Feeling natural:

The influence of tactile characteristics and sensory presentation of food packaging on consumers' perceived naturalness

MARIE-LUISE PETERS

Master Thesis

University of Twente
Faculty of Behavioural Management and Social Sciences
Master in Communication Studies
Marketing Communications

Supervisor: Dr. A. Fenko
Second supervisor: Dr. T.J.L. van Rompay

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Author:

Marie-Luise Peters
Master Communication Studies
Faculty of Behavioural Management and Social Sciences
University of Twente, the Netherlands

1st Supervisor:

Dr. A. Fenko
Faculty of Behavioural Management and Social Sciences
University of Twente, the Netherlands

2nd Supervisor:

Dr. T.J.L. van Rompay
Faculty of Behavioural Management and Social Sciences
University of Twente, the Netherlands

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ABSTRACT

More and more “natural” food products are appearing on the German market, utilising the trend of healthy and environmentally-friendly eating while increasing the complexity of decision-making. While most research has focused on the visual cues of food packaging on consumer perceptions, tactile input can also influence evaluations. Hence, the aim of the present study was to investigate whether a change in tactile characteristics of muesli packaging and sensory presentation type affect consumers’ perception of naturalness. In a 2x2 experimental design, 95 German participants evaluated muesli packages which varied in terms of their surface texture (kraft paper vs. rough plastic) in two presentation conditions (visual only vs. visual-tactile). The results revealed that natural tactile characteristics positively influenced perceived naturalness and marginally product liking. Furthermore, naturalness positively predicted perceived quality, product liking and purchase intention. These findings highlight that naturalness can be communicated through food packaging with the help of tactile characteristics to positively influence consumer evaluations. The results could have important implications for food packaging designers, marketers in the muesli sector and online grocery providers.

Keywords: perceived naturalness; tactile characteristics; sensory presentation; purchase intention; need for touch

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1. INTRODUCTION

"Natural" seems to be an attribute that improves the perception of items to which it is being applied to (Rozin, 2005). This might be due to human beings' innate preference for natural things, which affects the relationships they form with their natural environments (Wilson, 1984). This concept has been described by Fromm (1964) as biophilia or the "love of life". This preference for naturalness has been shown to be universal, especially among Europeans and Americans where naturalness possesses a rather positive connotation (Rozin, Fischler & Shields-Argelès, 2012). It is therefore not surprising that the "natural" claim has been attached to various food products in the Western world (Rozin et al., 2012).

Translating consumers' increasing demand for natural food products, which are of high quality and deliver aspects of healthiness and environmental friendliness, into competitive product offerings is a difficult task for marketers. Consequently, the packaging of a food product and its design play an important role. They not only help to categorise a product, the various structural and visual elements can also communicate meaning or strengthen existing associations (Citrin, Stern, Spangenberg & Clark, 2003; Schifferstein, Fenko, Desmet, Labbe & Martin, 2013). The sensory characteristics of packaging can then greatly affect the product experience and in this case perceived naturalness of food products.

While several studies have looked into the single-mode effects of senses on brand and product evaluations, these have primarily focused on the sense of vision, exploring cues such as colours (Kauppinen, 2004), pictures (Underwood & Klein, 2002) or shapes (Raghubir & Krishna, 1999). Yet, only few studies have included touch and feel properties as non-verbal signs. Tactile input is used for (1) gathering information and (2) for sensory stimulation and exploration (Balaji, Raghavan & Jha, 2011). Hence, how things feel has wide ranging psychological implications. Research by Krishna and Morrin (2008) for example showed that for some participants touching a flimsy cup decreased their perceived quality of the water contained in the cup. Touch therefore plays an important role when perceiving, evaluating and appreciating different products.

Furthermore, people experience the world not only with one sense, but instead perceive things in a multi-sensory manner (Hekkert, 2006; Lindstrom, 2005). For example, it has been found that images become more distinctive when matched with a second sense (Lindstrom, 2005). Consequently, vision and touch can oppose or cooperate with each other (Jansson-Boyd, 2011) to acquire a greater amount of information. However, research does not specifically address whether interplay of vision and touch affects consumers' perception of naturalness.

Since tactile features and the interplay of the senses on consumer evaluations have been examined only by a few, this research is trying to fill this research gap by considering the single and joint influence of vision and tactile cues on the perception of naturalness of muesli packaging. Therefore, the following research question and subsequent sub-question are proposed:

RQ 1. To what extent do tactile features of food product packaging and sensory presentation affect consumers' perception of naturalness?

RQ 1.1 To what extent does the need for touch moderate the effect of tactile characteristics and sensory presentation on perceived naturalness?

Muesli is a wholesome food, which, unlike its counterparts of highly processed cereals, does not contain great amounts of sugar, artificial flavours or colours. It could hence be described as a "natural" food product, because it normally has no ingredient significantly changed, has been subjected to minimal processing (Kurmann, Rasic & Kroger, 1992) and tends to be associated with being healthy and fair. Even though the German breakfast cereals market is at a mature and saturated life cycle stage with brands such as Dr. Oetker dominating the category, growth can however be achieved within the muesli segment, due to trends such as growing awareness about a healthy diet, gluten-free and naturalness (Euromonitor, 2014). Based on this, muesli has been used as a natural food product for this study.

2. THEORETICAL FRAMEWORK

2.1 Packaging

Consumers do not spend a lot of time choosing fast moving consumer goods such as muesli. When considering to buy a product, consumers therefore consciously or rather subconsciously take into account its utilitarian value as well as its symbolic significance (Dittmar, 1992). Accordingly, packaging is able to influence consumers' evaluations by supplying certain information (McDaniel & Baker, 1977) which assist decision-making. According to Citrin et al. (2003), consumers utilise a variety of intrinsic (i.e. texture and shape) and extrinsic cues (i.e. brand name and price) to make causal inferences about the quality and performance of a product. While certain product features such as hardness, roughness or weight may only be determined effectively with the sense of touch (i.e. Klatzky & Lederman, 1993), visual elements such as logos or green claims may draw attention to the product as well as ease product categorisation (Prendergast & Pitt, 1996). This implies that product features, such as food naturalness, can be communicated with the help of product packaging (Binninger, 2015). Naturalness therefore can be conveyed via visual and haptic packaging properties, which can be evaluated by using multiple senses.

2.2 Perceived naturalness

The existence of the preference for naturalness already raises the question of how naturalness is actually defined. Naturalness is defined as "[something which] possesses the distinctive features of a naturally occurring object, landscape... the appearance of being unchanged or unspoilt by human intervention" (Oxford English Dictionary, 2011). While the concept of naturalness seems particularly persuasive, no enforceable standards seem to exist for a natural food product. Its meaning is regulated differently in various countries. From a food science perspective defining the naturalness of a food product is rather difficult, because most food products are somehow processed and no longer in their naturally occurring form or state. From a regulatory perspective however, a natural food product is one that does "not contain added colours, artificial flavours or synthetic substances and is minimally processed" (FDA, 2015; USDA, 2015). For that reason, the perception of naturalness is often linked with sparsely processed ingredients (Evans, de Challemaison & Cox, 2010), which is why this study is utilising muesli as a "natural" food product.

Even though no clear definition seems to exist, consumers seem to use "naturalness" as a decision-making heuristic while considering natural products to be of better quality, especially in terms of nutrition (Rozin, Spranca, Krieger, Neuhaus, Surillo, Swerdlin & Wood, 2004). While people have become more concerned about the safety and quality of their food, they rate for example additives as potential health hazards (Williams, Stirling & Keynes, 2004). Rozin et al. (2004) suggest that consumers' preference for natural things and hence their definition of the construct is largely driven by moral and instrumental motives. The importance of moral motives refers to the idealisation of natural things, meaning that natural products are

increasingly environmentally friendly and therefore morally better (Rozin et al., 2004). Instrumental motives on the other hand refer to functional concerns such as healthiness and effectiveness. The research by Rozin et al. (2004) furthermore showed that when products were demonstrated to be chemically equivalent, the majority of people kept their preference for natural products. Moral motives then seem to be the main driver of consumers' preference for naturalness instead of the often claimed instrumental motives (Rozin et al., 2004).

Furthermore, under social construction theory (Dittmar, 1992), social meaning is communicated between people via physical objects. Natural appearing food packaging may not only give information about the product's qualities, but also about the kind of people who consume it. Due to current trends of healthy eating and sustainable consumption, high levels of perceived naturalness may therefore be linked with higher product liking, perceived quality and higher purchase intention. Formally stated, this leads to the following hypotheses:

H1a. Perceived naturalness positively predicts product liking.

H1b. Perceived naturalness positively predicts perceived quality.

H1c. Perceived naturalness positively predicts purchase intention.

2.3 Touch and vision in product experience

2.3.1 Touch

The notion of touch in consumer behaviour has only recently been of increasing interest in the literature (Citrin et al., 2003; Peck & Childers, 2003). While touch in general is defined as "sensations aroused through the stimulation of receptors in the skin" (Stevens & Green, 1996, pg. 1), haptic perception is limited to information acquired by the hand (Gibson, 1966). It is therefore considered to be a contact sense, requiring closeness with an object. This makes touch hard to manipulate, which is why consumers trust this sense the most (Spence & Gallace, 2011).

Accordingly, physical examination of products can increase preference (McCabe & Nowlis, 2003). Research by McCabe and Nowlis (2003) demonstrated that when simply being confronted with a product in pictorial format, choice for a product dropped by almost 10%, which has far reaching implications for purchases on the internet. A study by Citrin et al. (2003) supports this notion by showing that a lack of tactile information for material objects negatively impacted purchase intentions on the internet. They suggest that the absence of touch results in inaccurate product evaluations. This is supported by Peck and Childers (2003) who found that touch increases consumers' confidence in their purchase behaviour.

2.3.2 Vision

Visual information of packaging is effective in gaining consumers' attention (Garber, Hyatt & Boya, 2008) and to communicate an intended message. Aesthetic experience hereby seems to rely on emotions and feelings that are evoked by aspects such as colour (Garber et al., 2008; Rundh, 2005), use of images (Underwood, Klein & Burke, 2001), shapes and dimensions (Raghubir & Greenleaf, 2006). These not only contain symbolic meaning which allows consumers to develop a relationship with the product (Bloch, Brunel & Arnold, 2003), but are also long processed before the finer details of the packaging. Furthermore, with the help of

vision consumers may decide whether to handle a product or not. Hence, at the moment of buying, vision seems to be the most important modality, while other sensory modalities tend to become important during usage (Fenko, Schifferstein & Hekkert, 2010b).

2.3.3 Joint influence of touch and vision

Previous studies have started to explore interactions of various senses. For example, a study by Fenko, Schifferstein & Hekkert (2010a) demonstrated that colour and material equally contributed to the judgments of warmth. Research by Labbe and Martin (2013) showed that both touch (55%) and vision (24%) contributed to expected food naturalness. Vision and touch together therefore seem to dominate product experience over other senses. This opens up possibilities to include a multi-sensory approach when intending to use packaging as a communication-tool.

While in most cases the visual sense initially guides the consumer's evaluation of products (Jansson-Boyd, 2011), the tactile features can be utilised to reinforce the visual to some extent (Spence & Gallace, 2011). Even though tactile qualities are often examined through vision, either before touching or instead of (Wagner, 2013), touch enables a more accurate discrimination of product qualities and consequently leads to more precise product judgments (McCabe & Nowlis, 2003). This multi-sensory appraisal then creates an all-round impression of the texture. Information from vision and touch might therefore lead to a weighted average of sensory input (Guest & Spence, 2003).

Grounded cognition also suggests that information provided by multiple senses is integrated and influences overall perceptions. This is furthermore supported by Schifferstein et al. (2013), who suggest that product responses are relative to the integrated information from the senses. Their research showed, when consumers are allowed to only look at the packaging, positive affect seems to be low, but when consumers are allowed to taste (or interact with) the product, negative emotions decrease. This highlights the need to study effects of food packaging on perceived naturalness from a multisensory perspective.

There still seems to be a need to empirically assess the extent to which multi-sensory presentation positively contributes to product perceptions. The present study therefore is trying to assess how perceived naturalness of a muesli product may be evaluated by input from specifically vision and touch. That is why the following hypothesis is proposed:

H2. Packaging with natural tactile characteristics is perceived as more natural during visual-tactile presentation than visual only presentation.

2.4 Influence of packaging texture

Although studies have focused on the importance of the senses in creating customer engagement, the symbolic value of individual packaging properties to create meaningful perceptions such as a food product's naturalness has been emphasised less. Yet, the communication of naturalness uses various signs, such as texture, on packaging which is trying to suggest a link between the expression and the contents of the product (Binninger, 2015).

Previous research has shown that the texture of products has a strong impact on customer evaluations. For example, Peck and Wiggins (2006) found that an advertising

message becomes more persuasive with the help of tactile characteristics, regardless of its informative aspects. Schifferstein (2009) demonstrated that consumers' product experience is affected by the material a package is made of. He suggested that consumers may draw inferences from their experience with the container material to the content of the product. A similar study was conducted by McDaniel and Baker (1977), who found that potato chips were perceived to have a better taste when the bag was hard to open. Hence, the texture of a product packaging may allow brand values and product characteristics to become tangible, so that the quality as well as the psychological benefit of the product can be felt. This suggests that products, which are able to capture people's attention with the help of tactile input may have an advantage over competitors (Jansson-Boyd, 2011).

It is known from research that packaging which is perceived as having environmental issues has negative effects on consumers' attitudes and preferences (Venter, van der Merwe, de Beer, Kempen & Bosman, 2011). Labbe and Martin (2013) showed that rough and supple materials generated the highest expected naturalness. According to the authors this might be because imperfection seems to be closer to nature than smooth and rigid materials, which give the impression of being processed (and often plastic based). Hence, manipulation of tactile characteristics can affect the attitude towards a product as well as perceived quality (Schifferstein, 2009; Spence & Gallace, 2011). This suggests that texture is an important determinant of product perception. Since natural entities are often related to the absence of human intervention (Rozin, 2005), textures of muesli packaging conceived as natural should lead to a higher degree of perceived naturalness than unnatural textures. Hence, the following hypothesis is proposed:

H3. A product with a natural texture is perceived as more natural than a product with an unnatural texture.

2.5 Need for touch

The need to touch generally refers to people's internal motivation to experience haptic information and their awareness of such experiences. Hence, need for touch is defined as the "preference for the extraction and utilization of information through the haptic system" (Peck & Childers, 2003, p. 431). As a result, touch is divided into utilitarian and hedonic touch. While utilitarian touch is used for the functional gathering of information about a product, hedonic touch is used to create a sensory experience or general exploration (Peck & Childers, 2003).

In their study Peck and Childers (2003) found that individuals with a strong need for touch preferred a direct experience while showing greater confidence in their product evaluation when being able to haptically explore the product. On the other hand, individuals with a low need for touch showed no difference in their judgment confidence, because they relied on other non-haptic input for their product evaluation. Visual-tactile presentation may increase perceived naturalness for natural textures in consumers with a high need for touch, leading to the following hypothesis:

H4. The effects of sensory presentation and tactile characteristics are stronger for individuals with a high need for touch than for individuals with low need for touch.

In addition, it has been found that for some consumers, touch increases positive affective response which in turn leads to a positive effect on attitude as well as behaviour (Peck and Wiggins, 2006). Barriers to touch on the other hand have been shown to lead to frustration and less confidence in product judgement (Peck & Childers, 2003). Thus, it is suggested that consumers with a high need for touch will experience a rather negative affective response when being hindered to assess tactile properties with the help of touch. At the same time, there should not be differences for consumers with low need for touch. Formally stated:

H5a. High need for touch consumers evaluate products less positively in the visual-only condition than in the visual-tactile condition.

H5b. For high need for touch consumers, the effect of sensory presentation on perceived naturalness is mediated by affective response.

In order to test the different hypotheses, the research model depicted in Figure 1 will be used.

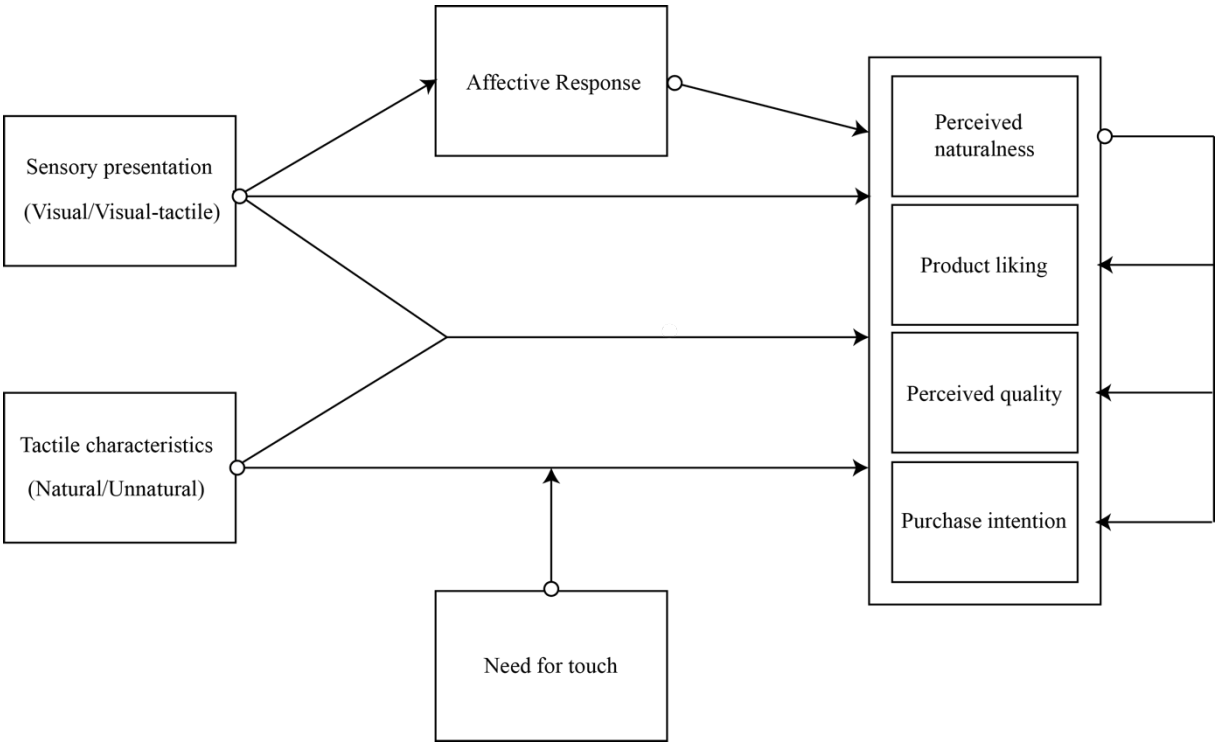

Figure 1 - Research model

3. RESEARCH METHODOLOGY

3.1 Pre-Studies

The aim of the pre-studies was to select packaging prototypes for the main study. Pre-study 1 assessed which colour stimulus (visual information) should be used for the muesli packaging stimuli, while pre-study 2 was used to find textures (tactile information) which significantly differ in their perceived naturalness.

3.1.1 Pre-Study 1

Aim

The first pre-study has been conducted to select a colour stimulus for the main study that is neither perceived as extremely natural or unnatural. This way, the visual information will stay constant in the main study in order to see effects of varying tactile stimulus instead. Therefore, the colour that was rated as the most neutral has been selected as part of the visual information for the main study.

Participants

A convenience sample of 26 participants was recruited via social media, e-mail and snowballing. All participants have previously done their own shopping. Yet, three cases had to be excluded, because one questionnaire was not completely filled in, one respondent was not of German nationality and one participant had a food intolerance that prohibited eating muesli. Hence, the final sample included 23 German participants with a mean age of 29.3, 52% were females.

Stimuli

Nine colours were to be rated by participants in order to find a colour that, in the context of muesli, is perceived as rather neutral in terms of naturalness. The colours of packaging used in the pre-study were yellow, blue, green, red, brown, black, purple, orange and pink. As examples, two coloured mock-up packages, as used in this study, are presented in Figure 2.

The packages all had the same label, shape and typeface to avoid bias due to brand familiarity and associations. To also prevent distraction while being as realistic as possible the overall design of the packaging was kept fairly simple.

Figure 2 - Examples of coloured packaging, blue and green

Procedure

In the online survey, respondents were shown one coloured packaging at a time. After each packaging, they had to rate perceived naturalness, perceived attractiveness and product liking on 7-point Likert scales from *not at all* to *very* as well as answering a few questions about their demographics.

The data has been analysed by using a repeated measures analysis of variance (ANOVA), with an alpha level of 0.05. To analyse differences between means, pairwise comparisons with Bonferroni corrections were calculated. Descriptive statistics of all colours can be found in Table 1.

3.1.1.1 Pre-Study 1 Results

Naturalness

Mauchly's test of sphericity indicated that the assumption of sphericity had been violated, $\chi 2(35) = 65.96$, $p = .001$. Hence, the repeated measures ANOVA with a Greenhouse-Geisser correction showed statistically significant differences between the nine different colours regarding perceived naturalness ($F(4.59, 100.89) = 7.81$, $p < .001$, partial $\eta 2 = .60$). Post hoc tests using the Bonferroni correction revealed that there are significant differences regarding perceived naturalness between brown and black ($p < .05$), green and purple ($p < .05$), green and red ($p < .05$), green and black ($p = .001$), orange and red ($p < .05$), and orange and black ($p < .05$). Mean scores and (SD) of the dependent variables per colour manipulation are shown in Table 1 and Figure 3.

Attractiveness

Repeated Measures ANOVA revealed that the means for perceived attractiveness were significantly different for the nine colours ($F(8, 176) = 3.17$, $p < .05$, partial $\eta 2 = .13$). Pairwise comparison using Bonferroni correction showed that orange ($M = 4.74$, $SD = 1.42$) and black ($M = 3.22$, $SD = 1.93$) significantly differed from each other ($p < .05$).

Liking

Repeated Measures ANOVA did not reveal any significant differences between the means of the nine colours ($F(8, 176) = 1.66$, $p = .112$, partial $\eta 2 = .07$). Pairwise comparison using Bonferroni adjustments also showed that none of the colours differ significantly from each other regarding product liking.

Table 1 – Mean ratings of perceived naturalness, attractiveness and product liking (with SD) for colours used in pre-study 1

	Naturalness	Attractiveness	Liking
Blue	4.04 (1.52)	4.39 (1.73)	4.13 (1.82)
Brown	4.65 (1.40)	4.43 (1.56)	4.26 (1.51)
Yellow	3.83 (1.72)	3.70 (1.58)	3.65 (1.53)
Green	5.13 (1.14)	4.48 (1.31)	4.35 (1.34)
Purple	3.91 (1.34)	4.35 (1.61)	4.22 (1.65)
Orange	4.78 (1.28)	4.74 (1.42)	4.3 (1.66)
Pink	3.78 (1.51)	4.13 (1.60)	4.04 (1.61)
Red	3.48 (1.38)	4.00 (1.65)	3.74 (1.57)
Black	3.17 (1.67)	3.22 (1.93)	3.30 (2.01)

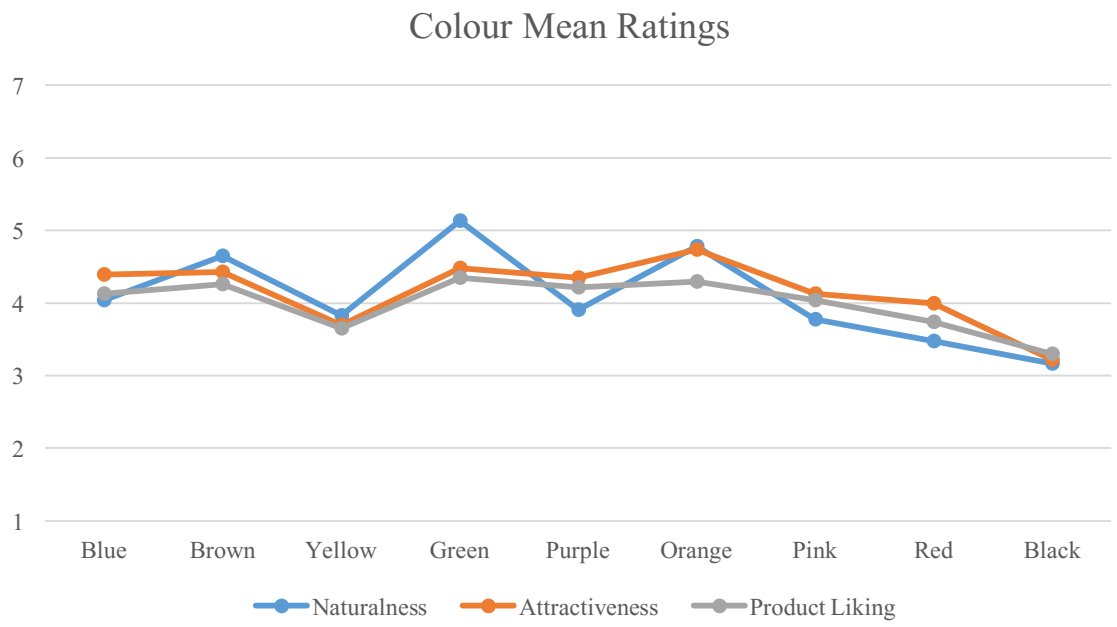

Figure 3 –Results Pre-Study 1 - Colour means perceived naturalness, perceived attractiveness, product liking

Summary Pre-Study 1

Based on the results regarding perceived naturalness, green (M = 5.13, SD = 1.14) was perceived as the most natural colour for muesli packaging. Furthermore, orange and brown were also perceived as more natural than other colours. Black (M = 3.17, SD = 1.67) on the other hand significantly differed from orange, brown and green, while it was perceived as the least natural colour. Since the focus of this pre-study was to select the colour perceived as most neutral regarding perceived naturalness, blue (M = 4.04, SD = .32) was selected as the most neutral packaging colour for the main study.

3.1.2 Pre-Study 2

Pre-study 2 has been conducted in order to select different textures for the main study which differ significantly in their perceived naturalness. That means only the materials perceived as most and least natural have been kept for the main study.

Participants

For the second pre-study, a convenience sample of 18 German participants (55.6% females, mean age 29.4) were recruited by convenience sampling. None of the participants had food intolerances that prohibit them to eat muesli and all of them have previously done their own shopping.

Stimuli

For the judgment of perceived naturalness, five different texture materials were selected (examples see Figure 4). All of them had a rectangular shape, measuring 21cm x 29.7 cm. The following five different packaging materials were selected:

- plain paper
- recycled paper
- kraft paper
- smooth plastic
- rough plastic

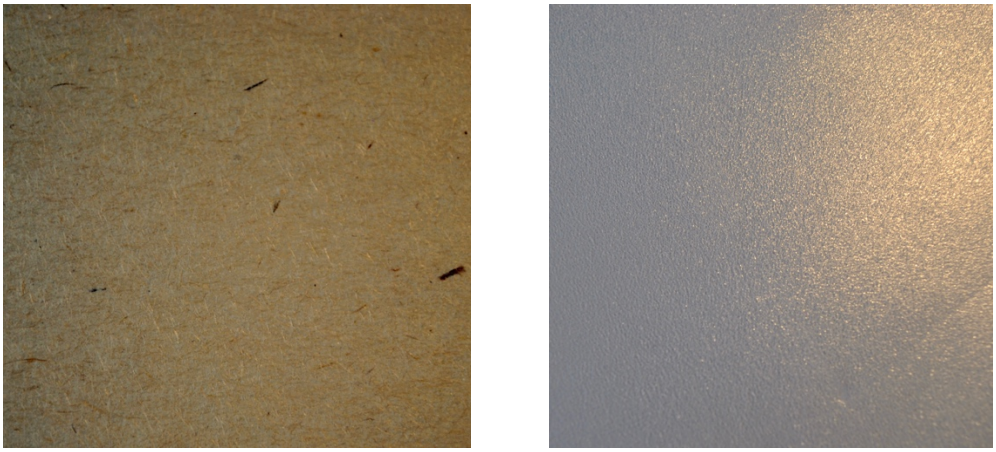

Figure 4 – Photographs of recycled paper and rough plastic

Procedure

In this tactile only exploration, a blind box was presented to participants on a table in front them. The box was covered with a cloth in order to prevent participants from seeing the sample textures. To further exclude acoustic cues, the participants had to wear headphones which played white noise (following research by Overvliet & Soto-Faraco, 2011) so that the sounds of the tactile exploration were covered up.

The five trials always started in the same manner, with the experimenter placing a sample on the bottom of the box. Respondents were then asked to freely explore the sample with their hands by reaching into the box. After they were finished exploring a sample, they were asked to rate perceived naturalness, perceived attractiveness and product liking on 7-point Likert scales from *not all* to *very.*

As in pre-study 1, the gathered data was analysed by conducting a repeated measures ANOVA with an alpha level of 0.05. The differences between means were calculated by using pairwise comparisons with Bonferroni adjustments. Descriptive statistics of all textures can be found in Table 2.

3.1.2.1 Pre-Study 2 Results

Naturalness

Repeated Measures ANOVA revealed that the means for perceived naturalness were statistically significantly different for the five textures ($F(4, 68) = 85.29$, $p < .001$, partial $\eta 2 = .83$). Pairwise comparison using Bonferroni correction showed that kraft paper led to the highest perception of naturalness ($M = 5.61$, $SD = 1.04$). Kraft paper significantly differed from smooth plastic ($p < .001$), rough plastic ($p < .001$) and plain paper ($p < 0.05$).

Rough plastic on the other hand was perceived as the least natural texture ($M = 1.50$, $SD = .62$). This material significantly differs from recycled paper ($p < .001$), kraft paper ($p < .001$) and plain paper ($p < .001$). Mean scores and (SD) of the dependent variables per texture are shown in table 2 and fig. 5.

Attractiveness

Mauchly's test of sphericity indicated that the assumption of sphericity had been violated, $\chi 2(35) = 18.11$, $p < .05$. Hence, the degrees of freedom were corrected, because the Greenhouse-Geiser ε was $\varepsilon < .7$. The repeated measures ANOVA with a Greenhouse-Geisser correction showed statistically significant differences between the five different textures regarding perceived attractiveness ($F(2.56, 43.58) = 22.31$, $p < .001$, partial $\eta 2 = .57$).

Post-hoc analyses with Bonferroni adjustments showed that kraft paper was perceived as the most attractive texture ($M = 5.67$, $SD = .18$). It significantly differed from smooth plastic ($p < .05$) and rough plastic ($p < .001$). Rough plastic was perceived as least attractive ($M = 2.33$, $SD = .23$) and significantly differed from recycled paper ($p < .001$), kraft paper ($p < .001$) and plain paper ($p < .001$).

Liking

Repeated Measures ANOVA revealed that the means for product liking were significantly different for the five textures ($F(4, 68) = 23.35$ $p < .001$, partial $\eta 2 = .58$). Pairwise comparison using Bonferroni correction showed that kraft paper led to the highest product liking ($M = 5.78$, $SD = .88$). Kraft paper also significantly differs from smooth plastic ($p < .001$), rough plastic ($p < .001$) and plain paper ($p < 0.05$).

Rough plastic showed the lowest product liking ($M = 2.50$, $SD = 1.20$). It significantly differed from recycled paper ($p < .001$), kraft paper ($p < .001$) and plain paper ($p < .001$).

Table 2 – Mean ratings of perceived naturalness, attractiveness and product liking (with SD) for textures used in pre-study 2

	Naturalness	Attractiveness	Liking
Plain Paper	4.22 (1.06)	4.78 (1.26)	4.83 (1.10)
Recycled Paper	5.44 (.92)	5.22 (1.11)	5.17 (1.20)
Kraft Paper	5.61 (1.04)	5.67 (.77)	5.78 (.88)
Smooth Plastic	1.89 (.76)	3.33 (1.78)	3.11 (1.68)
Rough Plastic	1.50 (.62)	2.33 (.97)	2.50 (1.20)

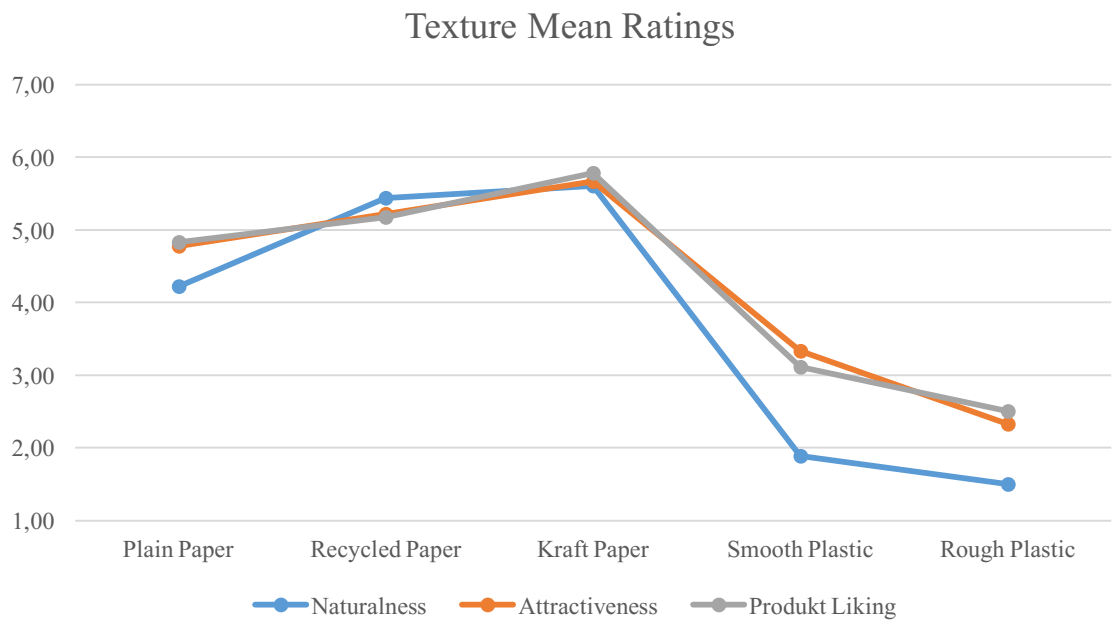

Figure 5 - Results Pre-Study 2 - Texture means perceived naturalness, perceived attractiveness, product liking

Summary Pre-Study 2

Based on the results from pre-study 2, kraft paper was chosen as the most natural packaging texture, which was simultaneously the most attractive and the most liked packaging texture. Rough plastic was chosen as the unnatural texture for the main study, which was also the least attractive and least liked texture.

3.2 Main Study

Design

The purpose of the study was to investigate the relative impact of sensory presentation and tactile characteristics of packaging on consumers' perceived naturalness while taking into account consumers' need for touch and their affective response. Hence, the main study uses a 2 (sensory presentation: visual vs. visual-tactile) x 2 (tactile characteristics: natural vs. unnatural) between-subjects design (see Table 3). While perceived naturalness, purchase intention, quality and product liking were measured as dependent variables; affective response was treated as a potential mediator and consumers' need for touch as a covariate.

Table 3 - Experimental design

	Natural texture	Unnatural texture
Visual presentation	Group 1	Group 2
Visual-tactile presentation	Group 3	Group 4

Participants

For the main study, a convenience sample of 97 German participants was recruited via e-mail, social media, snowballing and the participant pool of the University of Twente. All respondents participated completely voluntarily while being naïve to the purpose of the study. No rewards were granted except to participants who were recruited through the participant tool of the University of Twente who received 0.25 credits on their account.

From the 97 responses, 2 had to be removed due to the qualifying criteria: intolerances that prohibit from eating muesli (n = 1), unfinished questionnaires (n = 1). The final data set therefore consists of 95 responses. The participants were between 18 and 33 years old (M = 22.64, SD = 3.00), 28 respondents were male (29 %).

Participants were randomly assigned to one of the stimulus conditions. Table 4 shows the distribution of age, gender and level of need for touch per condition. To compare the mean level of need for touch and the mean age between the four conditions ANOVAs were performed.

Table 4 – Characteristics of participants per experimental condition

	Experimental Group				**Total**
	Visual natural	Visual unnatural	Visual-tactile natural	Visual-tactile unnatural	
Mean age (SD)	23.29 (3.38)	21.71 (2.69)	22.22 (2.73)	23.46 (2.90)	22.67 (2.99)
Gender					
Male	4 (17%)	4 (17%)	10 (43%)	10 (42%)	28 (29%)
Female	20 (83%)	20 (83%)	13 (57%)	14 (58%)	67 (71%)
Mean NFT score (SD)	42.57 (7.27)	39.17 (9.36)	38.96 (7.73)	41.21 (7.32)	40.45 (7.99)
NFT groups					
Low	10 (42%)	15 (63%)	14 (61%)	10 (42%)	49 (52%)
High	14 (58%)	9 (37%)	9 (39%)	14 (58%)	46 (48%)
Total	24	24	23	24	95

Stimuli materials

The two product stimuli that had been chosen for the main study were (1) blue muesli packaging with rough plastic (unnatural material) and (2) blue muesli packaging with kraft paper (natural material) (see Figure 6). The same product name and label from the pre-studies were added to each packaging. No existing brand was used in order to avoid brand familiarity and existing brand associations.

Figure 6 – Muesli packaging with kraft paper (front, back) and packaging with rough plastic (front, back)

Measures

Dependent Measures

Perceived Naturalness. The measurement for naturalness was evaluated by using a Likert scale from 1 to 5. The scale had been adapted from Binninger (2015) consisting of two dimensions (environment and health) with seven items total as well as an adaption of the naturalness scale from Camus (2004), from which two items concerning ingredients were used. This had been done in order to cover instrumental as well as moral motives as mentioned in the research by Rozin et al. (2004).

Purchase intention. Purchase intention was measured with four items based on Baker and Churchill (1977) on a Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Product Liking. Four items were used to measure product liking (scale developed by Fenko, Backhaus and van Hoof, 2015) on a Likert scale (1 = strongly disagree, 5 = strongly agree).

Perceived Quality. The initial scale to measure perceived quality was composed of five items. However, these did not form a reliable scale ($\alpha = .65$). In order to increase reliability, two items were removed. The revised scale then consisted of three items and reached an acceptable threshold of $\alpha = 0.71$.

Mediating/Moderating Measures

Need for touch. The scale designed by Peck and Childers (2003), called the "Need for Touch Scale", consists of 12 items which are designed to measure individual differences in terms of preference for tactile information. The items have been categorised into two dimensions, namely autotelic and instrumental. While the autotelic dimension considers the hedonic dimension of touch, the instrumental dimension on the other hand relates touch to information gathering. A German translation by Nuszbaum, Voss, Klauer and Betsch (2010) was used, because it has proven to be valid and reliable. All items were measured on a five-point Likert scale.

The scores ranged from 20 to 59 with a mean score of 40.5, median 40. In order to split the respondents into high NFT and low NFT, the data set was split at score 40. Both groups were approximately equal (see Table 4). There was a significant difference in mean need for touch scores between consumers with low need for touch ($M = 34.39$, $SD = 4.79$) and consumers with a high need for touch ($M = 47.13$, $SD = 4.74$), $t(93) = 13.03$, $p < .001$.

Affective response. To measure affective response as a potential mediator, participants were asked to indicate on a five-point Likert scale ("not at all" to "very strongly") how much they have felt an emotional reaction, which was measured by using 12 emotions (admiration, aversion, attraction, boredom, contempt, fascination, dissatisfaction, satisfaction, joy, pleasant surprise, unpleasant surprise, sadness). These emotions were originally used in the PrEmo instrument designed by Desmet (2003) to measure emotional responses to visual appearances.

All items used in the main study are shown in Table 5.

Procedure

Participants were randomly assigned to one of the four conditions: (1) visual presentation only with natural packaging, (2) visual presentation only with unnatural packaging, (3) visual-tactile presentation with natural packaging or (4) visual-tactile presentation with unnatural packaging. In the first and second condition, participants were instructed to imagine they were in the supermarket where they would only visually evaluate the product, meaning they were prohibited from touching it. In condition three and four, participants were invited to examine the packaging visually as well as by touch. As soon as participants finished looking at the product, they were asked to fill in the questionnaire provided, where they first had to answer a few screening questions and then go on to evaluate the perceived naturalness, product liking, perceived quality, purchase intention, need for touch and indicate their affective response. Finally, a few socio-demographic questions were asked, such as age, gender and level of education. Afterwards they were thanked for their participation and debriefed.

Table 5 - Overview of items and reliabilities of scales used

Scale	Items	α
Perceived naturalness	(1) This is an eco-friendly product. (2) This product is one of those that really respect the environment. (3) You can immediately see that this product is ecological. (4) This product is more ecological than most. (5) The nutrition qualities of this product are good for the health. (6) This product is globally good for the health. (7) This product is healthy and natural. (8) This product does not contain artificial elements. (9) This product contains only natural elements.	.81
Purchase Intention	(1) I would buy this product if I happened to see it in a store. (2) I would actively seek out this product in a store. (3) I would consider buying this product. (4) I would recommend this product to others.	.76
Perceived quality	(1) The overall quality of the product is good. (2) The likelihood that this product keeps what it promises is high. (3) The workmanship of this product is good.	.71
Product liking	(1) My first impression of the product is that I extremely like it. (2) The product looks nice. (3) The product draws attention. (4) In general, the product seems attractive to me.	.74

Need for Touch	*Instrumental Factor Items* (1) I place more trust in products that can be touched before purchase. (2) I feel more comfortable purchasing a product after physically examining it. (3) If I can't touch a product in the store, I am reluctant to purchase the product. (4) I feel more confident making a purchase after touching a product. (5) The only way to make sure a product is worth buying is to actually touch it. (6) There are many products that I would only buy if I could handle them before purchase. *Autotelic Factor Items* (7) When walking through stores, I can't help touching all kinds of products. (8) Touching products can be fun. (9) When browsing in stores, it is important for me to handle all kinds of products. (10) I like to touch products even if I have no intention of buying them. (11) When browsing in stores, I like to touch lots of products. (12) I find myself touching all kinds of products in stores.	.88
Affective Response	(1) Pleasant surprise (2) Attractiveness (3) Admiration (4) Fascination (5) Joy (6) Satisfaction (7) Aversion (R) (8) Contempt (R) (9) Dissatisfaction (R) (10) Unpleasant surprise (R) (11) Boredom (R) (12) Sadness (R)	.77

R, Reversed items.

4. RESULTS

4.1 Main effects

A multivariate analysis of covariance (MANCOVA) was used in order to investigate the effects of the tactile characteristics manipulation, the sensory presentation manipulation and need for touch as a covariate on perceived naturalness, perceived quality, product liking and purchase intention. To analyse the differences between the means, pairwise comparisons with Bonferroni adjustments were calculated.

Tactile characteristics

MANCOVA showed a statistically significant difference between the tactile characteristics of the packaging on the combined dependent variables, $F(4, 87) = 2.66$, $p = .038$; Wilks' $\Lambda = .89$; partial $\eta^2 = .109$. Further analysis showed that there was a statistically significant difference in perceived naturalness between the different tactile characteristics of the packaging, $F(1, 90) = 4.26$, $p = .042$; partial $\eta^2 = .045$. There was also a marginally significant effect of tactile characteristics on product liking, $F(1, 90) = 3.88$, $p = .053$; partial $\eta^2 = .041$.

Pairwise comparisons were then used to more specifically identify the differences in perceived naturalness and product liking as a result of the tactile characteristics manipulation. Participants rated the muesli with the natural packaging material as significantly more natural (M = 3.52, SD = .51) than the muesli with the unnatural packaging material (M = 3.29, SD = .58). These results support H3 (a product with a natural texture is perceived as more natural than a product with an unnatural texture). The natural tactile characteristics were also more liked (M = 3.73, SD = .59) than the unnatural tactile characteristics (M = 3.47, SD = .71). All mean scores (SD) of each dependent variable per tactile characteristics manipulation are shown in Table 6.

Sensory presentation

Main effects of the sensory presentation manipulation on perceived naturalness, perceived quality, product liking and purchase intention were not significant, $F(4, 87) = .39$, $p = .816$; Wilks' $\Lambda = .98$; partial $\eta^2 = .018$. Mean scores and (SD) of the dependent variables per sensory presentation manipulation are shown in table 7.

There was also no statistically significant interaction effect between tactile characteristics and sensory presentation $F(4, 87) = .646$, $p = .631$; Wilks' $\Lambda = .971$; partial $\eta^2 = .029$. Hence, H2 (packaging with natural tactile characteristics is perceived as more natural during visual-tactile presentation than visual only presentation) was not supported by the results.

Table 6 - Mean scores (SD) of consumer evaluations of natural and unnatural tactile packaging characteristics

	Natural tactile characteristic	Unnatural tactile characteristic
Perceived naturalness*	3.52 (.51)	3.29 (.58)
Perceived quality	3.61 (.56)	3.52 (.66)
Product Liking (m.s., $p = .053$)	3.73 (.59)	3.47 (.71)
Purchase Intention	3.26 (.57)	3.27 (.69)

* $p < .05$

Table 7 - Mean scores (SD) of consumer evaluations by type of sensory presentation

	Visual	Visual-tactile
Perceived naturalness	3.42 (.46)	3.40 (.65)
Perceived quality	3.63 (.54)	3.50 (.67)
Product Liking	3.60 (.67)	3.60 (.67)
Purchase Intention	3.30 (.57)	3.22 (.68)

Need for touch

No statistically significant effects of *Need for touch* on perceived naturalness, $F(1, 90) = 0.01$, $p = .916$, perceived quality, $F(1, 90) = 1.20$, $p = .275$, product liking, $F(1, 90) = .24$, $p = .628$, and purchase intention, $F(1, 90) = .219$, $p = .641$ were found. Therefore, the data does not support H4 (the effects of sensory presentation and tactile characteristics are stronger for individuals with a high need for touch than for individuals with low need for touch).

4.2 Mediation effect

Affective Response

Results of a univariate analysis of variance with need for touch (high vs. low) and sensory presentation (visual vs. visual-tactile) as independent variables and affective response as dependent variable indicated no statistically significant interaction $F(1, 91) = .47$, $p = .495$. Hence, no further mediation analysis was conducted.

There was, as expected, no difference in the level of affective response for participants with low NFT (Visual condition: M = 3.6, SD = .40, Visual-tactile condition: M = 3.67, SD = .40). Even though respondents with a high NFT showed a lower affective response when they were prevented from touching (M = 3.62, SD = .41) than when they were allowed to touch the product (M = 3.81, SD = .43), the difference was not significant. The results therefore do not support H5a (high need for touch consumers evaluate products less positively in the visual-only condition than in the visual-tactile condition) nor H5b (for high need for touch consumers, the effect of sensory presentation on perceived naturalness is mediated by affective response).

In order to assess other possible effects of affective response, a linear regression established that affective response significantly predicted perceived naturalness, $\beta = .39$, $t(93) = 3.08$, $p = .003$, $R^2 = .09$, perceived quality, $\beta = .43$, $t(93) = 4.55$, $p < .001$, $R^2 = .18$, product liking, $\beta = .64$, $t(93) = 8.03$, $p < .001$, $R^2 = .41$, and purchase intention, $\beta = .43$, $t(93) = 4.58$, $p < .001$, $R^2 = .18$.

4.3 Prediction of purchase intention, product liking and perceived quality

A linear regression established that perceived naturalness significantly predicted perceived quality, $\beta = .39$, t(93) = 4.11, p < .001. Perceived naturalness explained a significant proportion of variance in perceived quality scores, $R^2 = .15$, $F(1, 93) = 16.90$, $p < .001$. Perceived naturalness also significantly predicted product liking, $\beta = .36$, t(93) = 4.77, $p < .001$ and purchase intention, $\beta = .38$, t(93) = 3.92, $p < .001$ (see Figure 7). Perceived naturalness explained a significant proportion of variance in perceived quality scores, $R^2 = .13$, $F(1, 93) = 14.24$, $p < .001$ and in purchase intention scores, $R^2 = .14$, $F(1, 93) = 15.36$, $p < .001$. These results confirm H1a/b/c (perceived naturalness positively predicts product liking/ perceived quality/ purchase intention).

A stepwise multiple regression was run to evaluate whether tactile characteristics, perceived naturalness, perceived quality and product liking were necessary to predict purchase intention. Perceived quality ($\beta = .20$, t(92) = 2.35, $p = .021$) and product liking ($\beta = .56$, t(92) = 6.57, $p < .001$) statistically significantly predicted purchase intention, and together explained a significant proportion of variance in purchase intention scores, $R^2 = .44$, $F(2, 92) = 35.83$, p < .001. Tactile characteristics (t = 1.837, p = .069) and perceived naturalness (t = 1.370, p = .174) did not enter into the equation. Regression coefficients and standard errors can be found in Table 10 in appendix A.

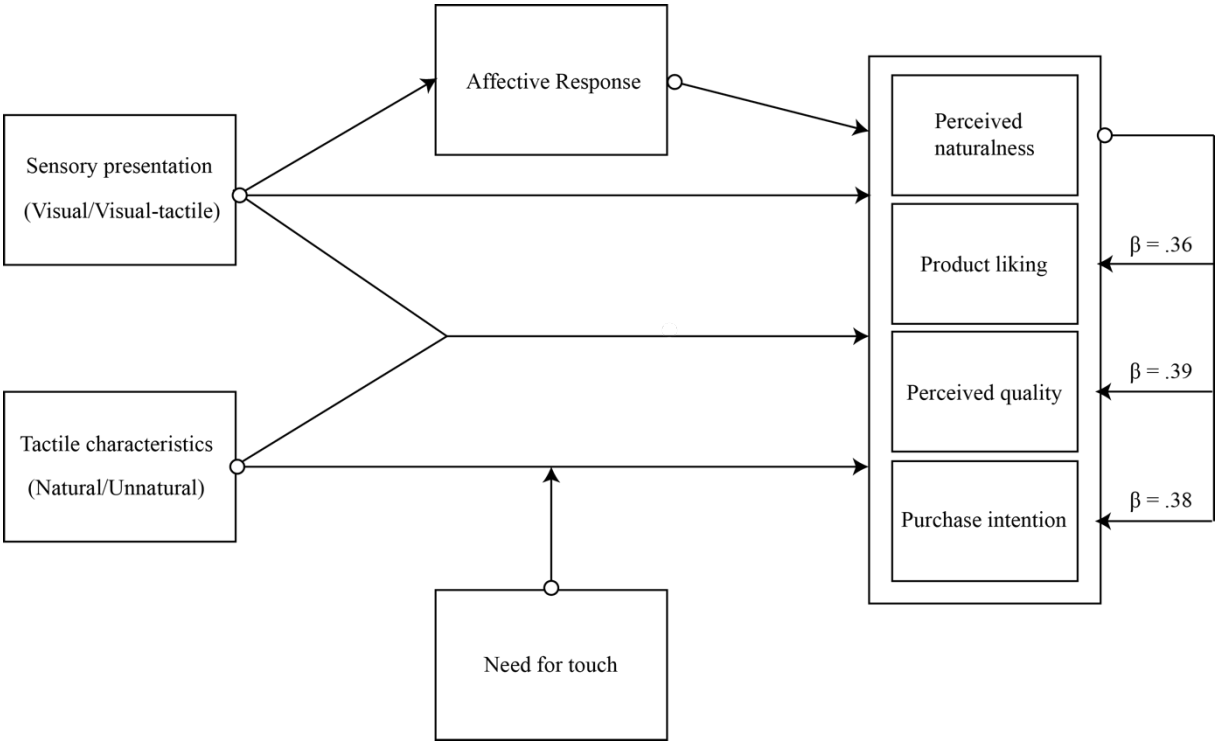

Figure 7 - Effects of perceived naturalness on perceived quality, product liking and purchase intention (significant regression coefficients)

5. DISCUSSION

This study aimed to get insight into the relative effects of tactile characteristics and sensory presentation of food packaging on the perceived naturalness, product liking, perceived quality and purchase intention among people with different levels of need for touch and their affective response. In line with the hypotheses, the results showed a significant effect of tactile characteristics. Natural tactile characteristics positively influenced perceived naturalness (H3 confirmed), whereas perceived naturalness positively predicted product liking, perceived quality and purchase intention (H1a, b and c confirmed). Contrary to expectations, the need for touch did not influence consumer responses to muesli packaging (H4 rejected). Consumers with a high need for touch also showed no significant differences in affective response when they were not allowed to touch the product compared with the visual-tactile presentation (H5a and 5b rejected). Following up on that, sensory presentation did not affect responses to muesli packaging either, meaning that natural tactile characteristics did not show higher levels of perceived naturalness during the visual-tactile presentation compared to visual only presentation (H2 rejected).

Table 8 provides an overview of the supported and rejected hypotheses.

Table 8 - Overview of the hypotheses

	Hypotheses	Supported
H1a/b/c	Perceived naturalness positively predicts product liking/ perceived quality/ purchase intention.	Yes
H2	Packaging with natural tactile characteristics is perceived as more natural during visual-tactile presentation than visual only presentation.	No
H3	A product with a natural texture is perceived as more natural than a product with an unnatural texture.	Yes
H4	The effects of sensory evaluation and tactile characteristics are stronger for individuals with a high need for touch than for individuals with low need for touch.	No
H5a	High need for touch consumers evaluate products less positively in the visual-only condition than in the visual-tactile condition.	No
H5b	For high need for touch consumers, the effect of sensory presentation on perceived naturalness is mediated by affective response.	No

Tactile characteristics

This study confirms that tactile characteristics play a role in perceived naturalness. In line with previous research (Labbe & Martin, 2013), the rough kraft paper generated higher levels of perceived naturalness than the plastic coating. The results also showed that the effect of tactile characteristics on product liking is marginally significant. A bigger sample size might have found a statistically significant effect. The natural texture generated higher ratings of product liking than the unnatural texture. This finding is in accordance with previous studies that people like things which appear to be natural more than unnatural things (Rozin et al., 2012).

The effect of tactile characteristics found in this study suggests that texture needs to be taken into account when designing food packaging that is supposed to convey naturalness. Textures can convey an identity for its content while making lasting impressions on consumers (Piqueras-Fiszman & Spence, 2012). A natural texture may result in positive product liking while allowing the product to differentiate itself from its competition. This might form the basis for future interactions. Therefore, by using texture as a way to encode information about the content, consumers may make more accurate purchase decisions according to their needs while feeling more informed.

Sensory presentation

The sensory presentation manipulation used in this study had no direct effect on consumer evaluations. Hence, it cannot be said that multi-sensory presentation alters consumers' evaluations of food products, especially in terms of naturalness, in a more positive or negative way than uni-sensory presentation.

There may be several explanations for the non-significant effect. In none of the two sensory presentation conditions were consumers able to verify the actual naturalness of the product. It can only be verified once consumers have the possibility to open the product and eventually taste it. Therefore, consumers' perceptions of naturalness may also be influenced by experiencing the product across various stages of usage as suggested by previous research (Schifferstein et al., 2013). Alternatively, some studies suggest that the dominance of a modality depends on the property that is being judged (Guest & Spence, 2003). In this study, the focus laid on the texture of the packaging. Other characteristics such as softness or hardness of the packaging might also play a role. It could also have to do with the nature of the product. Muesli belongs to the group of fast moving consumer goods. Previous research by Marlow and Jansson-Boyd (2011) indicates that touch might not play an influential role for these kinds of products. Instead, touch seems to be more important when purchasing luxury items (Cummings, 2016). Thus, perceptions of a muesli brand, that is positioned as premium and luxurious, may be altered by multi-sensory presentation. Consumer scepticism may also affect the relationship between sensory experiences and product evaluation. Multisensory experiences are associated with a reduction in scepticism (Fenko, Kersten & Bialkova, 2016). Hence, further research is needed to compare the effects of sensory presentation and the type of food product on perceived naturalness, perceived quality, product liking and purchase intention.

Furthermore, the non-significant effect of sensory presentation has implications for marketers involved with online groceries. The challenge then is to provide consumers with valuable information even without them touching it. Showing the product from various angles as well as visual merchandising (such as pairing the product with an item that conveys the same message – i.e. in case of naturalness a wooden table) might enhance the visual input. Value-added information may further be used to personalise the service offering, eventually leading to repeat purchases.

Interaction

In this study, no interaction effect of sensory presentation and tactile characteristics of the packaging was found. Hence, the effects of the tactile characteristics manipulation on perceived naturalness are not strengthened by the combination of texture and mode of presentation. This could be explained by consumers' preference for congruence which stimulates a faster product classification (Pavani, Spence & Driver, 2000) and information processing (Lederman & Klatzky, 2004). Research by Little and Orth (2013) indicates that multisensory input, which conveys congruent semantic meaning, has an impact on consumers' evaluations. In this study, the visual design of both products was the same and held neutral, so that any differences in ratings must have been due to the different textures. Yet, if visual input such as colour would have matched tactile input (i.e. green colour for the natural texture), multi-sensory presentation might have had an effect on perceived naturalness and consumer evaluations compared with uni-sensory presentation.

Need for touch (NFT)

Contrary to expectations as well as previous research (i.e. Peck & Childers, 2003; Peck & Wiggins, 2006), the study did not confirm that the level of need for touch influences the perceived naturalness of food products nor product liking, perceived quality and purchase intention. These results might not have been significantly different due to a number of reasons. For one, studies have shown that touching a product can positively impact on the perception of ownership while increasing the value attached to it (Kahneman, Knetsch & Thaler, 1990). Since the study was set in a laboratory setting, participants maybe did not really expect to touch the product. This may have negatively influenced participants' perceived sense of ownership, so that people were less inclined to touch the packages in the first place. Therefore, no differences in evaluations might have been found and for that matter participants with a high NFT also did not display the expected rather negative affective response as initially suggested.

Besides, as previously stated, muesli belongs to the fast moving consumer goods and might be seen as rather ordinary and low risk. Touching a fast moving consumer good maybe appeals more to the utilitarian side of touch to gather further information about the product. Hedonic touch on the other hand may therefore be secondary for muesli, which could be why participants were less inclined to evaluate it haptically. Muesli might not be seen as a product that needs to be touched unlike luxury food items, clothes or furniture. On these grounds, need for touch gives the impression to be category-dependent.

Other reasons could be the relatively small sample size (n = 95) as well as several personal characteristics of participants such as health concern, an interest in environmental issues or nutritional knowledge, which could all be related to naturalness.

Affective Response

Surprisingly neither tactile characteristics nor sensory presentation type had an effect on affective response. Yet, affective response showed a positive correlation with perceived naturalness, product liking, perceived quality and purchase intention. This is in accordance with research by Rozin et al. (2012) who suggest that the perception of naturalness includes positive affect (such as good and healthy). Product liking may be linked to emotional processes evoked by the packaging (Binninger, 2015). While the data showed that positive affect does not seem to be a significant mediator, the emotional states of consumers during evaluation could act as a moderator, too. Furthermore, a real-life setting could also be more demanding than a laboratory setting, which is why high need for touch consumers may then experience stronger emotional reactions when touching products. As a consequence, future research should assess the role of affective response in more detail while also considering each of the twelve emotions individually as suggested by Schifferstein et al. (2013).

Predictive power of naturalness

The positive predictive power of perceived naturalness on perceived quality, product liking and purchase intention indicates that participants used naturalness as a decision-making anchor. It seems to reassure consumers by referring to moral and instrumental motives (Rozin et al., 2004) and could therefore be a factor in terms of perceived risk.

However, the results have also shown that product liking and perceived quality actually contribute best to purchase intention. The higher product liking and perceived quality were, the higher was the purchase intention of the muesli. This is in line with previous research that showed that a proven benefit as well as liking of a healthy product increases intention to buy (Bower, Saadat & Whitten, 2003). Yet again, these findings may be different for other food product categories such as fruit, meat or fish, where naturalness tends to play a more important role due to perceived risk. Muesli on the other side has lower risk associated with it than fresh groceries.

6. LIMITATIONS AND FUTURE RESEARCH

Product category and brand familiarity

This research established an effect of texture only for one product category, namely muesli. Different effects on perceived naturalness might occur for other types of food products and categories, especially with regards to luxury food items. Furthermore, consistent with previous research (i.e. Little & Orth, 2013), a brand that was unfamiliar to participants was used to control for brand familiarity. Yet, this indicates that the current findings may only be applicable to new market introductions. Follow-up studies should therefore extend this research to a brand familiarity perspective even though this might complicate the isolation of effects.

Setting

The present research was conducted in a laboratory setting in order to control for extraneous influences. Yet, this may have caused respondents to answer differently than they would have in a more realistic setting, like a retail environment. The visual complexity of a store, as well as crowding could majorly influence the perception of visual and tactile cues. Future research should therefore investigate the potential moderating effect of store characteristics on consumers' multisensory experience and perceived naturalness.

Cultural differences

This study was limited to a single food product, muesli, and was tested within a relatively small sample (n = 95) from one population, German consumers. Research by Rozin et al. (2012) already suggests that perceived naturalness is a very subjective concept which may be interpreted differently in various countries. Hence, findings from this research cannot be generalised to other countries and cultures without further analysis. Furthermore, muesli consumption differs greatly between countries, which is why other food products should also be investigated in relation to naturalness. Besides, there may be other factors influencing the perceptions of naturalness such as certain socio-demographics (age, gender, level of income) and environmental awareness, which also tends to be culture dependent (Szagun & Pavlov, 1995). Additional research might be needed to analyse the influence of these individual characteristics of people.

7. CONCLUSIONS AND PRACTICAL IMPLICATIONS

Since the German muesli market is facing intense competition and increasingly demanding consumers (Euromonitor, 2014), it is crucial for marketers to understand what value perceived naturalness can bring to their product category and how to effectively translate the findings of this study into a valuable product offering. Therefore, the results of the present study can provide a better understanding of the perception of naturalness and give guidelines for the positioning of natural food products and especially muesli.

The results demonstrate that natural tactile characteristics are crucial in positively influencing perceived naturalness and product liking of food products. These findings could guide product designers to enhance the appeal of food products, so that consumers can make inferences from the packaging to the content (Schifferstein, 2009). Positive inferences could lead to an overall increase in trial behaviour and later consumption.

It has further been demonstrated that perceived naturalness positively predicts product liking, perceived quality and purchase intention, while purchase intention is best predicted by product liking and perceived quality. This indicates that products which are attributed as natural have an advantage over competitive products, which is in line with previous research (Rozin et al., 2004; Overvliet & Soto-Faraco, 2011). Results also indicate that a positive affective response is positively correlated with perceived naturalness, product liking, perceived quality and purchase intention. Consumers' emotional states and the emotions evoked by the packaging might therefore moderate the consumer experience and their perception of naturalness which needs to be investigated further by future research.

Contrary to expectations, in the current study consumer evaluations were not significantly influenced by the sensory experience. There was no difference whether consumers could only visually evaluate the product or in a multi-sensory manner. Need for touch also did not significantly influence perceived naturalness nor perceived quality, product liking and purchase intention of the muesli products used in this study, which is not in line with previous findings (i.e. Peck & Childers, 2003). The results highlight that to make marketing of natural food products more efficient, more research is needed into the relative effects of multisensory experience on consumers' perceived naturalness for various other food categories.

In sum, packed goods such as muesli do not necessarily belong to the "touch" category of food products such as fruits and vegetables. This is good news for the increasing presence of online grocery websites. To make online sales of packed goods, such as muesli, more efficient, information about the texture as well as visually showing details of the packaging may add value and possibly leads to increased product liking. More research is therefore needed into the relative effects of online grocery shopping to promote natural and organic food products.

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APPENDIX

Appendix A – Additional tables

Table 9 - Mean scores (SD) of consumer evaluations to muesli product per tactile characteristics and sensory presentation manipulation for high NFT and low NFT consumers

	Visual				Visual-tactile			
	Natural		Unnatural		Natural		Unnatural	
	High NFT	Low NFT	High NFT	Low NFT	High NFT	Low NFT	High NFT	Low NFT
Perc. naturalness	3.56 (.47)	3.37 (.48)	3.32 (.23)	3.37 (.54)	3.60 (.66)	3.55 (.50)	3.13 (.75)	3.38 (.60)
Perceived quality	3.48 (.57)	3.93 (.38)	3.74 (.55)	3.51 (.56)	3.48 (.58)	3.60 (.62)	3.36 (.84)	3.57 (.63)
Product liking	3.48 (.63)	4.00 (.60)	3.61 (.52)	3.45 (.77)	3.86 (.40)	3.71 (.59)	3.41 (.85)	3.45 (.65)
Purchase intention	3.16 (.53)	3.25 (.59)	3.33 (.60)	3.45 (.60)	3.31 (.72)	3.32 (.52)	3.13 (.90)	3.15 (.58)

Table 10 - Regression coefficients and standard error from perceived quality and product liking on purchase intention

	Purchase Intention	
	β	SE_{β}
Perceived quality	.200	.087
Product liking	.558	.080

Appendix B – Questionnaire

Einstellung gegenüber einem neuen Lebensmittelprodukt

Sehr geehrter Teilnehmer,

Danke, dass du an meiner Studie im Rahmen meines Masterprogramms “Communication Studies“ an der University of Twente teilnimmst.

In dieser Studie wirst du Informationen über eine neue Müslimarke bekommen, die auf den deutschen Markt kommen soll. Bitte fülle hierzu alle Fragen auf dem Fragebogen über deine Einstellung gegenüber diesem Produkt aus basierend auf Produktpräsentation und Produkteigenschaften aus. Deine Antworten werden anonym ausgewertet und nur für diese Studie benutzt.

Es gibt keine richtigen oder falschen Antworten. Solltest du einige Fragen jedoch nicht beantworten wollen, dann hast du natürlich das Recht deine Teilnahme an dieser Studie jederzeit zu widerrufen. Solltest du Fragen über diese Studie oder zu den Ergebnisse haben, dann kontaktiere mich bitte unter XXX.

Danke für deine Teilnahme und Unterstützung!

Marie-Luise Peters

Informed Consent

Hiermit bestätige ich, dass ich über den Inhalt der Studie informiert wurde und dass keine Risiken während einer Teilnahme bestehen. Ich bin einverstanden, freiwillig an dieser Studie teilzunehmen.

☐ Datum: _____

Hast du jemals Müsli konsumiert?

❍ Ja
❍ Nein

Hast du Allergien, die es dir nicht erlauben, Müsli zu essen?

❍ Ja
❍ Nein

Wie oft kaufst du Lebensmittel ein?

❍ Nie
❍ Manchmal
❍ Regelmäßig

Nachfolgend findest du eine Liste emotionaler Reaktionen, die du vielleicht erlebt hast, während du die Verpackung untersuchst hast. Bitte gib an, wie sehr du diese Emotionen gespürt hast.

	Überhaupt nicht	Wenig	Mittel	Stark	Sehr stark
Abneigung	❍	❍	❍	❍	❍
Angenehme Überraschung	❍	❍	❍	❍	❍
Attraktivität	❍	❍	❍	❍	❍
Bewunderung	❍	❍	❍	❍	❍
Geringschätzung	❍	❍	❍	❍	❍
Unzufriedenheit	❍	❍	❍	❍	❍
Unangenehme Überraschung	❍	❍	❍	❍	❍
Langeweile	❍	❍	❍	❍	❍
Traurigkeit	❍	❍	❍	❍	❍
Faszination	❍	❍	❍	❍	❍
Freude	❍	❍	❍	❍	❍
Zufriedenheit	❍	❍	❍	❍	❍

Bitte lies die folgenden Aussagen genau durch und kreuze an, wie stark du zustimmst.

Allgemeiner Eindruck.

	Stimme überhaupt nicht zu	Stimme nicht zu	Weder noch	Stimme zu	Stimme stark zu
Allgemein wirkt das Produkt attraktiv auf mich.	❍	❍	❍	❍	❍
Das Produkt ist für mich einfach zu benutzen.	❍	❍	❍	❍	❍
Das Produkt scheint besser als andere.	❍	❍	❍	❍	❍
Das Produkt sieht gut aus.	❍	❍	❍	❍	❍
Das Produkt zieht Aufmerksamkeit auf sich.	❍	❍	❍	❍	❍
Die Gesamtqualität des Produktes ist gut.	❍	❍	❍	❍	❍
Die Nährwerte dieses Produktes sind gut für die Gesundheit.	❍	❍	❍	❍	❍
Die Verarbeitung des Produktes ist hochwertig.	❍	❍	❍	❍	❍
Die Wahrscheinlichkeit, dass dieses Produkt hält, was es verspricht, ist hoch.	❍	❍	❍	❍	❍
Dies ist ein umweltfreundliches Produkt.	❍	❍	❍	❍	❍
Dieses Produkt enthält keine künstlichen Zusatzstoffe.	❍	❍	❍	❍	❍
Dieses Produkt enthält nur natürliche Bestandteile.	❍	❍	❍	❍	❍
Dieses Produkt ist eines von denen, die wirklich die Umwelt respektieren.	❍	❍	❍	❍	❍
Dieses Produkt ist gesund und natürlich.	❍	❍	❍	❍	❍
Dieses Produkt ist in allen Bereichen gut für die Gesundheit.	❍	❍	❍	❍	❍
Dieses Produkt ist umweltfreundlicher als die meisten.	❍	❍	❍	❍	❍
Man kann sofort sehen, dass dieses Produkt ökologisch ist.	❍	❍	❍	❍	❍
Mein erster Eindruck von dem Produkt ist, dass ich es sehr mag.	❍	❍	❍	❍	❍

Bitte lies die folgenden Aussagen genau durch und kreuze an, wie stark du zustimmst.

	Stimme überhaupt nicht zu	Stimme nicht zu	Weder noch	Stimme zu	Stimme stark zu
Ich würde dieses Produkt kaufen, sollte ich es zufällig beim Einkaufen sehen.	❍	❍	❍	❍	❍
Ich würde dieses Produkt an andere weiterempfehlen.	❍	❍	❍	❍	❍
Ich würde beim Einkaufen aktiv nach diesem Produkt Ausschau halten.	❍	❍	❍	❍	❍
Ich würde es in Erwägung ziehen, dieses Produkt zu kaufen.	❍	❍	❍	❍	❍

Allgemeine Fragen.

	Stimme überhaupt nicht zu	Stimme nicht zu	Weder noch	Stimme zu	Stimme stark zu
Ich vertraue stärker auf Artikel, die man vor dem Kauf anfassen kann.	❍	❍	❍	❍	❍
Beim Kauf eines Artikels fühle ich mich wohler, wenn ich diesen vorher durch Anfassen eingehend geprüft habe.	❍	❍	❍	❍	❍
Wenn ich einen Artikel im Geschäft nicht anfassen kann, möchte ich diesen nur ungern kaufen.	❍	❍	❍	❍	❍
Beim Kauf eines Artikels fühle ich mich sicherer, wenn ich diesen zuvor anfassen konnte.	❍	❍	❍	❍	❍
Um herauszufinden, ob es sich lohnt, einen Artikel zu kaufen, muss man diesen angefasst haben.	❍	❍	❍	❍	❍
Es gibt eine Vielzahl von Artikeln, die ich nur kaufen würde, wenn ich sie zuvor auch in die Hand nehmen kann.	❍	❍	❍	❍	❍
Wenn ich einkaufen gehe, muss ich alle möglichen Artikel anfassen.	❍	❍	❍	❍	❍
Es macht Spaß, alle möglichen Artikel anzufassen.	❍	❍	❍	❍	❍

Wenn ich mich in Geschäften umsehe, ist es wichtig für mich, alle möglichen Artikel in die Hand zu nehmen.	❍	❍	❍	❍	❍
Auch wenn ich einen Artikel nicht unbedingt kaufen will, mag ich es, ihn anzufassen.	❍	❍	❍	❍	❍
Beim Stöbern in Geschäften mag ich es einfach, alle möglichen Artikel anzufassen.	❍	❍	❍	❍	❍
Beim Einkaufen ertappe ich mich immer wieder dabei, dass ich alle möglichen Artikel anfasse.	❍	❍	❍	❍	❍

Geschlecht:

❍ Männlich
❍ Weiblich

Wie alt bist du?

Was ist dein höchster Bildungsabschluss?

❍ Kein Schulabschluss
❍ Grund-/ Hauptschulabschluss
❍ Mittlere Reife
❍ Abitur
❍ Abgeschlossene Ausbildung
❍ Bachelor
❍ Master
❍ Anderer

Vielen Dank für deine Teilnahme!

Appendix C – Questionnaire Items

Table 11 - Overview of translated items of scales used

Scale	Items
Perceived naturalness	(1) Dies ist ein umweltfreundliches Produkt. (2) Dieses Produkt ist eines von denen, die wirklich die Umwelt respektieren. (3) Man kann sofort sehen, dass dieses Produkt ökologisch ist. (4) Dieses Produkt ist umweltfreundlicher als die meisten. (5) Die Nährwerte dieses Produkts sind gut für die Gesundheit. (6) Dieses Produkt ist in allen Bereichen gut für die Gesundheit. (7) Dieses Produkt ist gesund und natürlich. (8) Dieses Produkt enthält keine künstlichen Zusatzstoffe. (9) Dieses Produkt enthält nur natürliche Bestandteile.
Purchase Intention	(1) Ich würde dieses Produkt kaufen, sollte ich es zufällig beim Einkaufen sehen. (2) Ich würde beim Einkaufen aktiv nach diesem Produkt Ausschau halten. (3) Ich würde es in Erwägung ziehen, dieses Produkt zu kaufen. (4) Ich würde dieses Produkt an andere weiterempfehlen.
Perceived quality	(1) Die Gesamtqualität des Produkts ist hochwertig. (2) Die Wahrscheinlichkeit, dass dieses Produkt hält, was es verspricht, ist hoch. (3) Die Verarbeitung des Produkts ist hochwertig.
Product liking	(1) Mein erster Eindruck von dem Produkt ist, dass ich es sehr mag. (2) Das Produkt sieht gut aus. (3) Das Produkt zieht Aufmerksamkeit auf sich. (4) Allgemein wirkt das Produkt attraktiv auf mich.
Need for Touch	(1) Ich vertraue stärker auf Artikel, die man vor dem Kauf anfassen kann. (2) Beim Kauf eines Artikels fühle ich mich wohler, wenn ich diesen vorher durch Anfassen eingehend geprüft habe. (3) Wenn ich einen Artikel im Geschäft nicht anfassen kann, möchte ich diesen nur ungern kaufen. (4) Beim Kauf eines Artikels fühle ich mich sicherer, wenn ich diesen zuvor anfassen konnte. (5) Um herauszufinden, ob es sich lohnt, einen Artikel zu kaufen, muss man diesen angefasst haben. (6) Es gibt eine Vielzahl von Artikeln, die ich nur kaufen würde, wenn ich sie zuvor auch in die Hand nehmen kann. (7) Wenn ich einkaufen gehe, muss ich alle möglichen Artikel anfassen. (8) Es macht Spaß, alle möglichen Artikel anzufassen. (9) Wenn ich mich in Geschäften umsehe, ist es wichtig für mich, alle möglichen Artikel in die Hand zu nehmen. (10) Auch wenn ich einen Artikel nicht unbedingt kaufen will, mag ich es, ihn anzufassen. (11) Beim Stöbern in Geschäften mag ich es einfach, alle möglichen Artikel anzufassen. (12) Beim Einkaufen ertappe ich mich immer wieder dabei, dass ich alle möglichen Artikel anfasse.
Affective Response	(1) Angenehme Überraschung (2) Attraktivität (3) Bewunderung (4) Faszination (5) Freude (6) Zufriedenheit (7) Abneigung (R) (8) Geringschätzung (R) (9) Unzufriedenheit (R) (10) Unangenehme Überraschung (R) (11) Langeweile (R) (12) Traurigkeit (R)