Touching a product: essential or expendable?

Replicating haptic product exploration via other senses

University of Twente - Master Thesis - Bart Roost

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Faculty of Behavioral Sciences
Master Thesis Communication Studies
University of Twente
Enschede, December 13, 2013

Author
Bart Roost
s1248960

Graduation Committee
Dr. A. Fenko
Dr. M. Galetzka

Abstract

Online shopping is becoming increasingly popular. However, it is not possible to provide fully realistic product experiences on the internet. The answer to this problem could lie within sensory marketing. Sensory marketing is a fairly new type of marketing, nonetheless it is becoming more interwoven in our society. This research investigates whether a certain aspect of real product experience (i.e. haptic exploration of products) can be replicated via other senses (i.e. audiovisual presentations of products).

An experiment was conducted with 129 Dutch participants to see if audiovisual representations of products (i.e. cardigan and computer mouse) could replicate a real product experience and thus improve product attitude, product emotion and purchase intention. The Need For Touch was considered as a moderator. Results showed that there were no significant differences between the product representations (audiovisual, visual and real product). Need For Touch did have significant effects on purchase intention, interacted with gender and women had a significantly higher amount of autotelic NFT than men.

Looking at our results, we suggest that videos (with or without audio cues) which replicate haptic product exploration can be a good replacement for real products experiences or can come very close to real product experiences and their effects on consumers (regarding purchase intention, product emotion and product attitude). However, further investigation is needed.

It does not seem to matter to people whether they see a product in real life or on a screen if the screen presentation shows a dynamic video of product exploration. This could be explained by the fact that these types of videos facilitate mental simulation of certain bodily functions and this could have effects on consumers (e.g. higher purchase intention). A second explanation could be the fact that a 'screen revolution' is amongst our society due to the growing amount of technology and internet shopping.

Acknowledgements

Two years ago, I moved from a little town in the South of the Netherlands to Enschede. One could consider it as Frodo or Bilbo Baggins (Lord of the Rings and The Hobbit), moving out from the Shire and going on an adventure. I did not really know what to expect, but on the first day, all my worries disappeared and I had a terrific time up to the last day.
Over the last two years, I have met a lot of new people, made close friends, gained a lot of knowledge regarding various academic topics, and I had a great time in Enschede. Although it was not always easy, I always enjoyed going to the University and studying there. Therefore, I would like take this opportunity to thank everyone who made this possible and who has helped me with having a great time in this city.

First of all, I would like to thank Anna Fenko and Mirjam Galetzka for all the help and support during my master thesis (and other courses). Your knowledge and guidance has helped me finish this project in a pleasant way. Thank you very much.

A special word of thanks goes out to my parents and my girlfriend for all the support and encouragement during these two (sometimes hectic) years. I would also like to thank my friends and family for all the support and positivity.
Another special word of thanks goes out to Luc Aerts, Samantha Korenhof, Frans van der Meijde, Jossie Hunting, Gerwin Koppelaar and Inge Faasen. It was your friendship, that helped me get through the first year and that made the two years in Enschede into two wonderful years that I cherish deeply. I would also like to thank Hendrik van den Berg – my Frisian roommate – for making sure that living in Enschede was awesome. I really enjoyed our time in Enschede and the laughs (and beverages) that we shared. This list would not be complete without saying thank you to Karel Oude Rengerink and "De mooie mannen en Bart Horstman" for the good times, talks and laughs.
Last but not least, a big thank you to everyone else (Communiqué members, classmates and other friends) who made these two years into a memorable part of my life that I will never forget. Thanks!

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Introduction

1.1 Problem statement

Online shopping is becoming more popular and embraced by our society in this day and age. This type of shopping prevents people from touching real products and marketers try to compensate for this inability to touch in various ways: interactive media (applications), low prices, persuasive techniques, commercials and many more. Compensating for this inability remains a difficult task because mainstream media are not yet able to mimic touch, surfaces or textures.

Touch, is considered as the most complex sense to replicate (Moneyline, 2000, as cited by Peck and Childers, 2003). Therefore, this research takes a look at multisensory marketing and possibilities that could to replicate or come close(r) to a touching experience when a real product is not present. The questions that arise are what senses have to be used? Can one sensory dimension (touch) be influenced by the perception of another sensory dimension or attributes (e.g. sound)?

1.2 Research questions

There is a wide variety of forms of audition and product sounds that influence people, like the sound that a coffee maker makes or the roaring sound of a Harley Davidson motorbike. Product sounds can also arise when humans come into contact with products, like the sound of a closing car door. Auditory cues can also be used to aid people (e.g. with impaired sensibility) and such cues can create the illusion of haptic exploration (Lundborg, Rosén & Lindberg, 1999). This research will therefore try to investigate if these auditory cues of haptic product properties can be as important as the other sounds which are associated with products.

There are different reasons why consumers touch products, that is to obtain information or just because they like to touch products (Peck, 2010). Touch can have several effects on people, to illustrate: if a consumer has the opportunity to touch a product and experience pleasurable sensory feedback, then this may influence their attitude towards the product (Peck & Childers, 2003). Willingness to pay for a product could also be influenced when consumers touch a product (Peck & Shu, 2009). When a tactile stimulus is not present, the illusion of tactile perception can also be created by presenting sounds of the stimulus (Spence & Zampini, 2006). And so, do the first two research questions arise:

RQ 1: To what extent can auditory cues that replicate sounds of haptic product exploration affect consumers' product evaluations when the real product is not present?

RQ 2: To what extent can auditory cues that replicate sounds of haptic product exploration affect consumers' purchase intention when the real product is not present?

Products can also have different effects on consumers; because of a brand, the quality, the attitude towards the product, product sounds and product emotions. A product's sound can influence a person's perception of a product, e.g. the sound of a Ferrari or the sound of one's favorite coffee machine. One's product perception can also be influenced by the emotions that are experienced due to interaction with a product. Owning or using a product can result in 'fun of use', i.e. the fun one experiences, this belongs to the affective domain. However, studying these experiences is quite complex and not an easy task. Several techniques have therefore been created to measure these emotions. This research will also investigate if product emotions can be affected by the previously mentioned auditory cues.

RQ 3: To what extent can auditory cues that replicate sounds of haptic product exploration affect consumers' emotions when the real product is not present?

To conclude: this research will especially focus on characteristics and effects audition and touch. However, it will not just focus on real haptic experiences, but also on the illusion of touch in the form of auditory cues (accompanied by vision). It will be tested if the mindset towards a product changes, if consumers are presented with auditory cues of haptic properties which aid the visual interaction process. Could these auditory cues come close to a real product experience? The final research question that arises, takes a look at this issue:

RQ 4: To what extent can auditory cues that replicate sounds of haptic product exploration replicate a real product experience?

1.3 Research approach and structure

The first section of this research focuses on the literature behind the above mentioned research questions. The basic principles of multisensory marketing are discussed and the senses of vision, audition and touch are described. Then, light is shed on multisensory

experiences, product emotion and finally the topics of product sounds and quality are discussed.

The second part discusses the method of the experiment that was conducted for this study. Different aspects of the experiment and the process of the experiment are described in this section. Then, the results of the experiment are looked upon and finally, the conclusions, discussion and limitations of this study are stated.

2 Theoretical framework

2.1 Sensory Marketing

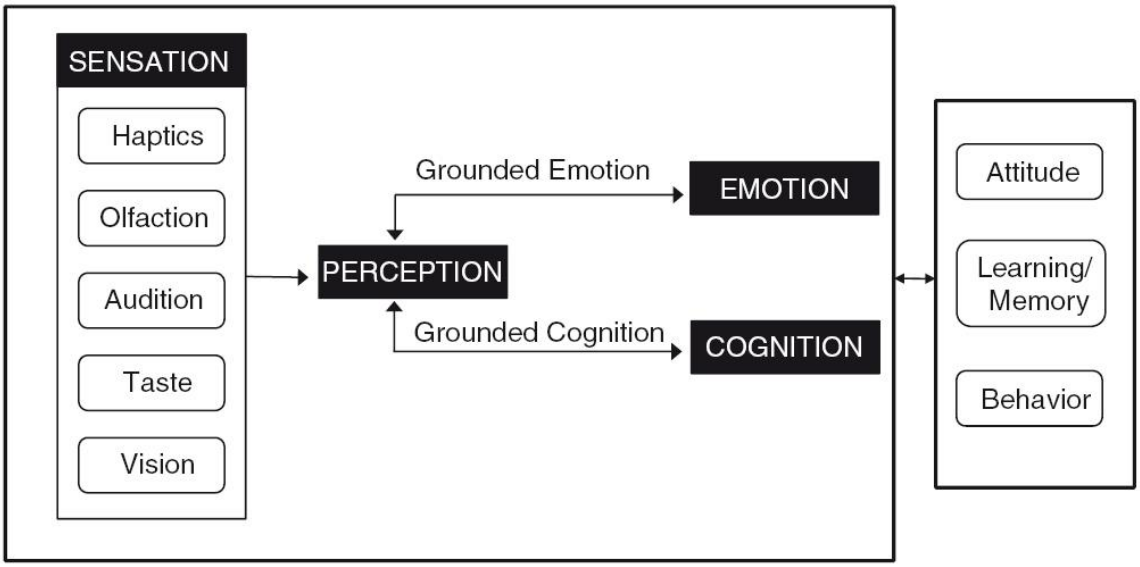
Sensory marketing is described as "marketing that engages the consumers' senses and affects their perception, judgment and behavior" (Krishna, 2012, p. 333). Most of the events and objects that one encounters everyday are multisensory, supplying information to multiple senses at the same time (Spence & Zampini, 2006).

If one looks at sensory marketing from a managerial angle, it can be used to create subliminal triggers that form consumer ideas of abstract notions of a product (e.g. its quality, elegance, interactivity) – the personality of the brand (Krishna, 2012). Sensory marketing can also be used to influence the anticipated quality of an abstract aspect like taste, smell, color or shape. A wide variety of companies try to make use of sensory cues in their products and / or promotion of their products: e.g. Grolsch (the characteristic sound of the bottles' swingtop caps), Harley Davidson (characteristic sound of the motorcycles), Singapore Airlines (special scents in airplanes), Apple (iPod Touch) and many more. These (sensory) characteristics can lead to e.g. stronger brands, better recognition and a higher perceived quality of the brand and / or products.

When one looks at sensory marketing from a research angle, it indicates an understanding of perception and sensation, with regard to consumer behavior (Krishna, 2012).

The field of sensory marketing research is growing, especially over the last five years (Krishna, 2012; Peck & Childers, 2008). Research topics cover a large variety of sensory topics (e.g. different senses: touch, olfaction, vision, audition and taste but also sensory interactions). To illustrate: how people explore different objects via touch, how touch affects the perceived ownership of a product, how auditory cues effect skin perception or product perception and many more. Figure 1 shows how the different senses effect / affect people.

Figure 1: Conceptual framework of multisensory marketing (Krishna, 2012)



In this framework, perception and sensation are stages within the structure of processing the senses. Sensation is biochemical (and neurological) in nature and occurs when a stimulus comes in contact with the receptor cells of any sensory organ. Perception is the understanding or awareness of sensory information (Krishna, 2012). After a certain stimulus is sensed and perceived, it depends on the type of stimulus whether it leads to grounded emotion or grounded cognition. According to Krishna (2012), "grounded cognition based on bodily state refers to cognition that is affected by an unmoving physical condition that one is in" (Krishna, 2012, p. 344). To illustrate: holding a pen tightly between the lips without touching the teeth (resulting in compromising the smile muscles) affected peoples' funniness ratings of cartoons (Strack, Marting & Stepper, 1988). Another example of grounded cognition is the study by Proffitt, Stefanucci, Banton, and Epstein (2003), where participants judged distances as longer and hills as being steeper when they wore heavy backpacks. In these examples of grounded cognition, certain thought processes and behavior are the result of a particular bodily state that one holds (Krishna, 2012).

Although a wide variety of studies regarding consumer behavior have focused on emotion, the grounded nature of emotion has not yet been explored (Krishna, 2012). Studies like the one by Strack, et al., (1988) have focused on the effect of sensory perception on perceived emotion. Other studies had participants indicate whether certain words (neutral or emotion-related) were related to specific emotions. However, emotion's grounded nature is still a subject for future research. To conclude: after sensory stimuli are sensed and perceived, and have led to

cognitive effects or emotional effects, they result into a certain attitude, learning / memory or behavior. This indicates the final stage of the sensory input processing mechanism.

(Multi)sensory marketing is a type of marketing with a wide variety of categories and topics with lots of potential for companies and customers, but also for researchers. Because one cannot do a study that covers the entire area of sensory marketing, this study focuses on the basics of (multi)sensory marketing and takes a look at the senses of audition and touch in particular.

2.2 Product perception and the senses

Senses play an important role in how people perceive products. Schifferstein and Cleiren (2005), demonstrated that vision and touch supplied the most detailed information about a product, and olfaction the least. However, how important a sensory modality was rated when using a product, differed per product (e.g. audition for a coffee machine and touch for a computer mouse). Fenko, Schifferstein and Hekkert (2010), showed that the dominant sensory modalities depend on the type of product and the period of purchase. To illustrate: vision is the most important modality when one buys a product, but after the first week, other modalities become more important, e.g. touch after one month of usage and after a year, audition and touch become evenly important (Fenko, et al., 2010). Just like Schifferstein and Cleiren (2005), Fenko, et al., (2010) also showed that the importance of sensory modalities is product-dependent. When one first encounters a product (in a shop), the interaction is mostly visual. However, most products are bought for other intentions than visual pleasure: e.g. listening to music, cooking, printing and many more. The dominant sensory modality can depend on primary product functions (e.g. taste, for food) or on specific features that are non-functional (e.g. the sound of an electric tooth brush) (Fenko et al., 2010). The distinguishing features of user-product interaction, influence the modality importance (Fenko et al., 2010). Thus, there is a wide variety of sensory cues with which consumers are confronted every day and every single one has its (complex and characteristic) effects on people.

2.3 Defining senses – Vision

A central idea to vision science is that the brain and the eyes work together to form an image of the world that surrounds people (Wedel & Pieters, 2008). People are showered with a vast amount of visual cues (several hundreds of explicit advertisements) everyday on television, billboards, in magazines, in newspapers, etcetera and even more implicit visual messages are experienced in the form of product packages in stores or at home (Wedel & Pieters, 2008).
There are various types of visual cues (e.g. geometric, color and statistical cues) and visual cues can have several goals (e.g. providing information, draw attention or aesthetic appeals) (Raghubir, 2010). Vision is often considered as a dominating factor of human experience, although this claim is open to multiple interpretations (Schifferstein, 2006). In the most extreme case, it could mean that one's experiences mostly rely on the perceived visual information, regardless of other factors such as the activity one is involved in (Schifferstein, 2006). However, it is not probable that this implies to product usage situations, due to the fact that different activities (e.g. eating an apple or driving a bicycle) depend on different sensory abilities (Schifferstein, 2006). To conclude: the product with which one interacts is likely to influence the relative importance of the sensory modality used during this interaction (Schifferstein, 2006).

Vision can also be very helpful to other senses, for example touch. These senses can complement each other by providing the brain with the information that the other sense cannot provide. To illustrate: properties of objects can be divided into two broad classes: geometry (e.g. size and shape) and material (e.g. surface properties) (Klatzky, 2010). Vision is most informative about geometry and these properties are quickly accessed by vision and the same applies to touch and material properties (Klatzky, 2010). When one purchases a product, e.g. via an online shop, the material properties of a product cannot be experienced / investigated. In such a scenario, vision is the only sensory modality that one can rely on. However, this sense prevents people from obtaining certain important types of product information and aspects. Therefore, this research will take a look at how other senses (i.e. touch and audition) could be used to aid a consumer with the evaluation of a product's material properties. The sensory modalities touch and audition will be described in more detail than vision, due to the fact that they are new in the above mentioned web shop scenario and the role of these modalities is more important in this research.

2.4 Defining senses - Touch

The sense of touch has been defined and identified as very meaningful, e.g. by Aristotle, during the Renaissance (e.g. the creation of man, by Michelangelo) and by Weber (1978, as cited in Peck, 2010) as something that is necessary for a human being to become whole (Peck, 2010).

Other senses operate via a certain medium; smell, vision and hearing all function via a buffer (e.g. air), and for taste, the wetness of saliva is necessary. Touch however, enables people to actually feel things that come in contact with them (Peck, 2010). People touch objects for different kinds of reasons, e.g. to feel if something is cool enough to grab a hold of it or just because touching a certain object pleases them. According to Peck (2010), there are four distinct kinds of touch: touch to purchase, touch to obtain non-haptic information, touch to obtain haptic information and hedonic touch. These types of touch will be explained in the next chapter.

2.4.1 How consumers use touch

Figure 2: Touch in consumer behavior (Peck, 2010)

Touch to purchase (touch as a means to an end)	Goal is to purchase - No additional product information is intentionally extracted
Touch to obtain non-haptic information	Goal is to extract specific non-haptic properties - Visual inspection - Olfactory inspection - Auditory inspection - Gustatory inspection
Touch to obtain haptic product information	Goal is to extract specific material properties - Texture - Hardness - Weight - Temperature
Hedonic touch (touch as an end in itself)	Goal is general exploration - Sensory experience - Fun

The first three types of touch hypothesize that a consumer is involved in problem-solving, goal-directed, pre-purchase behavior (Peck, 2010). Hedonic touch, focuses on the sensory experience of touch (Peck, 2010).

People have several reasons why they want to explore objects in haptic ways, but touching an object could also have several (psychological) effects on people. To illustrate: Peck and Shu (2009) found that feelings of psychological ownership and willingness to pay became greater when participants touched an object compared to the inability to touch an object. However, the effects of touch might be different per individual; Peck and Childers (2003) found that not every material characteristic induces the same type of response in consumers. To illustrate: a functional material property (e.g. weight) may have different effects on the individual touching an object than pleasant sensory feedback (e.g. softness) (Peck & Childers, 2003).

Touch can also play an important role during shopping. The amount of touch which is exhibited while shopping differs greatly per individual and according to Peck and Childers (2003), it seems likely that some consumers prefer information available through the sense of touch over other senses. To illustrate: some consumers spend a lot of time exploring products with their hands before they make a purchase decision, while others simply touch products to place them in shopping carts (Peck & Childers, 2003). The role of haptic information differs among consumers and could be explained by the 'Need for Touch' (NFT): "a preference for the extraction and utilization of information obtained through the haptic system" (Peck & Childers, 2003, p. 431). This haptic exploration can be driven by motivations associated with consumers seeking arousal, fun, enjoyment, fantasy and sensory stimulation (e.g. experiencing shopping as adventure) or consumer problem solvers (e.g. purchasing products in a timely and efficient manner to achieve goals with a minimum of irritation) (Holbrook & Hirschman, 1982; Peck & Childers, 2003).

NFT is a construct with two underlying factors: the instrumental factor and the autotelic factor. The instrumental factor refers to the aspects of pre-purchase touch that focus on outcome-directed touch with an important purchase goal (Peck & Childers, 2003). Goal-driven evaluative outcomes (e.g. certainty and comfort in one's judgment), assessing the target product (e.g. on quality or worth) and product properties which focus on haptic utilization (e.g. texture, temperature, weight or hardness) are important and contained within the domain of this form of touch.

In contrast, the autotelic factor focuses on the sensory aspects of touch and involves a hedonic-oriented response seeking arousal, fun, sensory stimulation and enjoyment (Holbrook

& Hirschman, 1982; Peck & Childers, 2003). There is no noticeable purchase goal, instead there can be irresistible needs to engage in haptic product explorations or/and impulsive examinations of multisensory psychophysical product relationships (Holbrook & Hirschman, 1982; Peck & Childers, 2003).
To investigate the individual differences in NFT, Peck and Childers (2003) have developed the NFT scale and conducted several studies to assess the scale's reliability, internal structure and a variety of consumer-behavior-related constructs.

Due to the increasing popularity of online shopping it is important to understand what the consequences of an inability to touch are on consumers. There are numerous factors which try to compensate for this inability e.g. low prices, branding, persuasive techniques or other non-haptic compensation mechanisms (Peck & Childers, 2003). How to replicate haptic exploration remains a difficult task and new haptic interfaces still have a lot of difficulties to match direct haptic exploration. According to Moneyline (2000), as cited by Peck and Childers (2003), touch is considered to be the most complex sense to replicate. It is therefore important to investigate this issue and to understand its complexity.

2.4.2 How haptic information influences consumers

Tactile stimulation may play a significant role in shopping behavior according to preliminary research on the significance of other senses (Fiore, 1993; Holbrook, 1983, as cited in Citrin, Stem, Spangenberg, & Clark, 2003). To illustrate: consumers will be more stimulated to touch a product before a purchase, if a product category differs in a characteristic way on one or more material properties (i.e. texture, temperature, weight information and hardness) (Peck, 2010). Whether or not a consumer can touch a product during an evaluation might also affect the confidence in a product judgment (Peck & Childers, 2003). If a consumer has the opportunity to touch a product and experience pleasurable sensory feedback, then this may also influence their attitude towards the product (Peck & Childers, 2003). When a person has a high NFT, barriers to touch will then consequently decrease the confidence in product evaluations because haptic information will not be received. However, this is not the case for individuals with a low NFT (Peck & Childers, 2003).
Peck and Childers (2003) also demonstrated that touch-oriented individuals could access haptic information more easily, that higher NFT individuals are able to retrieve haptic information more readily from memory and that these individuals might form richer mental product representations (due to haptic information) from memory.

McCabe and Nowlis (2003) showed that product categories which differed in the characteristics of touch (e.g. carpeting, bath towels) were more destined to be favored in shopping surroundings which allowed physical examination than in those where touch was not available. No preference toward products across surroundings was found when a product did not differ on material characteristics. These findings illustrate that the usage of touch to explore products is not applicable to every type of product. To illustrate: vision was for distinguishing products that did not differ in material characteristics in the previous example.
Grohmann, Spangenberg and Sprott (2007) showed that the tactile input, especially from products high in quality, had a positive effect on the evaluation of products that differed in the material properties of texture and softness.
Thus, the usage and effects of touch vary across different products and are used in different settings for different purposes.

As stated before, touch can play an important role in consumer decision making processes and evaluations. However, in some places where consumers buy products, there is no possibility to touch a product. When buying a product online in a web shop, one cannot touch a piece of clothing to feel its texture or to evaluate a product (e.g. a sweater). This could be a disadvantage for the website's company because the ability to touch a product could lead to greater feelings of psychological ownership and also a greater willingness to pay (Peck & Shu, 2009). This inability to provide a haptic experience is the cause of this study. Therefore, new possibilities have to be sought. Since real objects are out of the question in the online world (at least, at this time of writing), a solution has to be sought in another sense. For this problem, a solution might be found in audition.

2.5 Defining senses – Audition

During a normal day, people are showered with auditory cues. These cues can be natural; a couple of birds whistling a tune in the morning or the sound of raindrops on the street. These cues can also be unnatural; music on the radio or the sound of a car passing by. Although people are often unaware of them, many everyday sounds that they hear are meant for marketing purposes. Marketers use sound to attempt to persuade and to communicate to consumers in virtual all consumer domains. Sound plays an important role in a wide variety of consumption experiences, however, researchers have only just begun to explore how sound influences consumption experiences and marketing (Krishna, 2010).

2.5.1 How consumers use audition

Unlike haptics, where one (in many instances) deliberately chooses to touch something, is audition a process that people do not consciously activate and are not always aware of. The flow of auditory cues is a constant one and the ears and the brain are always receiving auditory cues (unless one deliberately seals the ears), even when the source is not in sight.

Besides this constant flow of cues, do people also touch objects to obtain useful auditory information about the nature of a certain object. Even when such an auditory cue is presented in isolation (without the visible source), it could still provide a person with enough information to assess e.g. the material from which it is made or the size of the object (Spence & Zampini, 2006). Thus, people can be aware of auditory cues, but it often occurs that they are unaware of them or their effects. To illustrate: whether people are conscious of the (cross model) influence of audition or not, what they hear can contribute to their purchasing decisions (Spence & Shankar, 2010). There are many different reasons why people use their hearing (e.g. listening during a conversation, being aware of one's surroundings or enjoying music) and marketers try to target this sense in many different ways.

2.5.2 How audition influences consumers

The sense of audition is targeted in many different ways, in many different places and with many different purposes. To illustrate: music in advertisements (e.g. setting a certain mood or affect consumers' moods), music in consumer environments (e.g. making consumers feel at ease) and the combination of music with multisensory experiences (Meyers-Levy, Bublitz, & Peracchio, 2010). This last example has been researched by e.g. Zampini and Spence (2004, 2005), who examined how product perceptions involving a sensory dimension (taste), could be influenced by the perception of one sensory attribute (sound). The researchers found that

perceptions of a product's taste or freshness could be influenced by the sound heard when pouring or eating a food product. To illustrate: a louder crunch while biting on a potato chip resulted in increased perceptions of the freshness and crispness. Loud bubbling when a drink was poured into a container resulted in perceiving a beverage as more carbonated (Zampini & Spence, 2004, 2005). These findings showed that sounds can be used to enhance people's mental reactions to certain products. In these cases, the concerned product was present when the respondents heard the sound, but could hearing a haptic sound (e.g. touching cloth or knocking on a surface) also result into a mental reaction, if the concerned product would not be present? To specify the question; could product perceptions involving a sensory dimension (touch), be influenced by the perception of one sensory attribute (sound)? Studying this issue could be very useful for e.g. online stores, because online stores cannot offer real objects to consumers for haptic exploration and evaluation.

2.5.3 Multisensory experiences and audition

Before the above mentioned issue will be examined, this literature research will shed light on relevant multisensory research that could clarify further connections between different sensory modalities. This section sheds light on research regarding audition and touch in particular.

Auditory cues often appear when people use or touch everyday objects. The sounds which appear when people interact with these objects disclose potentially useful information about the functioning and nature of the objects (Spence & Zampini, 2006). However, probably due to the fact that people are visually-dominant beings, they are typically unaware of the effect that product / surface sounds have on their overall evaluation or perception of particular stimuli (Spence & Zampini, 2006). How people perceive and react to sounds of interaction and touching everyday surfaces and / or products can be effected dramatically by manipulating these sounds (Spence & Zampini, 2006). An example of such a manipulation is the 'parchment-skin' illusion by Jousmäki and Hari (1998). During this experiment, the researchers provided participants with (manipulated) auditory feedback when the participants rubbed their hands together. The participants' perception of their skin changed; skin started to feel more like parchment paper (e.g. increased dryness) when the average sound level or the high frequencies was increased during the experiment (Jousmäki & Hari, 1998). This study showed that the effects of auditory cues on people could be very great and that these cues could alter people's perception of surfaces. The existence of examples like the 'parchment-

skin' illusion helps to demonstrate the multisensory character of peoples' everyday understanding (Spence & Zampini, 2006).

Auditory cues can also be very helpful to identify tactile properties, even when vision is not available. Lundborg, et al., (1999) demonstrated (with a small number of participants) that participants with impaired sensibility in their hands could use acoustic information as a substitute for tactile information. During the experiment, small microphones were placed on the fingers of prostheses or non-sensate hands. The sounds (of each individual finger) that were generated by touching objects were then amplified and transmitted to earphones. As a result, the participants could identify surfaces and textures (i.e. wood, glass, paper and metal) without vision and impaired abilities to touch (Lundborg, et al., 1999). Lundborg, et al., (1999) called this principle sense substitution, which is well-known among people who suffer from various handicaps, e.g. blind people use touch to read and deaf people use vision to communicate via sign language. This study indicates that the respondents were capable of using acoustic information as an alternative for tactile information. This outcome could also be very useful for other purposes, e.g. the inability to touch products in web shops. Spence and Zampini (2006) also state that in the absence of any tactile stimulus, one can create the illusion of tactile perception by many normal individuals, just by presenting them with the sounds that are caused by physical contact with a specific context. To conclude; auditory cues can contribute to the multisensory understanding of surface textures and could provide a solution in scenarios where real haptic exploration is impossible.

The above mentioned information, in combination with various (psychological) effects that touch (in combination with consumer products) has on people, e.g. that feelings of psychological ownership and willingness to pay become greater when people touch an object compared to the inability to touch (Peck & Shu, 2009), the fact that the tactile input, especially from products high in quality, has a positive effect on the evaluation of products that differ in the material properties of texture and softness (Grohmann, et al., 2007) and the reasons why people touch products by Peck (2010) lead to the following hypotheses:

H1: Auditory cues that replicate sounds of haptic product exploration can affect consumers' product evaluations in a positive way when the real product is not present.

H2: Auditory cues that replicate sounds of haptic product exploration can affect consumers' purchase intention in a positive way when the real product is not present.

H2b: Auditory cues that replicate sounds of haptic product exploration can especially affect high NFT individuals' purchase intention in a positive way when the real product is not present.

2.6 Product emotions

"Emotions guide, enrich and ennoble life; they provide meaning to everyday existence; they render the valuation placed on life and property" (Cacioppo, Berntson, Larsen, Poehlmann, & Ito, 2001, p. 173).

This sentence illustrates that the relationship between humans and the physical world is an emotional one (Desmet, 2003). Owning or using a product can result in 'fun of use' i.e. the fun one experiences, this belongs to the affective domain. However, these affective concepts are difficult to study because they seem hard to grasp and instead of just being an emotion, 'having fun' is likely to be the result of a vast range of possible emotional responses (Desmet, 2003).

The combination of several emotions instead of one isolated emotion, contributes to the experience of fun (e.g. amusement, fear, relief, hope and anger, when riding a go-kart) (Desmet, 2003). These combinations (in similar or different forms) could apply to other scenarios like using a product or watching a movie. In order to measure these emotions, a large number of techniques have been used over the years. To support the study of emotional responses (e.g. what aspects of design trigger emotional responses or how people respond emotionally to products), the Product Emotion Measurement Instrument (PrEmo) was developed (more information about the PrEmo instrument can be found in the method section). This research will try to see if emotions can also be induced when a real product is not present (with the help of PrEmo elements). Focusing on product sounds, the experiment will try to find out if emotions can be aroused by the combination of touch, audition and vision. The hypothesis is as follows:

H3: Auditory cues that replicate sounds of haptic product exploration can affect consumers' emotions in a positive way when the real product is not present.

2.7 Product-sounds and product perception

Reducing the acoustic energy emitted by products was one of the key goals of acoustic engineers for decades (Blauert & Jekosch, 1997). However, during the mid-eighties a change in the way of thinking took place and from then on, other relevant aspects of acoustic emissions of products were considered (e.g. frequency spectrum and time structure) (Blauert & Jekosch, 1997). At that time, the term "sound quality" was introduced, but a link to product quality was established only recently when the term sound quality changed into its final form (for now). This quality is linked to suitability of a product regarding to specific pre-set demands (Blauert & Jekosch, 1997). Jekosch and Blauert (1996), as cited in Blauert and Jekosch (1997, p.748), define product sound quality as

"A descriptor of the adequacy of the sound attached to a product. It results from judgments upon the totality of auditory characteristics of the said sound - the judgments being performed with reference to the set of those desired features of the product which are apparent to the users in their actual cognitive, actional and emotional situation."

However, these definitions and theories depend on the existence of acoustic waves which are emitted by a product, only then can sounds be judged on their quality (Blauert & Jekosch, 1997). This study focuses on sounds which are emitted by a product due to human interaction with the product and how these sounds / auditory cues might influence the consumer's perception of the product.

Perception of sounds can depend heavily on several factors, e.g. context and expectation (set by cultural demographic factors, previous experiences, etc.) (Pietila & Lim, 2012). During this study, the findings will have to indicate whether these 'human interaction product sounds' are also important to consumers, just like product sounds emitted by the product itself are important to them.

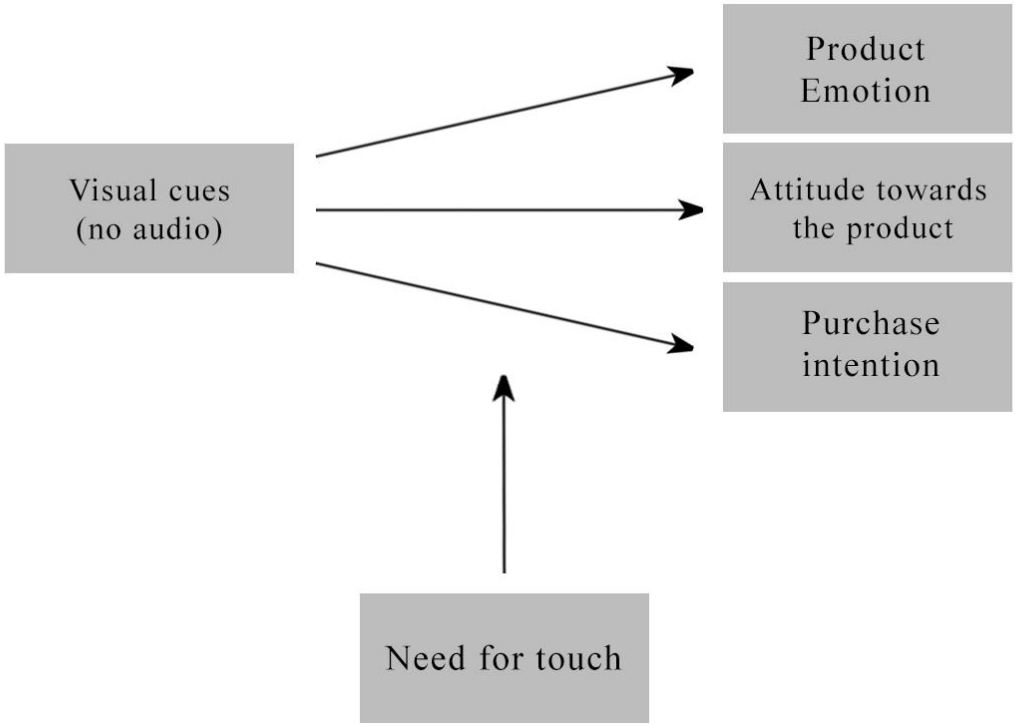
The final hypothesis, focuses on the sounds of haptic interaction in total:

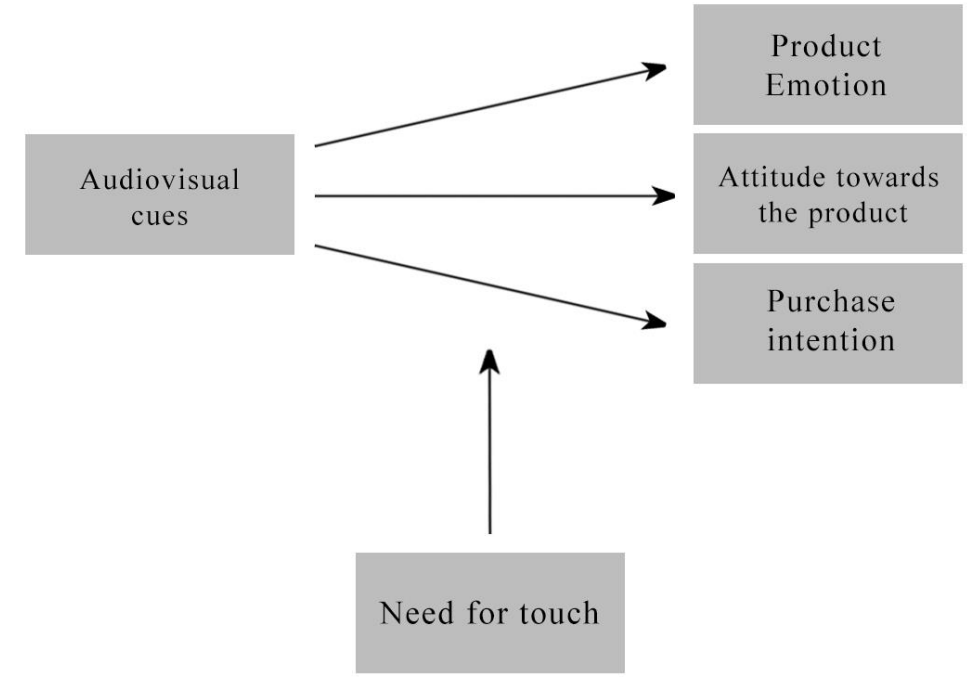
H4: Auditory cues that replicate sounds of haptic product exploration can lead to an approximately similar experience as a real product.

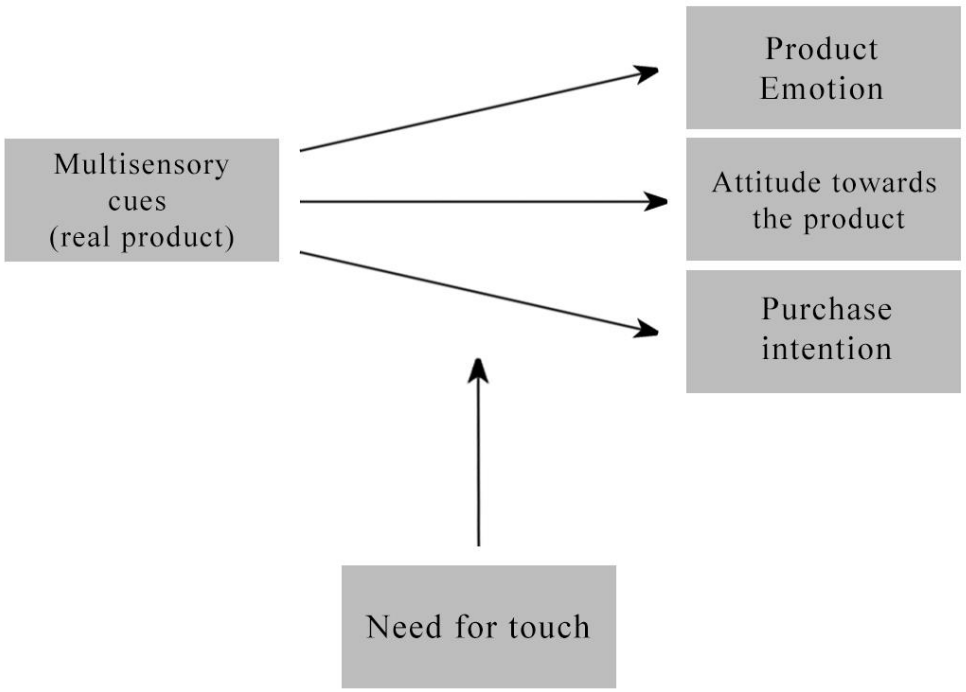
3 Model of the study

In this study the following items will make up the model: auditory cues that provide product interaction sounds will function as an independent variable. Purchase intention, product emotion and attitude towards the product will function as dependent variables. The consumers' Need For Touch functions as a moderator because it is independent from the auditory stimuli.

Figure 3: The three models of the study




Audiovisual cues
Product Emotion
Attitude towards the product
Purchase intention
Need for touch


Multisensory cues (real product)
Product Emotion
Attitude towards the product
Purchase intention
Need for touch

4 Method

The objective of this study was to examine whether auditory cues (that provide a consumer with sounds of haptic interaction when a real product is not available), had influence on the consumer's perception of a product or led to a similar product experience.
From a societal perspective, a certain situation might be relevant for online web shops, where consumers only see photographs of the product and where touching the real product is impossible. From a scientific perspective, this study could prove a multisensory link between audition and haptics, due to the fact that the input of these senses lead to one outcome / perception.

4.1.1 Pre-test

A pre-test was conducted to select the product that was most suitable for the experiment. This was done by letting participants see a static image of a product or a static image of a product accompanied by auditory cues of haptic interaction with that product.

Before the pre-test was conducted, several products were selected. During this selection process, different criteria were kept in mind. To illustrate: consumers will be more stimulated to touch a product before a purchase, if a product category differs in a characteristic way on one or more material properties (i.e. texture, temperature, weight information and hardness) (Peck, 2010). A piece of clothing can vary on texture and weight for example.
Products of different materials that encouraged consumers to touch were selected for the test. The following list of products was selected:

A cardigan (male and female example), a backpack (unisex example), a computer mouse, a leather wallet (male and female example), a stainless steel vase, a smartphone and a sneaker (unisex example).

Audio fragments of haptic interactions with the products were recorded with a Zoom H1 recorder combined with a Røde directional microphone.
The brands of the products were not mentioned or shown in the illustrations, otherwise preexisting opinions and attitudes might have biased the outcomes. Therefore the participants' attitudes towards the products were measured rather than attitudes towards brands.

During the pre-test, the participants were divided into two groups. Group one, viewed seven products accompanied with an audio fragment of a haptic interaction with the product. This fragment featured a sound of the material properties of the product, e.g. surface properties, like friction. These properties are mostly heard when one interacts in a haptic way with an object. To illustrate: participants heard sounds of fingers rubbing over the object. Rubbing can be done by a finger, tongue or toe, but it always generates a shearing or sideways force against a surface and it is a version of the exploratory procedure that Lederman and Klatzky (1987) call 'lateral motion' (Klatzky, 2010). The reason why people use these rubbing patterns is as follows: neural signals which are used to measure object's characteristics are optimized during the observed patterns of purposive exploration (rubbing) (Klatzky, 2010). Besides the sounds of rubbing, the audio fragments also included knocking sounds. The photographs which were accompanied by the audio fragments were meant for visual analysis of the geometric properties because touch is most informative relating to material, and vision to geometric properties (Klatzky, 2010). The second group viewed the same products, but without the audio fragments.

After each group viewed a photograph and listened to the audio fragments, the group had to fill in a set of questions regarding the products. These questions focused on attitude and purchase intention. The questions can be found in the appendix. The following constructs were used:

Attitude towards the product

This scale (original to Peracchio and Meyers-Levy's, 1994), is used to measure how a consumer evaluates a product via nine semantic differentials (e.g. poorly made / well made, boring / exciting, common / unique) (Bruner, Hensel & James, 2005). Regarding reliability, alphas of .71 up to .92 were found during several experiments (Bruner, Hensel & James, 2005).

Purchase intention

The scale measures the consumer's tendency to buy a service or specific good via multiple Likert-like scales and generally the seven-point response scales are used (Bruner, Hensel, & James, 2005). The origin of this scale lies with Baker and Churchill (1977) who used it for physical attractiveness of models in advertisements. Looking at reliability, Alphas from .73 to .82 have been measured.

After the two groups filled in the questionnaires, the outcomes were compared to look if the audio fragments had effects on the participants and which product was most suitable for the experiment.

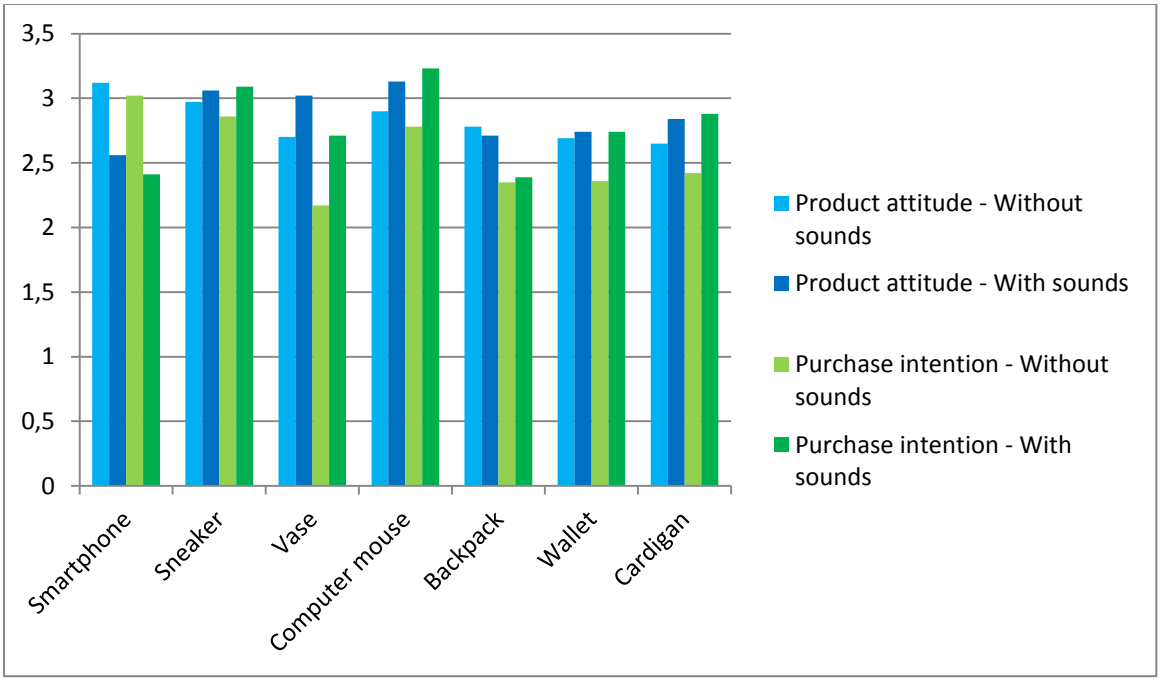
4.1.2 Reliability of the pre-test constructs

The Cronbach's Alphas of the constructs had to be measured per product since there was a questionnaire for every product. The reliability analysis showed that the scores were valid; the scores rated between .85 and .95.

4.1.3 Pre-test results

The questionnaires were made and filled out via the website www.qualtrics.com. The data obtained from the website was prepared for statistical analysis via a syntax. To illustrate: the two conditions 'audio cues' and 'no audio cues' were combined for each item (e.g. the attitude towards the smartphone in the condition with no audio cues and the condition with audio cues were combined) via the syntax. After this, the items which were reverse coded were recoded and the means per construct were calculated. An independent-samples t-test was conducted to compare attitude towards the product and purchase involvement in no audio cues and audio cues conditions.

Figure 4: Means of the product constructs



The significant results that were found contradicted our expectations: audio cues (M=2.56, SD=0.78) resulted in a less positive attitude (i.e. smartphone) compared to the scenario where no audio cues (M=3.12, SD=.90) were used, conditions; t(47)=2.26, p=.029. The same results were found regarding purchase intention (i.e. smartphone): audio cues (M=2.41, SD=0.85) resulted in a less positive attitude (i.e. smartphone) than when no audio cues (M=3.02, SD=1.12) were used, conditions; t(47)=2.05, p=.046.

Two products showed marginally significant results (confirming our expectations): resulting in higher purchase intention (i.e. cardigan) for audio cues (M=2.86, SD=0.75) compared to no audio cues (M=2.42, SD=.82), conditions; t(47)= -1.97, p=.055. The same results were found regarding another purchase intention (i.e. computer mouse), purchase intention was higher for audio cues (M=3.23, SD=0.85) compared to no audio cues (M=2.78, SD=.77), conditions; t(47)= -1.93, p=.060. These two products were selected for the experiment.

An explanation for these results might be that the audio fragments were incongruent with the images; static images with dynamic sounds. Another explanation of these results could be that the recorded sounds or the selected products were not appealing to the participants. Due to these results, videos focusing on haptic product exploration were used during the experiment instead of images with audio fragments. These videos showed interactions with the products, e.g. rubbing the cardigan between fingers, interacting with the mouse's buttons and people putting the cardigan on.

4.3 Experiment

4.3.1 Design

Two 3 X 2 designs were used:

1 3 (real product vs. audiovisual presentation of the product vs. visual presentation of the product) X 2 (NFT: low and high) design.

2 3 (real product vs. audiovisual presentation of the product vs. visual presentation of the product) x 2 (gender: male and female) with NFT (autotelic and instrumental) as covariates.

4.3.2 Research population and sample

The participants were recruited via convenient sampling; family, friends, acquaintances, people who lived in the same area as the researcher. They were contacted via personal contact, telephone, email and social media. A total of 129 participants took part in the experiment; 62 men and 67 women. The participants were aged between 17 and 62 (*M*=37.85, *SD*=14.32).

4.3.3 Stimuli

4.3.3.1 The products

Several other studies regarding audition and auditory cues used a wide variety of products in different experiments. To illustrate: vacuum cleaners, dishwashers, car doors, office machines, flip-open lighters, and many more (Spence & Zampini, 2004). Other studies focused on the usage of auditory cues and bodily functions, to illustrate: the 'parchment-skin' illusion by Jousmäki and Hari (1998) or the usage of modified audio cues in combination with eating or drinking (Zampini & Spence, 2004, 2005).

All in all, a wide variety of studies were conducted regarding auditory cues and objects. However, these studies usually focused on product sounds which are emitted by the products via audio waves when these products were switched on (e.g. the noise that a hair dryer makes or a coffee machine). The product sounds which arise when there is human interaction with it,

are seldom discussed or researched (e.g. car doors). Therefore, this study focused on these human interaction product sounds (HIPS) and what effects these sounds have on people. According to the pre-test results, the most suitable products were a cardigan and a computer mouse. Therefore, these products were used during the experiment.

4.3.3.2 Instruments used

Video material was shot with a Canon 550D and the sound was recorded with a Zoom H1 recorder combined with a Røde directional microphone. One video featured haptic interaction with the computer mouse and the other video featured haptic interaction with the cardigan.

The videos started with an establishing shot of the product, so participants could see the brand, the price and the product. The first part of the cardigan video featured medium close shots and close ups of haptic interaction with the cardigan (e.g. rubbing the fabric between fingers). The second part featured a man or woman, putting on the cardigan and buttoning it up.

Figure 5: Footage of the cardigan video with a male version, close up of interaction and a female version

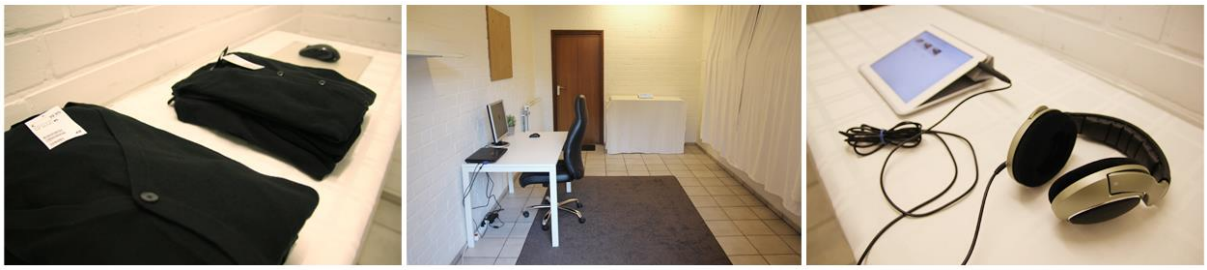
The computer mouse video featured medium close shots and close ups of interactions with the mouse. The interaction with the mouse were natural movements and clicking with the mouse.

Figure 6: Footage of the mouse video with different interactions and shots

4.3.4 Procedure

To execute the experiment in a proper way, a room in the researcher's house was transformed into an office that was suitable for an experiment. The experiment began on October 3rd, and on October 17th the 129th participant finished the experiment. The researcher was always present during the experiment to prepare the participants for the experiment and to aid the participants with their questions if needed.

Figure 7: The experiment room and the attributes used during the experiment



To examine whether (the videos with) auditory cues affected consumers, an experiment was conducted. Three different groups were formed and subjected to different settings to examine the research question and the hypothesis.

Group 1 (number of participants: 43). Group one was given the opportunity to touch two real products (i.e. a black cardigan and a black computer mouse that laid on a table). After haptic exploration had taken place, a questionnaire had to be filled in by the participants. This questionnaire focused on four different constructs regarding (the products): attitude, purchase intention, a need for touch and product emotion.

Group 2 (number of participants: 43). Group two was asked to envision a scenario where they were going to buy a product in the product category that they were going to see. During this process, the participant viewed the video of the product, accompanied by auditory cues of haptic interaction with the product. These videos were shown on an Apple iPad 4 with Retina Display and the participants listened to the video via a Sennheiser HD 595 headphone. After the scenario, the same questionnaire will have to be filled in by the participants.

Group 3 (number of participants: 43). Group three experienced the same scenario as group two, but the videos were not be accompanied by auditory cues. After the scenario, the same questionnaire had to be filled in by the participants.

The questionnaires were made and filled in via the website www.qualtrics.com. The three different groups and their datasets (real products, video and audio, video without audio) were put together in one dataset that was suitable for analysis. Items which were reverse coded were recoded and the means per construct were calculated. Then, different types of analysis were conducted to study the findings.

4.3.5 Constructs and reliability

The experiment was an extended and more detailed version of the pretest. The experiment measured four different variables via four scales: purchase intention, attitude towards a product, the need for touch and product emotion.

Purchase intention

This is the same scale as the one that was used during the pre-test. The scale measures the consumer's tendency to buy a service or specific good via multiple Likert-like scales and generally the seven-point response scales are used (Bruner, Hensel, & James, 2005). The origin of this scale lies with Baker and Churchill (1977) who used it for physical attractiveness of models in advertisements. Looking at reliability, Alphas from .73 to .82 have been measured.

Attitude towards the product

The same product attitude as the one that was used during the pre-test was used in the experiment. This scale (original to Peracchio and Meyers-Levy's, 1994), is used to measure how a consumer evaluates a product via various semantic differentials (e.g. poorly made / well made, boring / exciting, common / unique) (Bruner, Hensel & James, 2005). Regarding reliability, alphas of .71 up to .92 were found during several experiments (Bruner, Hensel & James, 2005).

Fifteen product personality items were added to the original nine item scale. These items included words like unfriendly – friendly and cold – warm.

The Need for Touch

The NFT scale is a 12-item scale that measures one's preference for information acquired through the haptic system via two factors: autotelic and instrumental. The scale was developed and empirically assessed in four studies and demonstrated high reliability (Cronbach's Alphas measured from .87 to .95) (Peck & Childers, 2003).

Product emotion (PrEmo)

The Product Emotion Measurement Instrument (PrEmo) is used to determine emotional responses and user experience to e.g. products, new designs or prototypes and enables the measurement of combinations of simultaneously experienced emotions (Desmet, 2003; Desmet & Schifferstein, 2012, as cited in Laurans & Desmet, 2012). PrEmo is an example of a self-report questionnaire which is a common emotion measurement technique but during this experiment, the verbal set of emotions are used to assess respondents' responses to the products instead of the graphical instruments.

Table 1: Cronbach's Alphas of the different constructs in the experiment

Construct	Cronbach's Alpha	Number of items
Purchase intention (Cardigan)	.84	4
Purchase intention (Mouse)	.87	4
Attitude towards the product (Cardigan)	.87	24
Attitude towards the product (Mouse)	.85	24
PrEmo (Cardigan)	.83	14
PrEmo (Mouse)	.77	14
Need for touch	.90	12

The internal consistency of the construct was measured by a reliability analysis in SPSS. Scores above .7 are generally considered as satisfying and scores above .8 as good (Nunnally, 1978; Pallant, 2005). The table shows mostly good and only reliable Cronbach's Alpha scores for all the constructs.

5 Results

Table 2: Means and standard deviations of the constructs

Construct	Mean	Standard deviation	Number of items
Purchase intention Cardigan	3.13	.96	129
Purchase intention Mouse	3.10	.79	129
Attitude Cardigan	3.27	.47	129
Attitude Mouse	3.12	.43	129
PrEmo Cardigan	3.64	.54	129
PrEmo Mouse	3.46	.46	129
Need for touch	3.63	.86	129

5.1 Main analysis: the effects of different product representations and Need For Touch on consumers

A multivariate analysis of variance ((M)ANOVA) was conducted to investigate the effects of real products versus representations of products on potential buyers. The amounts of NFT were also studied to see if this factor influences the potential buyers. The first (M)ANOVA focused on the findings regarding the **computer mouse**. Three dependent variables were used: attitude towards the product (i.e. computer mouse), purchase intention (i.e. computer mouse), and product emotion (i.e. computer mouse). The fixed factors were type of representation (i.e. real product, video of the product with audio and video of the product without audio) and NFT (divided in low and high NFT).

Main effects

Type of representation did not show significant effects on attitude F (2, 123)=.77, p=*ns*, purchase intention F (2, 123)=.14, p=*ns* and product emotion F (2, 123)=1.63, p=*ns*.

NFT showed no significant effects either, on attitude F (1, 123)=.37, p=*ns*, purchase intention F (1, 123)=.04, p=*ns* and product emotion F (1, 123)=.91, p=*ns*.

Interaction effect

The interaction effect of type of representation * NFT did not show significant effects on attitude *F* (2, 123)=.10, *p=ns,* purchase intention *F* (2, 123)=.38, *p=ns* and product emotion *F* (2, 123)=.12, *p=ns*.

Looking at the hypotheses, none of them could be confirmed by these findings.

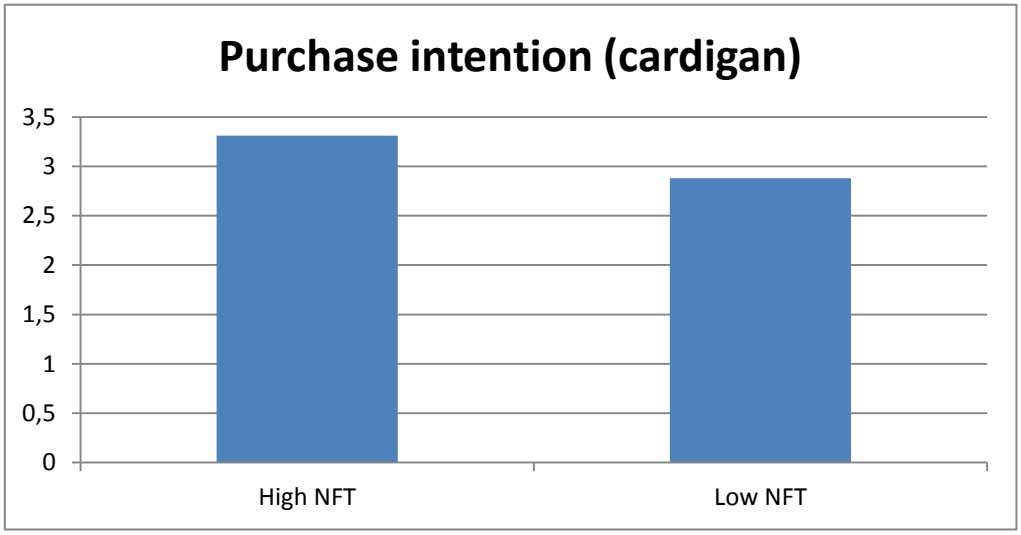
The same (M)ANOVA was conducted regarding the **cardigan**.

Main effects

Type of representation did not show significant effects on attitude *F* (2, 123)=.54, *p=ns,* purchase intention *F* (2, 123)=.63, *p=ns* and product emotion *F* (2, 123)=.37, *p=ns*.

NFT showed no significant effects on attitude *F* (1, 123)=2.17, *p=ns* and marginally significant results on product emotion *F* (1, 123)=2.82, *p*=.096. NFT did have a significant effect on purchase intention *F* (1, 123)=5.8, *p*=.02.

Figure 8: Significant differences in purchase intention between low NFT individuals versus high NFT individuals with regard to the cardigan



These findings showed that people with a high NFT (M=3.31, SD=.88) had a higher intention to purchase the cardigan compared to the people with a low NFT (M=2.88, SD=1.03). This finding confirmed hypothesis 2b; Auditory cues that replicate sounds of haptic product exploration can especially affect high NFT individuals' purchase intention in a positive way when the real product is not present.

Interaction effect

The interaction effect of type of representation * NFT did not show significant effects on attitude F (2, 123)=1.25, p=*ns*, purchase intention F (2, 123)=1.17, p=*ns* and product emotion F (2, 123)=.25, p=*ns*.

The other hypotheses were not confirmed by these findings.

Additional analysis

5.2 The effects of different product representations and gender differences on consumers

The following tests were conducted to see if gender differences had an influence on the results. Another multivariate analysis of variance ((M))ANCOVA) was conducted to investigate the effects of real products versus representations of products on potential buyers. The first (M)ANCOVA, focused on the findings regarding the **computer mouse**. The same three dependent variables were used: attitude towards the product (i.e. mouse), purchase intention (i.e. mouse), and product emotion (i.e. mouse). The fixed factors were type of representation (i.e. real product, video of the product with audio and video of the product without audio) and gender. NFT was split into autotelic NFT and instrumental NFT and used as covariates.

Main effects

Type of representation did not show significant effects on attitude F (2, 114)=.92, p=ns, purchase intention F (2, 114)=.02, p=ns and product emotion F (2, 114)=.61, p=ns.

Gender showed no significant effects on attitude F (1, 114)=1.17, p=ns, purchase intention F (1, 114)=.88, p=ns and product emotion F (1, 114)=1.06, p=ns.

Autotelic NFT did not show significant effects on attitude F (1, 114)=.08, p=ns, purchase intention F (1, 114)=1.83, p=ns and product emotion F (1, 114)=.03, p=ns.

Instrumental NFT did not show significant effects on attitude F (1, 114)=.42, p=ns, purchase intention F (1, 114)=1.81, p=ns and product emotion F (1, 114)=.00, p=ns.

Interaction effects

The interaction effect of gender * type of representation did not show significant effects on attitude F (2, 114)=.68, p=ns, purchase intention F (2, 114)=.15, p=ns and product emotion F (2, 114)=1.20, p=ns.

The interaction effect of gender * autotelic NFT did not show significant effects on attitude F (1, 114)=.31, p=ns, purchase intention F (1, 114)=2.21, p=ns and product emotion F (1, 114)=.23, p=ns.

The interaction effect of gender * instrumental NFT did not show significant effects on attitude F (1, 114)=.01, p=ns, purchase intention F (1, 114)=.21, p=ns and product emotion F (1, 114)=.64, p=ns.

The interaction effect of type of representation * autotelic NFT did not show significant effects on attitude F (2, 114)=.41, p=ns, purchase intention F (2, 114)=.08, p=ns and product emotion F (2, 114)=.13, p=ns.

The interaction effect of type of representation * instrumental NFT did not show significant effects on attitude F (2, 114)=.03, p=ns, purchase intention F (2, 114)=.05, p=ns and product emotion F (2, 114)=.40, p=ns.

The interaction effect of autotelic NFT * instrumental NFT did not show significant effects on attitude F (1, 114)=.02, p=ns, purchase intention F (1, 114)=2.32, p=ns and product emotion F (1, 114)=.1, p=ns.

The same (M)ANCOVA test was conducted with regard to the **cardigan**:

Main effects

Type of representation did not show significant effects on attitude F (2, 114)=.04, p=ns, purchase intention F (2, 114)=.36, p=ns and product emotion F (2, 114)=.31, p=ns.

Gender showed marginally significant effects on attitude F (1, 114)=2.91, p=.09 and no significant effects on purchase intention F (1, 114)=.21, p=ns and product emotion F (1, 114)=.36, p=ns.

Autotelic NFT did not show significant effects on attitude F (1, 114)=1.06, p=ns, purchase intention F (1, 114)=1.72, p=ns and product emotion F (1, 114)=.01, p=ns.

Instrumental NFT showed marginally significant effects on attitude F (1, 114)=3.12, p=.08 and no significant effects on purchase intention F (1, 114)=1.57, p=ns and product emotion F (1, 114)=.31, p=ns.

Interaction effects

The interaction effect of gender * type of representation did not show significant effects on attitude F (2, 114)=.34, p=ns, purchase intention F (2, 114)=.38, p=ns and product emotion F (2, 114)=.80, p=ns.

The interaction effect of gender * autotelic NFT showed significant effects on attitude F (1, 114)=4.6, p=.03, purchase intention F (1, 114)=8.61, p=.004 and marginally significant effects on product emotion F (1, 114)=3.8, p=.05.

The interaction effect of gender * instrumental NFT did not show significant effects on attitude F (1, 114)=.00, p=ns and product emotion F (1, 114)=.55, p=ns but showed significant effects on purchase intention F (1, 114)=3.95, p=.049.

The interaction effect of type of representation * autotelic NFT did not show significant effects on attitude F (2, 114)=1.07, p=ns, purchase intention F (2, 114)=1.84, p=ns and product emotion F (2, 114)=.50, p=ns.

The interaction effect of type of representation * instrumental NFT did not show significant effects on attitude F (2, 114)=.41, p=ns, purchase intention F (2, 114)=.82, p=ns and product emotion F (2, 114)=1.30, p=ns.

The interaction effect of autotelic NFT * instrumental NFT did not show significant effects on attitude F (1, 114)=1.15, p=ns, purchase intention F (1, 114)=.89, p=ns and product emotion F (1, 114)=.01, p=ns.

5.3.1 The relationship between gender and Need For Touch

Then, it was investigated if there was a (significant) relationship between gender and NFT. An independent-samples t-test was conducted with gender as grouping variable and NFT as test variable to compare the NFT scores for males and females. There was significant difference in scores for males (*M*=3.47, *SD*=.87) and females [*M*=3.78, *SD*=.82; *t*(127)=-2.10, *p*=.038]. The magnitude of the differences in the means was very small (eta squared=.008), since small is generally considered as .01, moderate as .06 and large as .14 (Pallant, 2005).

5.3.2 Autotelic and instrumental NFT differences between men and women

Two independent-samples t-tests were conducted to analyze if there was a significant relationship between the two factors of NFT (i.e. instrumental and autotelic) and gender. The first t-test was conducted with gender as grouping variable and autotelic NFT as test variable, to compare the differences between males and females. There was a significant difference in scores for males (*M*=3.26, *SD*=1.11) and females [*M*=3.71, *SD*=1.06; *t*(127)=-2.35, *p*=.02]. This meant that women had significantly higher amounts of autotelic NFT compared to men. The magnitude of the differences in the means was between small (.01) and moderate (.06) (eta squared=.04).

The second t-test was conducted with gender as grouping variable and instrumental NFT as test variable, to compare the differences between males and females. There was no significant difference in scores for males (*M*=3.67, *SD*=.91) and females [*M*=3.84, *SD*=.73; *t*(127)=-1.19, *p*=.24]. This means that there were no differences in instrumental NFT between women and men. The magnitude of the differences in the means was small (eta squared=.01).

5.4 Comparing results of the pre-test and the experiment

Finally, a test was done to compare the results of the pre-test and the results of the experiment. This was done for purchase intention (for the cardigan and the computer mouse) only, since extra questions were added to the product attitude questions of the experiment. This purchase intention condition could be regarded as a control condition for the experiment.

Comparing the no sound conditions - cardigan

An independent-samples t-test was conducted with the means of the no sound condition of the pre-test (M=2.42, SD=.82) and the experiment (M=3.24, SD=.98) regarding the cardigan. Results were significant: $t(70)=3.71$, $p=.0004$. The magnitude of the differences in the means was large (eta squared=.16).

Comparing the sound conditions – cardigan

An independent-samples t-test was conducted with the means of the sound condition of the pre-test (M=2.88, SD=.75) and the experiment (M=3.01, SD=.91) regarding the cardigan. Results were non-significant: $t(61)=.56$, *p=ns*. The magnitude of the differences in the means was very small (eta squared=.005).

Comparing the no sound conditions – mouse

An independent-samples t-test was conducted with the means of the no sound condition of the pre-test (M=2.78, SD=.77) and the experiment (M=3.09, SD=.68) regarding the mouse. Results were marginally significant: $t(70)=1.80$, $p=.076$. The magnitude of the differences in the means was between small (.01) and moderate (.06) (eta squared=.04).

Comparing the sound conditions – mouse

An independent-samples t-test was conducted with the means of the sound condition of the pre-test (M=3.23, SD=.85) and the experiment (M=3.04, SD=.72) regarding the mouse. Results were non-significant: $t(61)=.92$, *p=ns*. The magnitude of the differences in the means was small (eta squared=.01).

The above mentioned results indicate that a video that replicates haptic exploration (without sound) results into a higher purchase intention compared to a static image, especially

regarding the cardigan. Videos with sound that replicate haptic exploration do not lead to higher purchase intentions.

5.5 Reflecting on the hypotheses

Hypotheses	Confirmed or not confirmed
H1: Auditory cues that replicate sounds of haptic product exploration can affect consumers' product evaluations in a positive way when the real product is not present.	Not confirmed by significant results
H2: Auditory cues that replicate sounds of haptic product exploration can affect consumers' purchase intention in a positive way when the real product is not present.	Not confirmed by significant results
H2b: Auditory cues that replicate sounds of haptic product exploration can especially affect high NFT individuals' purchase intention in a positive way when the real product is not present.	Confirmed by significant results
H3: Auditory cues that replicate sounds of haptic product exploration can affect consumers' emotions in a positive way when the real product is not present.	Not confirmed by significant results
H4: Auditory cues that replicate sounds of haptic product exploration can lead to an approximately similar experience as a real product.	Not confirmed by significant results.

6 Conclusions

This section will take a look at what conclusions can be drawn from this research (with regard to the research questions).

6.1 Conclusions regarding the usage of different presentations (e.g. video with auditory cues) and their effects on consumers (RQ1, RQ2, RQ3, RQ4)

Although there were big differences between the three presentations (real products versus audiovisual presentations of products), the results indicated that the type of presentation had no significant effects on the purchase intention, product emotion and product attitude of the participants. No significant differences were found between the three representations and their effects on the participants. Due to the absence of significant differences between the three presentations, we suggest that videos (with or without audio cues) which replicate haptic product exploration can be a good replacement for real products or come very close to real products experiences and their effects on consumers (regarding purchase intention, product emotion and product attitude). However, further investigation is needed.
Another conclusion is that it does not seem to matter to people whether they see products in real life or on a screen in the form of videos (with or without auditory cues) which mimic haptic exploration.

6.2 Conclusions regarding the influence of Need for Touch

6.2.2 NFT and purchase intention

Looking at NFT (high or low): people with a high NFT have higher intentions to buy products compared to people with a low NFT. However, this amount (high or low) is not a predictor for all products. In this research, significant results were not found for both products but only one product: the cardigan. Thus, a high NFT can be a predictor of purchase intention, provided that the product category (e.g. clothing) is one that varies on one or more material properties and gives pleasant sensory feedback.

6.2.3 Gender differences and Need for Touch

The interaction between gender and NFT (autotelic or instrumental) has significant effects on consumers regarding cardigans (clothing). The interaction between gender and autotelic NFT has effects on purchase intention and product attitude while the interaction between gender and instrumental NFT only affects purchase intention.

Further analysis showed that women have significantly higher amounts of NFT than men. The research shows that women have higher preferences for "the extraction and utilization of information obtained through the haptic system" compared to men (Peck & Childers, 2003: 431). These significant results focus on the autotelic dimension of NFT since the instrumental dimension did not show significant differences between men and women. To conclude: women like the sensory aspects of touch, seeking arousal, fun, sensory stimulation and enjoyment (Holbrook & Hirschman, 1982; Peck & Childers, 2003).

6.3 The differences between videos of haptic product exploration and static images of a product

The last analysis indicates that videos of haptic exploration without sound lead to a higher purchase intention regarding the cardigan (clothing) compared to static images (a normal web shop scenario). Thus, instead of a normal web shop scenario that only focuses on photographs of a product, a web shop would be better off (when it comes to selling products) featuring a video of haptic exploration with that product since the video has more positive effects on consumers and is a good substitute for a real product.

7 Discussion

7.1 Discussing the main analysis – The usage of different product presentations and their effects on respondents

An explanation for the indifference between the three presentations, could be based on the process of mental stimulation. Mental stimulation, is another way in which cognition is grounded and can also be considered as the reenactment of perceptual experiences (Elder & Krishna, 2012). The theory of grounded cognition – as related to mental simulation – supposes that one's primary perception of objects (both conscious and non-conscious) can be played back or stimulated and stored in memory during an encounter with an object but also with a representation of an object (e.g. visual or verbal depictions) (Elder & Krishna, 2012). Mental stimulation focus on exposure to visual or verbal representations / depictions of objects which could lead to more (vs. less) embodied mental stimulation or to higher purchase intentions (Elder & Krishna, 2012).

According to their studies, Elder and Krishna (2012) state and show that mental simulation can be facilitated by the way that a product is visually presented, with significant behavioral consequences. They also show that purchase intention can be increased (due to facilitation of mental simulation of object interaction) by manipulating the orientation of an object toward a participant's dominant hand.

Elder and Krishna's (2012) study focuses on static images of objects and these images can induce mental simulation and behavioral consequences. In our study, videos were used during the experiment. This might have also lead to mental simulation and behavioral consequences; judging a video representation of a product in the same way as a real product.

It was also concluded that is does not seem to matter to people whether they see products in real life or on a screen in the form of a video (with or without auditory cues) which focuses on haptic exploration of a product. An explanation for this could be found in the growing amount of online shopping. To illustrate: in the US, online sales are expected to increase with 62% (estimated value: 327 billion dollars) and in Europe to 78% (estimated value: 230 billion dollars) (Forrester, 2012, as cited in Thuiswinkel waarborg, 2012). Consumers might get used to or adapt to seeing products on screens and evaluating them the same way as they do in real world stores. Trendwatching (2012) wrote the following about screens:

*"2012 will see three mega-tech currents converge: screens will be (even more): ubiquitous / mobile / cheap / always on**;** interactive and intuitive (via touchscreens, tablets and so on); an interface to everything and anything that lies beyond the screen (via the mobile web and, increasingly and finally mainstream in 2012, 'the cloud'). In fact, the future for most devices will be a world where consumers will care less about them and just about the screen, or rather what's being accessed through it."*

It is expected that the consumer culture will take place in and be influenced by an all-pervasive screen culture (Trendwatching, 2012). However, this does not necessarily mean that consumers are stopping with real world shopping. The need to shop in real stores will probably remain intact (for now). To illustrate: according to Google and IPSOS OTX (2010), as cited by Trendwatching (2011), 42% of the consumers does research online and then buys online, compared to 51% that does research online and then buys in-store. Consumers enjoy finding these online products in offline stores.

A good example where the offline and online aspects of shopping are combined is PanoPlaza. This website allows you to shop in online versions of existing offline stores by letting you virtually walk through the store (http://www.panoplaza.com). These virtual stores were launched in Japan in 2012. The boundaries of offline and online (real world versus online / virtual world) seem to be fading due to these developments and consumers seem to adapt to these developments.

To conclude: The usage of (mobile) devices (with screens) and shopping with these devices is getting more and more embraced by society. Using these devices (for online shopping) is getting more woven into our society and people get used to seeing products (and other things) in virtual places at any given time.

Figure 9: penetration percentages of smartphones in Dutch households (Marketingfacts, 2013)

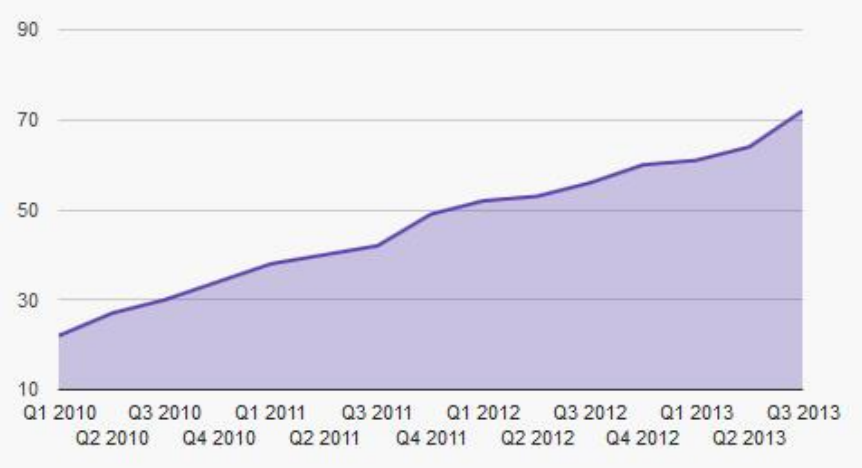
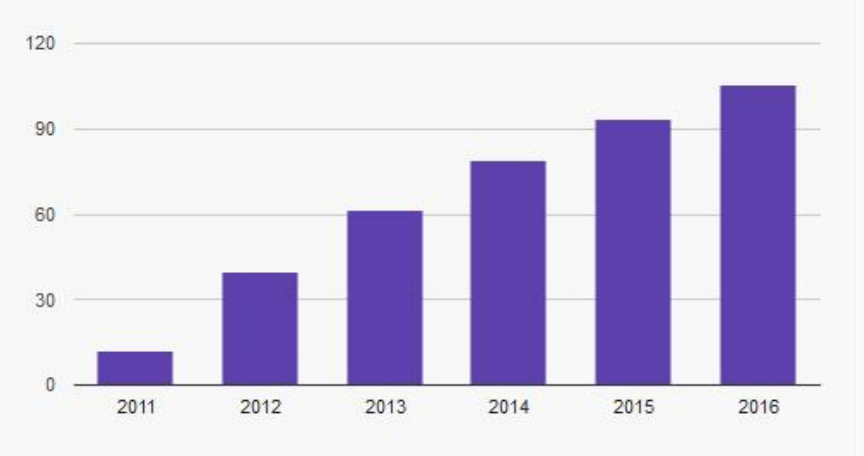


Figure 10: penetration of tablets in Europe (in millions) (Marketingfacts, 2013)



These developments and the screen culture could be the explanation why the three different representations of the products did not have significant effects on purchase intention, product emotion and attitude towards the product.

7.2 Discussing the main analysis – The role of Need for Touch

The first significant finding showed that NFT had a significant effect on the purchase intention of the cardigan. These findings showed that people with a high NFT had a higher intention to purchase the cardigan compared to the people with a low NFT. The reason why the cardigan had significant effects on purchase intention, and the mouse did not could be explained by the material and type of product. The cardigan gives pleasant sensory feedback, and is a type of product that people normally touch with their whole body. The mouse is quite a dull and cold object compared to the cardigan, and only features functional material properties. This could explain the absence of significant effects regarding the mouse.

Touching a product might increase the feeling of psychological ownership and willingness to pay (Peck & Shu, 2009). This fact, in combination with the pleasant sensory feedback from the cardigan, could explain why the high NFT individuals who saw the real product might want to purchase the product in contrast to the individuals with a low NFT.
Individuals with a high NFT can access haptic information more easily and form richer mental representations of products from memory. Therefore, individuals that did not see the real product but had a high NFT still had a higher intention to purchase the cardigan compared to individuals with a low NFT.

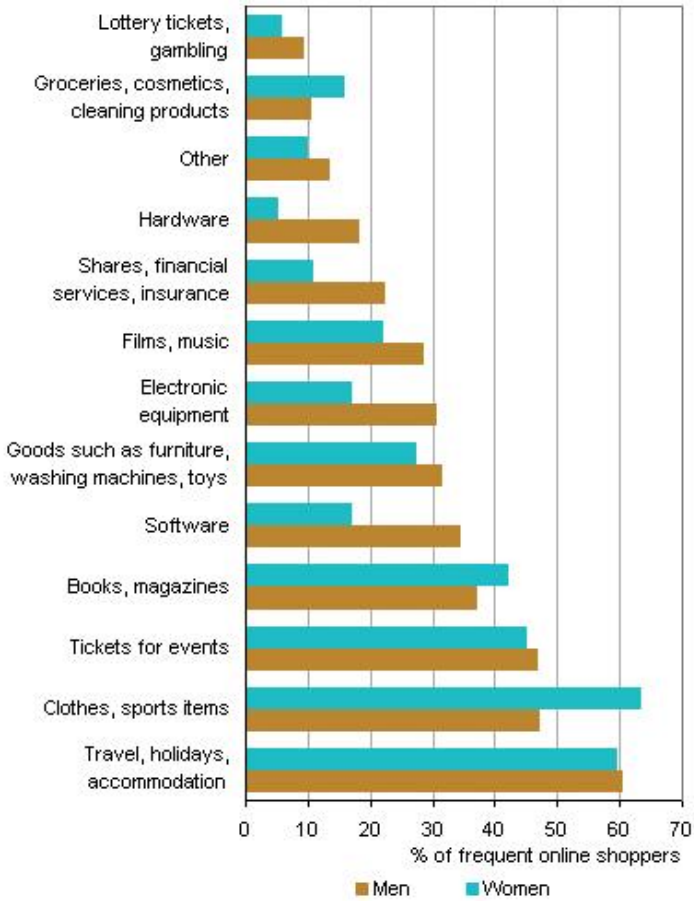
Whether or not a consumer can touch a product during an evaluation might also affect the confidence in a product judgment (Peck & Childers, 2003). Whether or not a consumer has the opportunity to touch a product and experience pleasurable sensory feedback may also influence their attitude towards the product (Peck & Childers, 2003). When a person has a high NFT, barriers to touch will consequently decrease the confidence in product evaluations because haptic information will not be received. However, this is not the case for individuals with a low NFT (Peck & Childers, 2003). This fact may not be applicable here because the amount of individuals with a high NFT was bigger than the amount of individuals with a low NFT (high: N=75, low: N=54). These factors could have led to the fact that no significant effects were found with regard to the attitude towards the product.

NFT does not seem to have significant effects on product emotions either. The feelings that arise when NFT expresses itself might not be strong enough to create the product emotion that was sought. Another reason could be that the usual NFT feelings that normally arise during e.g. shopping, were not stimulated enough in comparison to a real store scenario, where these feelings could be stronger. The experiment setting might (somewhat) suppress these positive or negative feelings.

7.3 Discussing the additional analysis - The influence of gender on Need for Touch

As stated before, women have higher amounts of (autotelic) NFT compared to men. The autotelic dimension focuses on the sensory aspects of touch and involves a hedonic-oriented response, seeking arousal, fun, sensory stimulation and enjoyment (Holbrook & Hirschman, 1982; Peck & Childers, 2003). There is no noticeable purchase goal, instead there can be irresistible needs to engage in haptic product explorations or/and impulsive examinations of multisensory psychophysical product relationships (Holbrook & Hirschman, 1982; Peck & Childers, 2003).

Figure 11: online purchases by frequent e-shoppers (CBS, 2013)



The fact that women have higher amounts of autotelic NFT and seek arousal and fun could be explained by the product categories in which they are interested. Looking at the following figure; clothing, which is a product that gives a large amount of pleasurable sensory feedback, is a product that is bought way more often by women than men. Electronic equipment; a category that shows a big gap between men and women and which does not give much sensory feedback is a product that is purchased more often by men.

The fact that electronic equipment like the mouse does not give much sensory feedback could also explain the absence of significant interaction effects between gender and NFT for this product. The finding that the interaction between autotelic NFT and gender has significant effects on purchase intention and attitude compared to instrumental NFT and gender which only have a significant effect on purchase intention, could be explained by the fact that the purchase goal is an essential item of instrumental NFT. Autotelic NFT also focuses on other factors like fun, arousal and enjoyment. Thus, these factors could also affect the product attitude and the purchase intention.

A lot of product examining (e.g. touching) happens in retail contexts and the theory behind these processes can therefore also be quite applicable to NFT. According to Babin, Darden and Griffin (1994), shopping can be divided into a utilitarian part or in a hedonic part. Utilitarian values can e.g. focus on whether a product is purchased in an efficient and deliberant manner (Babin, et al., 1994). The hedonic values are more personal and subjective compared to utilitarian values and instead of task completion, fun and playfulness are key factors (Holbrook and Hirschman 1982). According to the results of this research, these hedonic factors appear to be especially applicable to women.

7.4 Discussing the additional analysis - Differences between videos of haptic product exploration and static images of products

The additional analysis indicates that videos of haptic exploration lead to a higher purchase intention regarding the cardigan (clothing) compared to static images (a normal web shop scenario). This could also be explained by the process of mental simulation or / and the screen revolution. Consumers could be mentally stimulated by seeing haptic product interaction in a video, and this could even lead to more behavioral consequences or mental simulation compared to static images.

Regarding product attitude, the same construct was used during the experiment and the pre-test, however, extra questions were added to the construct for the experiment questionnaire. Although (significant) statistical effects cannot be concluded from these results, they could function as an indication. To illustrate: the product attitude was higher during the experiment in both the cardigan scenarios. Only during the computer mouse scenario with sound does the product attitude not increase due to the experiment stimuli. Further investigation is needed to examine these topics.

8 Limitations and future research

This study was conducted in the Netherlands using a convenient sample; people were asked to participate in the experiment via personal contact, telephone calls, social networks (i.e. Facebook and Linkedin) and email. A total of 129 participants took part in the experiment and a large part of the participants knew the researcher which might have led to biased (e.g. social desirability bias) results.

The second factor to keep in mind regarding the limitations of this research is the fact that this experiment was based on a scenario. People had to picture a scenario in which they were going to buy a product in the product category that they were going to see during the experiment. Thus, the results are subject to the imagination of the participants.
The other factor regarding the scenario is the setting. The experiment took place in the researcher's garage, which was transformed into a tidy office with a desk and a product presentation table. However, it was not a real store were people normally buy their products or their own computer from which they shop online or feel at home. A real store or one's home might have different lighting, a different ambiance and so different effects (positive or negative) on consumers.

Another factor that could be a limitation are the two products that were chosen for the experiment. The selection of the computer mouse and the cardigan was based on the results of the pre-test. However, this selection was based on marginally significant results. It is therefore possible that other products could have had different effects on people and resulted into other outcomes. If more products would have been used during the experiment, the results would have been more detailed, diverse and generalizable.

The questionnaire that was used during the pre-test and experiment were translated from English to Dutch and checked by a Translation Academy alumnus. However, translating a questionnaire could lead to errors and these errors could have effects on the outcomes of the study.

Although a part of the pre-test results could function as a control condition, a real control condition was not present during this study. Therefore, this issue of comparing the effects of videos of haptic product exploration with static images could be used during future research. The results of this experiment (and the pre-test) are a good indication that these haptic exploration videos can have positive effects on consumers and that these kind of videos can be very promising for the future. Additional research needs to be done to test a new hypothesis: *showing activity with a product could compensate for the lack of tactile information.*

Future research can be done regarding the facilitation of mental simulation due to videos of products (focusing on haptic interaction), and their effects on consumers. Research has been done on this topic regarding static images, but studying product videos could lead to new innovative results.

Future research can be done regarding seeing products on screens. Researchers could research in more detail what the precise effects of (in-store) shopping via screens are in the years to come. Although shopping in real stores will remain to exist (for now), humans will probably adapt to screens more and more in the future.
Seeing a real product or seeing a video that focused on haptic interaction did not make a lot of difference regarding the results. This could also be interesting to investigate in future studies; can these video / auditory / audiovisual presentations replace or support current ways of selling a product? Future research could deliver a specific answer to this question.

Gender differences regarding NFT are also a suitable topic for future research. Not many studies have been conducted regarding this subject. The same results regarding the autotelic and instrumental dimension were found in a study by Peck (2013), but these results were not found consistently in other studies (and therefore, these findings were published). Further investigation is needed to find out more about NFT and gender differences.

9 Managerial implications

This research can be used e.g. by web shop owners to learn about the effects of haptic visual cues and haptic auditory cues on people. As stated before, it does not appear to matter whether consumers see a product in real life or via a screen in the form of a video focusing on haptic product interaction. We therefore suggest that this type of videos can be a good substitute for real products when they are not available. Compared to a normal web shop scenario, videos (without sound) appear to have more positive effects than static images.
Shopping via different types of media is getting more popular and embraced by our society, although consumers still prefer retail stores over online stores. Marketers can take the findings of this research into account when designing new mobile shopping applications or new types of mobile media that focus on consumers.

Retail owners can also use the research to learn about gender differences regarding preferences for certain kinds of products and the NFT. Marketers and retail owners can focus certain types of campaigns or shopping environments on men or women, now that they know that especially women enjoy pleasant sensory feedback. This fact can be used during design processes of products or stores that mainly focus on female consumers.

This amount of information that is present in this research can also be used as a helping hand regarding multisensory issues. Many different kinds of topics are addressed and the literature can be used as guidelines for certain problems.

10 Final conclusion

This study investigated whether auditory cues of haptic product exploration could replicate or come close to real haptic product exploration. After an experiment and analysis of the findings, we suggest that a combination of audio and video in the form of a video that shows haptic product exploration could have the same effects on consumers as or come very close to real-life haptic product exploration (regarding purchase intention, product attitude and product emotion). It does not seem to matter to people whether they see a product in real life or on a screen in the form of an above mentioned video. The usage of this type of videos is not very common (in online shops), thus, future usage could have more positive effects on consumers than normal static images.

The Need For Touch scale was also used during the experiment to see what the results of this need are. High NFT can lead to higher purchase intentions regarding clothing (in our case; cardigans). Autotelic NFT interacts with gender (regarding purchase intention and product attitude towards the cardigan), as does instrumental NFT (regarding purchase intention of the cardigan) and it can be concluded that women have higher amounts of NFT compared to men. This is applicable to the autotelic dimension of NFT, not to the instrumental dimension.

To conclude: sensory marketing and the subject of this study are quite new and experimental. Future research could investigate the findings of this study in further detail to find out if these results will appear consistently.

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Appendix

Statistics of the experiment's participants

Level of education of the participants

Highest level of education (does not have to be finished)	**Percentage**
VMBO/MBO	27,9
HAVO/VWO	10,1
HBO	47,3
WO	14,7

Employment percentages of the participants

Employment	**Percentage**
Full time	45,7
Part time	32,6
Unemployed	6,2
Student	15,5

Pre-test questionnaire

Attitude towards the product
What do you think about the product that you just saw?

I would not purchase this product	I would purchase this product
Mediocre product	Exceptional product
Not at all high quality	Extremely high quality
Poor value	Excellent value
Boring	Exciting
Not a worthwhile product	A worthwhile product
Unappealing product	Appealing product
Common	Unique
Well made	Poorly made

Purchase intention
How much do you agree with the following statements about the product?

	Definitely not	Probably not	Maybe	Probably yes	Definitely yes
Would you like to try this product?					
Would you buy this product if you happened to see it in a store?					
Would you actively seek out this product (in a store in order to purchase it)?					
I would recommend this product.					

Experiment questionnaire

PrEmo

To what extent can you relate to the following emotions, regarding the product?

	Definitely not	Probably not	Maybe	Probably yes	Definitely yes
Satisfaction					
Fascination					
Joy					
Admiration					
Attraction					
Pride					
Hope					
Disgust					
Contempt					
Dissatisfaction					
Boredom					
Shame					
Fear					
Sadness					

Attitude towards the product (five point scale)

What do you think about the product that you just saw?

I would not purchase this product	I would purchase this product
Mediocre product	Exceptional product
Not at all high quality	Extremely high quality
Poor value	Excellent value
Boring	Exciting
Not a worthwhile product	A worthwhile product
Unappealing product	Appealing product
Common	Unique
Well made	Poorly made (r)
Unfriendly	Friendly
Cold	Warm
Honest	Dishonest (r)
Tense	Relaxed
Hard	Soft
Open to change	Traditional (r)
Tough	Cute
Annoying	Agreeable
Serious	Lively

Heavy	Light
Untidy	Tidy
Bold	Modest
Boring	Interesting
Rigid	Flexible
Rough	Smooth

Purchase intention

How much do you agree with the following statements about the product?

	Definitely not	Probably not	Maybe	Probably yes	Definitely yes
Would you like to try this product?					
Would you buy this product if you happened to see it in a store?					
Would you actively seek out this product (in a store in order to purchase it)?					
I would recommend this product.					

Demographics

What is your gender?
Male
Female

What is your age?
Open question

What is your highest level of education (this does not have to be finished yet)?
Primary school
VMBO/MBO
HAVO/VWO
HBO
WO

What is your current employment?
Full time
Part time
Unemployed
Student

Need for touch
Strongly disagree – disagree – neutral – agree – strongly agree

1. When walking through stores, I can't help touching all kinds of products. (A)
2. Touching products can be fun. (A)
3. I place more trust in products that can be touched before purchase. (I)
4. I feel more comfortable purchasing a product after physically examining it. (I)
5. When browsing in stores, it is important for me to handle all kinds of products. (A)
6. If I can't touch a product in the store, I am reluctant to purchase the product. (I)
7. I like to touch products even if I have no intention of buying them. (A)
8. I feel more confident making a purchase after touching a product. (I)
9. When browsing in stores, I like to touch lots of products. (A)
10. The only way to make sure a product is worth buying is to actually touch it. (I)
11. There are many products that I would only buy if I could handle them before purchase. (I)
12. I find myself touching all kinds of products in stores. (A)

(A): Questions focusing on the autotelic domain
(I): Questions focusing on the instrumental domain

Translations

PrEmo

In hoeverre kunt u zich vinden in de volgende emoties / termen, met betrekking tot het product?

	Zeker niet	Waarschijnlijk niet	Misschien	Waarschijnlijk wel	Zeker wel
Voldoening					
Geboeidheid					
Vreugde					
Bewondering					
Aantrekkingskracht					
Trots					
Hoop					
Afkeer					
Minachting					
Ontevredenheid					
Verveling					
Schaamte					
Angst					
Verdriet					

Attitude towards the product

Wat vindt u van het product dat u zojuist gezien heeft?

Ik zou dit product niet kopen	Ik zou dit product kopen
Middelmatig product	Uitzonderlijk product
Van matige kwaliteit	Van zeer hoge kwaliteit
Niet waardevol	Zeer waardevol
Saai	Opwindend
Een product dat het aanschaffen niet waard is	Een product dat het aanschaffen waard is
Onaantrekkelijk product	Aantrekkelijk product
Alledaags	Bijzonder
Goed gemaakt	Slecht gemaakt (r)
Onvriendelijk	Vriendelijk
Koud	Warm
Eerlijk	Oneerlijk (r)
Gespannen	Ontspannen
Hard	Zacht
Staat open voor verandering	Traditioneel (r)
Stoer	Schattig

Vervelend	Aangenaam
Serieus	Levendig
Zwaar	Licht
Rommelig	Netjes
Brutaal	Bescheiden
Saai	Interessant
Stijf	Flexibel
Ruw	Zacht

Purchase Intention
In hoeverre bent u het eens met de volgende stellingen met betrekking tot het product?

	Zeker niet	Waarschijnlijk niet	Misschien	Waarschijnlijk wel	Zeker wel
Zou u dit product willen proberen?					
Zou u dit product kopen als u het tegen zou komen in een winkel?					
Zou u actief op zoek gaan naar dit product (in een winkel om het te kopen)?					
Ik zou dit product aanbevelen aan anderen.					

Demographics

Wat is uw geslacht?
Mannelijk
Vrouwelijk
Wat is uw leeftijd?
Open question

Wat is uw hoogst genoten opleiding (deze hoeft niet te zijn afgerond)?
Lagere school
VMBO/MBO
HAVO/VWO
HBO
WO

Wat is uw huidige dienstverband?
Full time
Part time
Werkloos
Student

Need for Touch
1. Als ik door een winkel loop, kan ik het niet weerstaan om allerlei soorten producten aan te raken. (A)
2. Het aanraken van producten kan leuk zijn. (A)
3. Ik heb meer vertrouwen in producten die ik kan aanraken alvorens ze aan te schaffen. (I)
4. Als ik een product fysiek kan onderzoeken, voel ik me meer op mijn gemak om het te kopen. (I)
5. Ik hecht veel waarde aan het aanraken van allerlei soorten producten als ik in een winkel rondneus. (A)
6. Als ik een product niet kan aanraken in een winkel, aarzel ik om het product te kopen. (I)
7. Ik hou ervan om producten aan te raken, ook al heb ik niet de intentie om ze te kopen. (A)
8. Als ik een product heb aangeraakt, voel ik me zekerder om het aan te schaffen. (I)
9. Als ik in een winkel rondneus, hou ik ervan om allerlei producten aan te raken. (A)
10. De enige manier om er zeker van te zijn dat een product het aanschaffen waard is, is door het echt aan te raken. (I)
11. Er zijn veel producten die ik alleen zou kopen als ik ze zou kunnen aanraken vóór de aankoop. (I)
12. Ik betrap mezelf op het aanraken van allerlei soorten producten in winkels. (A)
Introductions

Pre-test introduction

Dear participant / *Geachte respondent,*

I would like to welcome you to the preliminary research of my master thesis. My thesis is part of the master Marketing Communication at the University of Twente and therefore I am conducting research for the optimization of a website*.

Welkom bij het vooronderzoek dat ik uitvoer vanwege mijn master thesis. Mijn thesis is onderdeel van de master Marketing Communication aan de Universiteit Twente en hiervoor doe ik onderzoek naar de optimalisatie van een website.*

During this preliminary research, you will get to see a few products. Imagine then, that you want to buy a product of the product category that you are about to see. After you have viewed the product, you have to fill in a couple of questions per product. Filling in the questionnaire will take about five to ten minutes, depending on the time one is willing to take. The results will be treated completely anonymous and are only intended for scientific purposes. There are no right or wrong answers during this research: your opinion is our only interest.

Tijdens dit vooronderzoek krijgt u een aantal vertoningen van producten te zien. Stelt u zich dan voor dat u een product wil gaan kopen in de productcategorie die u te zien krijgt. Nadat u het product bekeken heeft moet u per product een aantal vragen beantwoorden. Het invullen van de vragenlijst duurt ongeveer vijf tot tien minuten, afhankelijk van de tijd die iemand ervoor wil nemen. De resultaten worden volledig anoniem behandeld en dienen alleen voor wetenschappelijke doeleinden. Er zijn geen goede of foute antwoorden in dit onderzoek: er is alleen interesse naar uw mening.

Thank you in advance for your cooperation */ Bij voorbaat dank voor uw medewerking.*

Kind regards */ Met vriendelijke groet,*
Bart Roost

*A different purpose of the pre-test was stated so participants would not be influenced by the real purpose

Experiment introduction

Dear participant / *Geachte respondent,*

I would like to welcome you to the research of my master thesis. My thesis is part of the master Marketing Communication at the University of Twente and the goal of this research is to find out people perceive certain products.

Welkom bij het onderzoek dat ik uitvoer vanwege mijn master thesis. Mijn thesis is onderdeel van de master Marketing Communicatie aan de Universiteit Twente en de insteek van mijn onderzoek is hoe mensen bepaalde producten waarnemen.

Real product scenario
During this research, you will get to see two products. Imagine then, that you want to buy a product of the product category that you are about to see. You are allowed to look at, touch, lift and / or put on the two products (like you would do in a store). You are allowed to do this but it is not obligatory. When you are ready with this product inspection, you are requested to fill in a few questions per product.

Tijdens dit onderzoek krijgt u twee producten te zien. Stelt u zich dan voor dat u een product wil gaan kopen in de productcategorie die u te zien krijgt. U mag deze twee producten bekijken, aanraken, optillen en/of aantrekken (zoals u dat ook in de winkel zou doen). U mag dit doen, het is niet verplicht. Nadat u klaar bent met deze productinspectie wordt u verzocht om per product een aantal vragen te beantwoorden.

Audiovisual scenario
During this research, you will get to see two videos of products. Imagine then, that you want to buy a product of the product category that you are about to see. After you have seen the video, you are requested to fill in a few questions per product.

Tijdens dit onderzoek krijgt u twee video's van producten te zien. Stelt u zich dan voor dat u een product wil gaan kopen in de productcategorie die u te zien krijgt. Nadat u de video heeft bekeken wordt u verzocht een aantal vragen te beantwoorden over het product dat u in de video heeft gezien.

Visual scenario
During this research, you will get to see two soundless videos of products. Imagine then, that you want to buy a product of the product category that you are about to see. After you have seen the video, you are requested to fill in a few questions per product.

Tijdens dit onderzoek krijgt u twee geluidloze video's van producten te zien. Stelt u zich dan voor dat u een product wil gaan kopen in de productcategorie die u te zien krijgt. Nadat u de video heeft bekeken wordt u verzocht een aantal vragen te beantwoorden over het product dat u in de video heeft gezien.

The experiment will take about ten to twenty minutes, depending on the time one is willing to take. The results will be treated completely anonymous and are only intended for scientific purposes. There are no right or wrong answers during this research: your opinion is our only interest.

Het experiment zal ongeveer tien tot twintig minuten duren, afhankelijk van de tijd die iemand ervoor wil nemen. De resultaten worden volledig anoniem behandeld en dienen alleen voor wetenschappelijke doeleinden. Er zijn geen goede of foute antwoorden in dit onderzoek: er is alleen interesse naar uw mening.

Thank you in advance for your cooperation / *Bij voorbaat dank voor uw medewerking*.

Kind regards / *Met vriendelijke groet,*
Bart Roost