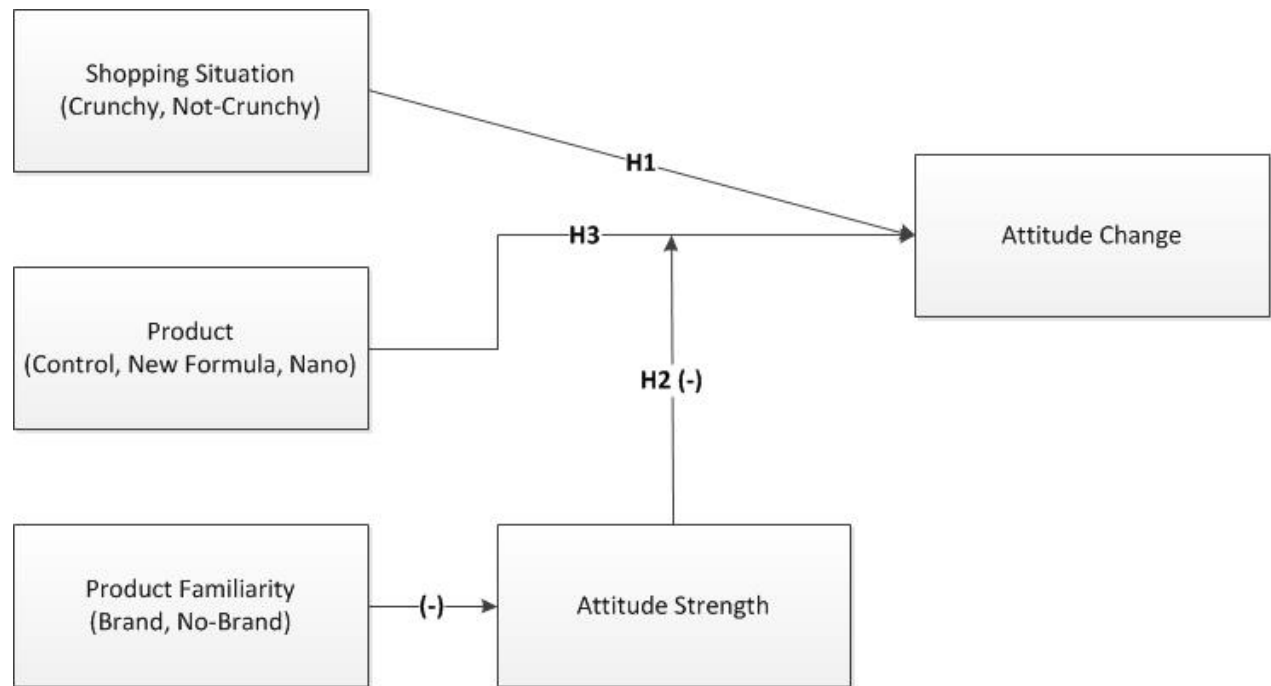


Figure 1: Conceptual Model

Methods:

Participants and Design:

Respondents consisted of a sample from the European Union. A total of 164 questionnaires were completed and used for further analysis. The study had a 2 (salience: high, low) x 3 (product modification: control, new formula, new nanotechnology) between x 2 (product familiarity: high, low) within group design. Respondents gave four responses each, two different products were subsequently investigated for attitude change. Different experimental treatments were administered to the same groups at different times to remove any differences in groups. Respondents were asked questions regarding their attitudes towards a well-known and an unknown cereal brand respectively at the beginning and end to evaluate attitude change. Their responses were measured on a seven-point scale.

Stimuli:

A small pre-study was used to identify the most salient attributes regarding breakfast cereal products. Subsequently three attributes were identified that were chosen as the most salient attributes: Crunchiness of the product, the product name and the products flavour. The selection of the most salient attributes was done by a mouse tracking method.



Figure 2: Mouse-tracking study in the pre-study for selection of the most salient product attributes

Attribute salience was manipulated in two shopping situations by giving one group a general task and the other an attribute task where the crunchiness of the cereal was made more salient. For the general group the task was a simple shopping task for a breakfast cereal. The attribute salience task group was asked to imagine shopping for a crunchy cereal.

Crunchiness was selected because of its use as a sensory indicator for freshness of the product in texture and sound (Zampini & Spence, 2004) as well as it being a versatile attribute and selection criterion for consumers.

Respondents were then shown either the original product in the control group, a product with a renewed formula for more crunchiness or a product with added nanotechnology that influenced the more salient attribute, crunchiness, of the product.



Figure 3: Examples of the stimuli used in the survey. On the left the “Nanotechnology” product of the well-known brand can be seen; on the right the “New Recipe” product of the less well-known brand (other stimuli are in the Appendix)

Measures:

The measure of attitude change was based on Ajzen’s Theory of Planned Behaviour (1991) with results measured on a seven-point semantic differential scale. The most important evaluative dimensions were identified by analysing previous research of attitude towards behaviour. The seven questions combined instrumental and experiential attitudes towards the product to measure overall attitude. Scales ranged from a general analysis of the product’s appearance to taste and perceived healthiness of the product, as well as a question about the claims the product makes (I think the product looks good - agree to disagree; I think the product tastes good - agree to disagree, ...).

Attitude change was measured by comparing the overall attitude of the respondents from the cereal product previous to manipulations, to the overall attitude after the manipulations had

taken place. Results gave the overall attitude and intention the participant had regarding the presented cereal product.

Then food neophobia was assessed because new food items are evaluated more negatively when participants scored high on that scale (Pliner & Hobden, 1992). Respondents were asked whether they like to try out new foods by asking them ten questions from Pliner and Hobden's neophobia scale. A question about allergies against any cereal ingredients (nuts, fruits, gluten) was asked, to control for possible conflicts.

Since a well-known and a less well-known product were analysed in the study, there had to be a control for price consciousness. Participants could have assumed that the less well-known product is a cheaper option even though prices were indicated as the same. Consumers that tend to compare and choose products only by the lowest price, will disregard most other attributes of the product (Karmakar et al., 2015). A price consciousness scale was used to identify participants that scored high on this level.

Procedure:

Respondents were electronically invited to participate in a survey to evaluate their perceptions of cereal products. They were first shown an introductory screen welcoming them to the survey and explaining that the subsequent questions that would help the researchers understand more about consumers and their favourite breakfast cereal products. Then two questions were asked about the importance of crunchiness of their cereal and how often they purchased crunchy cereal products.

On the second page of the questionnaire the more familiar breakfast cereal product was shown. Subsequently participants were asked questions about their attitudes towards that

product in seven questions. Then the less well-known product was shown and the same seven questions asked regarding that product. A small task was thereupon asked from the participants that had to categorise fish and mammals in the according table. The question was timed and the next click was only possible after 20 seconds.

In a short text one randomly chosen half of the participants was then asked to imagine going shopping for breakfast cereal, the other half shopping for a crunchy breakfast cereal, where special emphasis was put on the crunchiness of the cereal. Within these two groups, three groups were randomly selected. One group was shown the original product, the second group was shown a similar product claiming a renewed recipe that made the product crunchier. The third group was shown a nanotechnology product that claimed nano-coating on the packaging, that apparently increased the crunchiness of the product.

Subsequently the attitudes of the respondents towards the original or altered products were measured again and later compared to their initial judgement. Respondents were then asked to repeat the same procedure with the unknown product. When participants were done with the latter attitude assessment of the unknown product, they were asked to indicate their level of neophobia by answering ten questions. Then four questions about consumer's price consciousness followed. Next was a question about product relevant allergies. Some demographical questions followed at the end as well as a closing message thanking for participation in the survey.

Results:

Preliminary Analysis:

Demographics:

52% of respondents were female and more than 60% of respondents were younger than 34.

More than 85% of respondents lived in the European Union.

Scale Consistencies:

Cronbach's alpha was used to investigate scale reliability. It was found that all attitude scales had an alpha of over 0.833, hence above the acceptable threshold. The neophobia scales alpha equalled 0.793 and the price consciousness scale equalled 0.792. This confirmed that the scales used were reliable and no alterations had to be made. Average scores were used to measure scale consistency.

Model tests:

The first hypothesis states that when a salient attribute of a product is changed, the attitude towards that product will change more if it is a more salient attribute than when it is a less salient attribute. This means that a difference in attitude between the different shopping situations and products was expected to be found.

A mixed model ANOVA with the pre- and post attitude measurements towards the products as predictor variables on attitude change as outcome variable was used.

To test the first hypothesis, the effect of attribute salience on attitude change was investigated. The analysis within subjects could not identify any significant effects for H1, $F_{salience}(1, 157) = 0,759, p = 0.385$. The manipulation of the shopping situation which was used to make the attribute "crunchy" more salient did thus not account for any significant variance in the model, and H1 was not supported. For more details, see **Table 1**.

The second hypothesis was looking at the relationship between attitude strength and attitude change. To find proof, a measure for attitude strength had to be found. Product familiarity was used as a measure of attitude strength because it was determined that there were stronger attitudes towards the more well-known product than the less well-known product.

The model indicated that there is indeed a significant effect of attitude strength on attitude change, $F(2, 157) = 5.777, p = 0.004$.

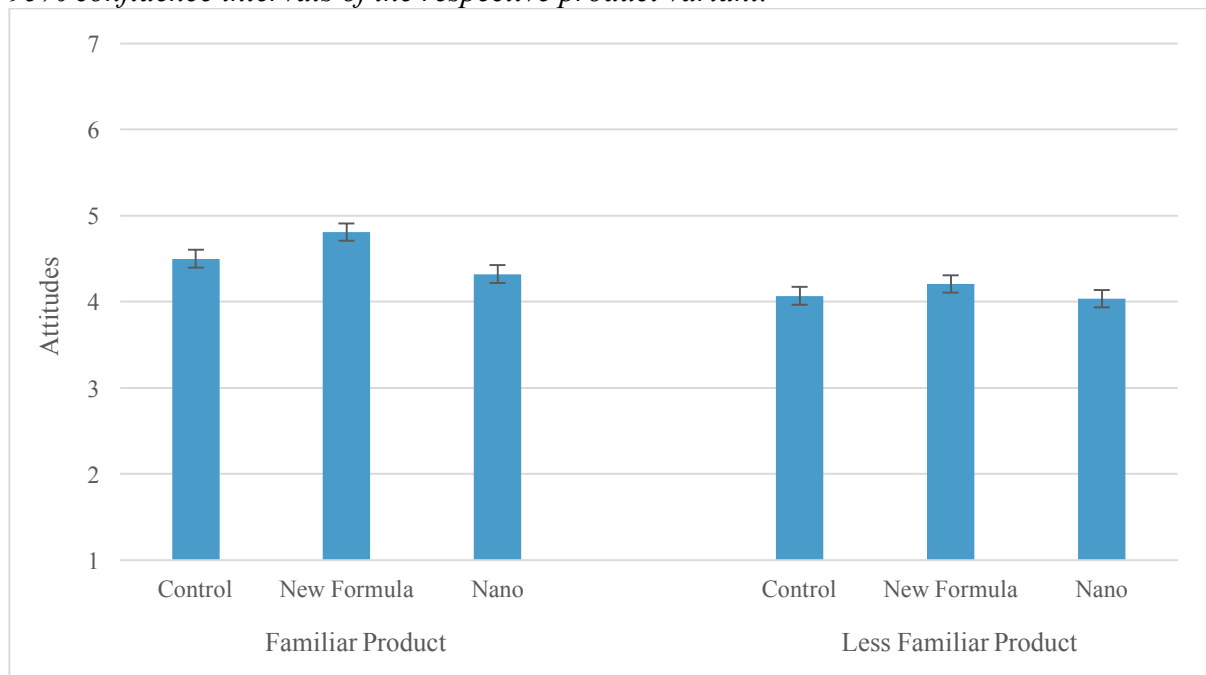
Effect		Value	F	Hypothesis df	Error df	Sig.
Brand Familiarity	Pillai's Trace	.028	4.526 ^b	1.000	157.000	.035
Brand Familiarity * Product Variation	Pillai's Trace	.069	5.777 ^b	2.000	157.000	.004

Table 1: Test statistic manipulation effects

The main effect indicated an interaction between nanotechnology and product familiarity $F(1, 107) = 6.803, p = 0.010$, which was further investigated to find proof for the third hypothesis. The simple effects analysis suggests that the attitude towards a product does change less when the product is from a well-known brand ($F(1, 106) = 4.296, p = 0.41$).

No interaction effect could be found for neophobia and product $F(1, 157) = 2.041, p = 0.155$ nor for price consciousness and product $F(1, 157) = 0.064, p = 0.801$, which were previously thought of as possible moderators of attitude change.

Figure 4: Comparison of attitudes towards the different brands. The error bars show the 95% confidence intervals of the respective product variant.



General Discussion

This study shows how attitudes towards products change as the attributes of a product change in a realistic context. No connection was found between the attribute salience and its influence on attitude change. This is contrary to what could be expected from the literature, as Fazio and colleagues (1989) have shown that attitudes are formed around the most salient features of a product. The manipulation of the salient attribute tried to make the crunchiness of the product more salient through increased goal congruency, which would confirm the theories by Brucks et al. (2000). This means that it is possible that goal congruency is not the most influential factor when attribute salience is concerned, but the pilot study gave reason to believe that it was feasible.

In the analysis of the experiment it could also be found that product familiarity had an influence on attitude change. As hypothesised, the attitude towards a product was not affected by attribute change when the attitude was strong before the product has changed. This gives further proof to what could have been expected from current literature of attitude strength (Krosnick et al., 1993; Lingle & Olstrom, 1980; Fazio, 2007; Petty et al., 2014) that jointly indicates that stronger attitudes have a broader foundation and are not changed easily.

The results also indicate that nanotechnology influences attitudes towards products. This can be interpreted as well-known brands will have less problems introducing technological advances such as nanotechnology, because attitudes towards them are stronger and they are liked better. This is in line with brand familiarity literature that indicates that attitudes towards brand extensions and new products of a larger parent brand are liked better when the parent brand is also liked (Czellar, 2003). This can also have other origins, such as trust in brands and brand positioning (Kim et al, 2001), which could be investigated in future research about nanotechnology in food.

It was also interesting that neither neophobia nor price consciousness had a moderating effect on attitude change. One of the product quality goals of many buyers is price, so it could be expected to play a role in this study (Bruck, Zeithaml and Naylor, 2000). On average the price consciousness in this sample was not very high, which could also be the reason that it did not influence the model. That neophobia did not influence the study might also be because in the product category chosen people are more willing to choose experimentally and are therefore ready to spend more money on a specific item (Kim et al, 2001). Also cereal products are not organic or fresh products, so altering them might not be seen as tampering with nature (Frewer, 2014).

To answer the original research questions, it can be implied that although attitudes are quite stable when attributes are changed, they might be dependent on a multitude of factors that are unrelated to attribute salience such as the product category chosen in the study. It might be that a more natural product would have received much different reactions from the respondents. In relation to nanotechnology, this paper suggests that there is evidence underlying that nanotechnology is in fact less negatively received as anticipated, which might give companies that are hesitant in the introduction of nanotechnological products a more positive reinforcement.

Limitations

From the feedback received of some respondents of the survey, it became clear that it would have been better to use the same flavour of the cereal product. The well-known brand was chocolate and the less well-known was of strawberry flavour. In future experiments it would be useful to avoid such a differentiation and choose the same flavour for a better comparability of results.

More natural products could have more explanatory power since a manipulation of these is deemed as tampering with nature and seen negatively by consumers.

Also a larger sample would be advantageous, because due to the difference in groups only about 60 respondents were asked about nanotechnology, which is not large enough to give a representative sample of the population.

Fishbein and Ajzen's attitude model, which was chosen for this study, might not be the most complex, but it allows for good comparability and quantifiable results. The respondents are not exhausted by a multitude of questions and can therefore give clear and distinct answers. Due to the little number of possibilities and the ease with which the questionnaire is filled out, the answers are genuine and unbiased.

Future research could set up an experiment on a much larger scale with a multitude of products in, for example, a test supermarkets where categories of products with and without nanotechnology are presented in an open setting, which would allow for a less artificial environment and give even more conclusive results.

In spite of all limitations the current research shows that adding nanotechnology has less influence on consumer attitudes towards well-known brands. This could imply that consumers are ready for nanotechnology in some of their food products.

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Appendix

Survey Example

Welcome to my survey! The following questions will tell us more about your experience with breakfast cereal and will be of great help for my research

Please answer two short questions about the crunchiness of cereal

How relevant is the crunchiness of a cereal for you?

- ☐ Extremely irrelevant (1)
- ☐ Very irrelevant (2)
- ☐ Moderately irrelevant (3)
- ☐ Neither irrelevant nor relevant (4)
- ☐ Moderately relevant (5)
- ☐ Very relevant (6)
- ☐ Extremely relevant (7)

When you are eating cereal, how often is it a crunchy cereal?

- ☐ Always (1)
- ☐ Most of the time (2)
- ☐ Often (3)
- ☐ About half the time (4)
- ☐ Sometimes (5)
- ☐ Almost never (6)
- ☐ Never (7)

Please answer six questions about this cereal. If you do not know this cereal, simply answer following your first impression



I like how the product looks

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I think the product tastes good

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

This product offers what I want

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

Consuming the product is

- ☐ extremely bad (1)
- ☐ Moderately bad (2)
- ☐ Slightly bad (3)
- ☐ Neither good nor bad (4)
- ☐ Slightly good (5)
- ☐ Moderately good (6)
- ☐ Extremely good (7)

The claims that the product makes are

- ☐ completely untrue (1)
- ☐ almost untrue (2)
- ☐ slightly untrue (3)
- ☐ neither true nor untrue (4)
- ☐ slightly true (5)
- ☐ almost true (6)
- ☐ true (7)

The effects of consuming this product are

- ☐ harmful (1)
- ☐ moderately harmful (2)
- ☐ slightly harmful (3)
- ☐ neither beneficial nor harmful (4)
- ☐ slightly beneficial (5)
- ☐ moderately beneficial (6)
- ☐ beneficial (7)

Please answer six questions about this cereal. If you do not know this cereal, simply answer following your first impression.



Consuming the product is

- ☐ extremely bad (1)
- ☐ Moderately bad (2)
- ☐ Slightly bad (3)
- ☐ Neither good nor bad (4)
- ☐ Slightly good (5)
- ☐ Moderately good (6)
- ☐ Extremely good (7)

I like how the product looks

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I think the product tastes good

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

The claims that the product makes are

- ☐ completely untrue (1)
- ☐ almost untrue (2)
- ☐ slightly untrue (3)
- ☐ neither true nor untrue (4)
- ☐ slightly true (5)
- ☐ almost true (6)
- ☐ true (7)

The effects of consuming this product are

- ☐ harmful (1)
- ☐ moderately harmful (2)
- ☐ slightly harmful (3)
- ☐ neither beneficial nor harmful (4)
- ☐ slightly beneficial (5)
- ☐ moderately beneficial (6)
- ☐ beneficial (7)

This product offers what I want

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

In the next task we would like to see how quickly and accurately you can sort animals into their appropriate categories.

Small Reminder: a mammal is: a warm-blooded vertebrate animal of a class that is distinguished by the possession of hair or fur, females that secrete milk for the nourishment of the young, and (typically) the birth of live young.

Please drag and drop the items in the right box

Mammals	Fish
<input type="text"/> Monkey (1)	<input type="text"/> Monkey (1)
<input type="text"/> Dog (2)	<input type="text"/> Dog (2)
<input type="text"/> Whale (3)	<input type="text"/> Whale (3)
<input type="text"/> Salmon (4)	<input type="text"/> Salmon (4)
<input type="text"/> Cow (5)	<input type="text"/> Cow (5)
<input type="text"/> Herring (6)	<input type="text"/> Herring (6)
<input type="text"/> Trout (7)	<input type="text"/> Trout (7)
<input type="text"/> Sheep (8)	<input type="text"/> Sheep (8)

Normal Shopping Situation Manipulation*Control Group*

After this sorting task we would like to ask you some more questions about cereal.
Now imagine the following situation. You are going to your usual supermarket to shop for breakfast cereal. You need to buy a pack of cereal that you just ran out of. Cereal is the only product you are shopping for this time. On the shelves you see this product



Please answer six questions about this product

I like how the product looks

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I think the product tastes good

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

This product offers what I want

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

Consuming the product is

- ☐ extremely bad (1)
- ☐ Moderately bad (2)
- ☐ Slightly bad (3)
- ☐ Neither good nor bad (4)
- ☐ Slightly good (5)
- ☐ Moderately good (6)
- ☐ Extremely good (7)

The claims that the product makes are

- ☐ completely untrue (1)
- ☐ almost untrue (2)
- ☐ slightly untrue (3)
- ☐ neither true nor untrue (4)
- ☐ slightly true (5)
- ☐ almost true (6)
- ☐ true (7)

The effects of consuming this product are

- ☐ harmful (1)
- ☐ moderately harmful (2)
- ☐ slightly harmful (3)
- ☐ neither beneficial nor harmful (4)
- ☐ slightly beneficial (5)
- ☐ moderately beneficial (6)
- ☐ beneficial (7)

You are still shopping for breakfast cereal and see this product on the shelves



Please answer six questions about this product

Consuming the product is

- ☐ extremely bad (1)
- ☐ Moderately bad (2)
- ☐ Slightly bad (3)
- ☐ Neither good nor bad (4)
- ☐ Slightly good (5)
- ☐ Moderately good (6)
- ☐ Extremely good (7)

I like how the product looks

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I think the product tastes good

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

The claims that the product makes are

- ☐ completely untrue (1)
- ☐ almost untrue (2)
- ☐ slightly untrue (3)
- ☐ neither true nor untrue (4)
- ☐ slightly true (5)
- ☐ almost true (6)
- ☐ true (7)

The effects of consuming this product are

- ☐ harmful (1)
- ☐ moderately harmful (2)
- ☐ slightly harmful (3)
- ☐ neither beneficial nor harmful (4)
- ☐ slightly beneficial (5)
- ☐ moderately beneficial (6)
- ☐ beneficial (7)

This product offers what I want

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

Crunchy Shopping Situation Manipulation*New Recipe Group*

After this sorting task we would like to ask you some more questions about cereal. Now imagine the following situation. You are going to your usual supermarket to shop for breakfast cereal. You need to buy a pack of cereal that you just ran out of. Cereal is the only product you are shopping for this time. On the shelves you see this product



Please answer six questions about this product

I like how the product looks

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I think the product tastes good

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

This product offers what I want

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

Consuming the product is

- ☐ extremely bad (1)
- ☐ Moderately bad (2)
- ☐ Slightly bad (3)
- ☐ Neither good nor bad (4)
- ☐ Slightly good (5)
- ☐ Moderately good (6)
- ☐ Extremely good (7)

The claims that the product makes are

- ☐ completely untrue (1)
- ☐ almost untrue (2)
- ☐ slightly untrue (3)
- ☐ neither true nor untrue (4)
- ☐ slightly true (5)
- ☐ almost true (6)
- ☐ true (7)

The effects of consuming this product are

- ☐ harmful (1)
- ☐ moderately harmful (2)
- ☐ slightly harmful (3)
- ☐ neither beneficial nor harmful (4)
- ☐ slightly beneficial (5)
- ☐ moderately beneficial (6)
- ☐ beneficial (7)

You are still shopping for breakfast cereal and see this product on the shelves



Please answer six questions about this product

Consuming the product is

- ☐ extremely bad (1)
- ☐ Moderately bad (2)
- ☐ Slightly bad (3)
- ☐ Neither good nor bad (4)
- ☐ Slightly good (5)
- ☐ Moderately good (6)
- ☐ Extremely good (7)

I like how the product looks

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I think the product tastes good

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

The claims that the product makes are

- ☐ completely untrue (1)
- ☐ almost untrue (2)
- ☐ slightly untrue (3)
- ☐ neither true nor untrue (4)
- ☐ slightly true (5)
- ☐ almost true (6)
- ☐ true (7)

The effects of consuming this product are

- ☐ harmful (1)
- ☐ moderately harmful (2)
- ☐ slightly harmful (3)
- ☐ neither beneficial nor harmful (4)
- ☐ slightly beneficial (5)
- ☐ moderately beneficial (6)
- ☐ beneficial (7)

This product offers what I want

- ☐ strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

Nanotechnology Group



Neophobia Control

Please answer some general questions regarding food

I am constantly sampling new and different foods.

- ☐ Strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither disagree nor agree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I don't trust new foods.

- ☐ Strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither disagree nor agree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

If I don't know what is in a food, I won't try it.

- ☐ Strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither disagree nor agree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I like foods from different countries.

- ☐ Dislike a great deal (1)
- ☐ Dislike a moderate amount (2)
- ☐ Dislike a little (3)
- ☐ Neither dislike nor like (4)
- ☐ Like a little (5)
- ☐ Like a moderate amount (6)
- ☐ Like a great deal (7)

Ethnic food looks too weird to eat.

- ☐ Strongly disagree (1)
- ☐ disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither disagree nor agree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

At dinner parties, I will try a new food.

- ☐ Strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither disagree nor agree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I am afraid to eat things I have never had before.

- ☐ Strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither disagree nor agree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I am very particular about the foods I will eat.

- ☐ Strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither disagree nor agree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I will eat almost anything.

- ☐ Strongly disagree (1)
- ☐ Disagree (2)
- ☐ Somewhat disagree (3)
- ☐ Neither disagree nor agree (4)
- ☐ Somewhat agree (5)
- ☐ Agree (6)
- ☐ Strongly agree (7)

I like to try new ethnic restaurants.

- ☐ Dislike a great deal (1)
- ☐ Dislike a moderate amount (2)
- ☐ Dislike a little (3)
- ☐ Neither dislike nor like (4)
- ☐ Like a little (5)
- ☐ Like a moderate amount (6)
- ☐ Like a great deal (7)

Price Consciousness Control

Please answer four short questions about shopping

Q194 I shop a lot for special offers

- ☐ Strongly agree (1)
- ☐ Agree (2)
- ☐ Somewhat agree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat disagree (5)
- ☐ Disagree (6)
- ☐ Strongly disagree (7)

Q195 I frequently check prices in stores even for small items

- ☐ Strongly agree (1)
- ☐ Agree (2)
- ☐ Somewhat agree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat disagree (5)
- ☐ Disagree (6)
- ☐ Strongly disagree (7)

Q196 I usually watch advertisements and check for sales

- ☐ Strongly agree (1)
- ☐ Agree (2)
- ☐ Somewhat agree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat disagree (5)
- ☐ Disagree (6)
- ☐ Strongly disagree (7)

Q197 When I shop I usually go to different stores to compare prices

- ☐ Strongly agree (1)
- ☐ Agree (2)
- ☐ Somewhat agree (3)
- ☐ Neither agree nor disagree (4)
- ☐ Somewhat disagree (5)
- ☐ Disagree (6)
- ☐ Strongly disagree (7)

Check for Brand Familiarity



Q200 Please indicate how well you know this breakfast cereal product

- ☐ 0 - not at all (1)
- ☐ 1 - slightly (2)
- ☐ 2 - moderately (3)
- ☐ 3 - a little bit (4)
- ☐ 4 - well (5)
- ☐ 5 - very well (6)
- ☐ 6 - extremely well (7)



Q176 Please indicate how well you know this breakfast cereal product

- ☐ 0 - not at all (1)
- ☐ 1 - slightly (2)
- ☐ 2 - moderately (3)
- ☐ 3 - a little bit (4)
- ☐ 4 - well (5)
- ☐ 5 - very well (6)
- ☐ 6 - extremely well (7)

Allergy Control and Demographics

Are you allergic against any of the following ingredients (please tick the appropriate boxes)

- ☐ Peanuts (1)
- ☐ Walnuts (2)
- ☐ Lactose (3)
- ☐ Gluten (4)
- ☐ Hazelnut (5)
- ☐ Almonds (6)
- ☐ Wheat (7)
- ☐ Barley (8)
- ☐ Oat (9)
- ☐ Dried Fruits (10)
- ☐ Other. Please specify (11) _____
- ☐ No allergies (12)

Q111 What is your gender?

- ☐ Male (1)
- ☐ Female (2)

Q205 What is your current age?

- ☐ 16 to 19 (1)
- ☐ 20 to 24 (2)
- ☐ 25 to 34 (3)
- ☐ 35 to 44 (4)
- ☐ 45 to 54 (5)
- ☐ 55 to 64 (6)
- ☐ 65 or over (7)

Q114 In which country do you reside?

- ☐ Please select below... (1)