Touching Brands

The Effects of Multisensory Packaging Design on Brand and Product Perception and Evaluation

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UNIVERSITY OF TWENTE.

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Abstract

Research objective
Leading brands increasingly adopt sensory marketing, a strategy focused on the engagement of multiple senses in the consumer environment. The rising field of multisensory experience lacked insight in the way multisensory marketing strategies could contribute to packaging design. A hypothesized framework of packaging design was developed to underlie an effective multisensory packaging strategy for the beverage category. This framework hypothesized that inclusion of brand or product congruent stimuli in packaging design would affect brand and product perception and evaluation in a favorable direction. Two studies investigated how multisensory packaging does affect brand and product perception and evaluation by testing the validity of the hypothesized framework within the beer category.

Study 1
In an online survey 42 participants evaluated five images of beer bottles on a list with the most common brand values and taste descriptors among beer brands and on tactile, auditive and olfactive stimuli. The study confirmed that consumers hold a semantic associative network of relationships among beer brand values, taste descriptors and sensory stimuli which makes them perceive certain brand values and taste descriptors as matching or mismatching with specific sensory stimuli.

Study 2
In an experiment was investigated how brand and product congruent tactile attributes of a beer bottle design affected brand and product perception and evaluation. 90 participants evaluated two beer bottle designs of distinctive brands which differed in weight (heavy vs. light) and texture (rough vs. smooth) on tactile perceptions, brand values, taste descriptors and brand and product evaluation. The study demonstrated that 1) tactile stimuli in beer bottle design affect brand and product perception and evaluation; 2) the facilitating role of semantic congruency works in some, but not all cases and sometimes a facilitating effect of semantically incongruent stimuli was found; and 3) individual characteristics (gender and age) moderated the effect of tactile stimuli on perception and evaluation.

Conclusion
A framework of multisensory packaging design was developed which implied that: 1) sensory stimuli in packaging design affect product and brand perception and evaluation; 2) consumers hold semantic associative networks of stimuli that match or mismatch with brands and products; 3) semantically congruent, but also incongruent stimuli in packaging design may facilitate brand and product perception and evaluation; and 4) individual characteristics may moderate the effects of multisensory packaging. Based on these insights a multisensory packaging strategy is formulated for brand owners within the beverage category.

IV

Management summary

I. Research objective

Leading brands start increasingly adopting sensory marketing, a strategy focused on the engagement of multiple senses in the consumer environment. However, the rising innovative field of multisensory experience lacked cohesion and insights in the way multisensory marketing strategies can be applied successfully to generate added commercial value.

Therefore, the international packaging design agency CARTILS approached the University of Twente for a collaborative Master thesis project to investigate how a multisensory approach can contribute to packaging design within the beverage category.

II. Hypothesized framework of multisensory packaging design.

Academic literature suggested the existence of synaesthetically and semantically congruent relationships between sensory stimuli and characteristics of brands and products which means that consumers may perceive certain sensory stimuli as matching or mismatching with a brand or product.

Based on these insights a hypothesized framework of packaging design was developed to serve as the basis underlying an effective multisensory packaging strategy. The framework was build on the assumption that the inclusion of brand or product congruent sensory stimuli (secondary product attributes) in packaging design might affect perception and evaluation of brands and products (the primary product attributes) in a favorable direction.

This thesis project tested the validity of this hypothesized framework within the beer category. Two studies were conducted to investigate the following research question:

How does multisensory packaging design affect brand and product perception and evaluation?

III. Study 1.

First, in an online survey 42 participants evaluated five images of beer bottles on a list with the most common brand values and taste descriptors among beer brands and with tactile, auditive and olfactive stimuli. The correlational study demonstrated that:

Consumers hold a semantic associative network of relationships among beer brand values, taste descriptors and sensory stimuli which makes them perceive certain brand values and taste descriptors as matching or mismatching with specific sensory stimuli.

III. Study 2.

Second, an experiment was conducted to investigate how brand and product congruent tactile attributes of a beer bottle design (identified in study 1) affect brand and product perception and evaluation. 90 participants evaluated the beer bottle designs of two distinct beer brands that differed at random in weight (heavy or light) and texture (rough or smooth) by completing a questionnaire which measured tactile perceptions, brand values, taste descriptors and brand and product evaluation. The study demonstrated that:

- Tactile stimuli in the beer bottle design affect beer brand and product perception and evaluation which confirmed these causal relationships in the hypothesized framework.
- The facilitating role of semantic congruency within this framework was found in some instances, but not for all brand value dimensions and taste descriptors and in some instances semantically incongruent stimuli even affected brand perception evaluation in a favorable direction.
- Moreover individual characteristic (gender and age) moderated the effect of weight and texture on product perception and brand and product evaluation, which added a new insight to the hypothesized framework.

IV. Conclusion

Based on the findings of both studies a framework of multisensory packaging design is developed which underlies a multisensory packaging strategy recommended to brand owners within the beverage category.

IV.I. Framework of packaging design

Figure I presents the resulting framework of packaging design. This framework implies that:

1. The sensory properties of a beer bottle design can serve as secondary product attributes of the packaging to affect brand and product perception and evaluation.

2. Consumers hold semantic associative networks that makes them perceive certain brand values and taste descriptors as matching or mismatching with specific sensory stimuli.
3. Inclusions of matching sensory stimuli in packaging design facilitate brand and product perception and evaluation in certain instances, while in other situations these effects do not occur or even occur for semantically incongruent stimuli.
4. The effect of sensory stimuli in packaging design on product perception and brand and product evaluation also depends on individual characteristics like gender and age.

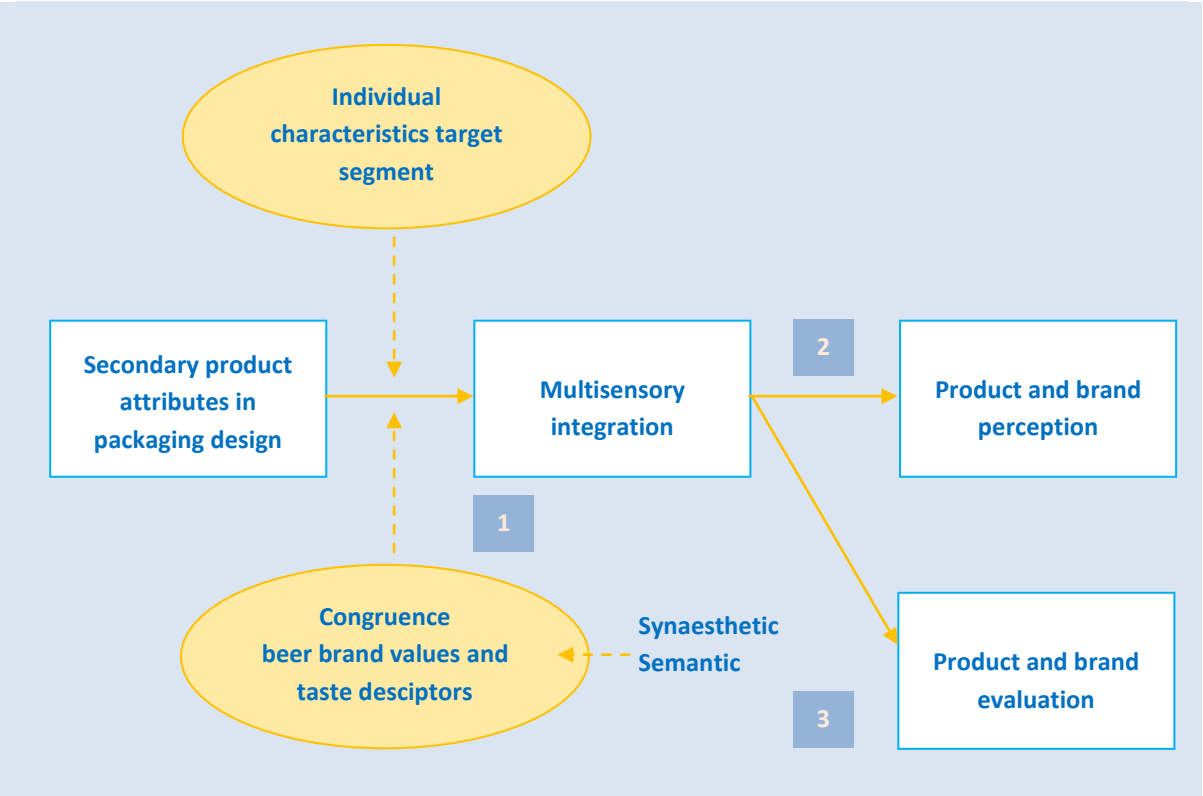


Figure I. The framework of multisensory packaging design

The main relationships of the framework are generalizable to packaging of products within the beverage category. However, the specific semantic associative network developed in study 1 and outcomes of tactile multisensory packaging in study 2 can be generalized in a limited way to beverage brands and products that share brand values and taste descriptors with the beer category.

IV.II. Multisensory packaging strategy

Based on the framework of multisensory packaging design a multisensory packaging strategy is formulated for brands and products the beverage category:

- *Step 1 :* Division of sensory stimuli in primary product attributes and secondary product attributes and the selection of relevant brand values.
- *Step 2:* Selection of semantically congruent stimuli for multisensory packaging from the semantic associative networks that are developed for designers to serve as a initial starting point for multisensory packaging.
- *Step 3:* Trial and error: Prior testing of the effects of the multisensory packaging design on perception and evaluation within the target segment is recommended before taking the packaging design into production.

This multisensory packaging strategy needs to be considered with caution. It is developed with the aim to provide designers and brand managers a starting point within this innovative field. In the end multisensory packaging is not about congruent or incongruent relationships, but about finding the most effective combinations of sensory stimuli for products and brands. More research and trial and error in practice are needed to validate this multisensory packaging strategy.

IV.II. Theoretical and practical contribution

This thesis project makes valuable contributions to the academic and the professional field of multisensory packaging:

- This research demonstrated that tactile stimuli in packaging design affect brand and product perception and evaluation which has (especially for brands) hardly been demonstrated by previous academic research.
- The research also proved the value of multisensory packaging for the commercial field by demonstrating how managers can use multisensory packaging design to:
  - Affect brand and product perception and evaluation.
  - Respond to the rising need for an enhanced brand and product experience and to inconspicuous consumption.
  - Develop their own unique sensory signatures.

- The thesis also considered the extent to which multisensory packaging may benefit a brand and its products by demonstrating that:
  - The outcomes of a multisensory packaging strategy heavily depend on the individual characteristics of the target segment.
  - The potential small effects of a multisensory packaging are important to consider in relation to the involved costs.
  - Future academic research and trial and error in the marketing practice are needed to indentify the combinations of sensory stimuli that result in the most favorable outcomes for products and brands.

1

Introduction

Leading brands start adopting sensory marketing, a strategy focused on the engagement of multiple senses in the consumer environment. The international packaging design agency CARTILS has noticed this trend and requested the University of Twente to investigate how a multisensory approach can contribute to packaging design. This section will introduce the sensory marketing concept and the goal of this thesis project.

1.1 An introduction in sensory marketing

The iPod touch feels incredible, because the product is lighter and thinner than ever, consists of a smooth finish and designed in a way that allows one hand to rule the screen.

(Apple, 2014)

1.1.1. It's in the senses

We all know Apple's *iPod touch*. It is impossible to call this product a dull technical device. The iPod touch is a typical example of the current marketing tendency for brands and products to emphasize more and more their sensuality. Since the Millennium, companies are showing increasing interest in sensory experience (Krishna, 2010).

There are many examples of leading brands with awareness of sensory experience (Lindstrom, 2005). Magnum launched in 2005 its limited edition *5 senses*. A product line consisting of the Magnum variants *Sound*, *Aroma*, *Touch*, *Vision* and *Taste*, supported by a campaign which takes a journey through the senses (Marketing Magazine, 2005; Unilever, 2014).

Mercedes-Benz is working with in-car scenting and Singapore Airlines uses its own signature aroma, *Floridian waters*, which is especially mixed for this brand and is infused into its planes. In addition, Harley-Davidson lost a court case to protect the typical sound of a roaring engine as its signature and Coca-Cola uses the noises of carbonating coke in many of its advertisements to make it iconic to coke.

Disney focuses on multiple sensory levels in its attractions to make each ride a full sensory experience and also Bang & Olufsen targets consumers with sensory retail concepts. Marlboro invests in bars and nightclubs to create an atmospheres that implicitly conveys its brand identity.

Moreover, Nokia is developing its future mobile phone concept *Scentsory* that works with smell, sight hearing and touch to experience communication on multisensory levels.

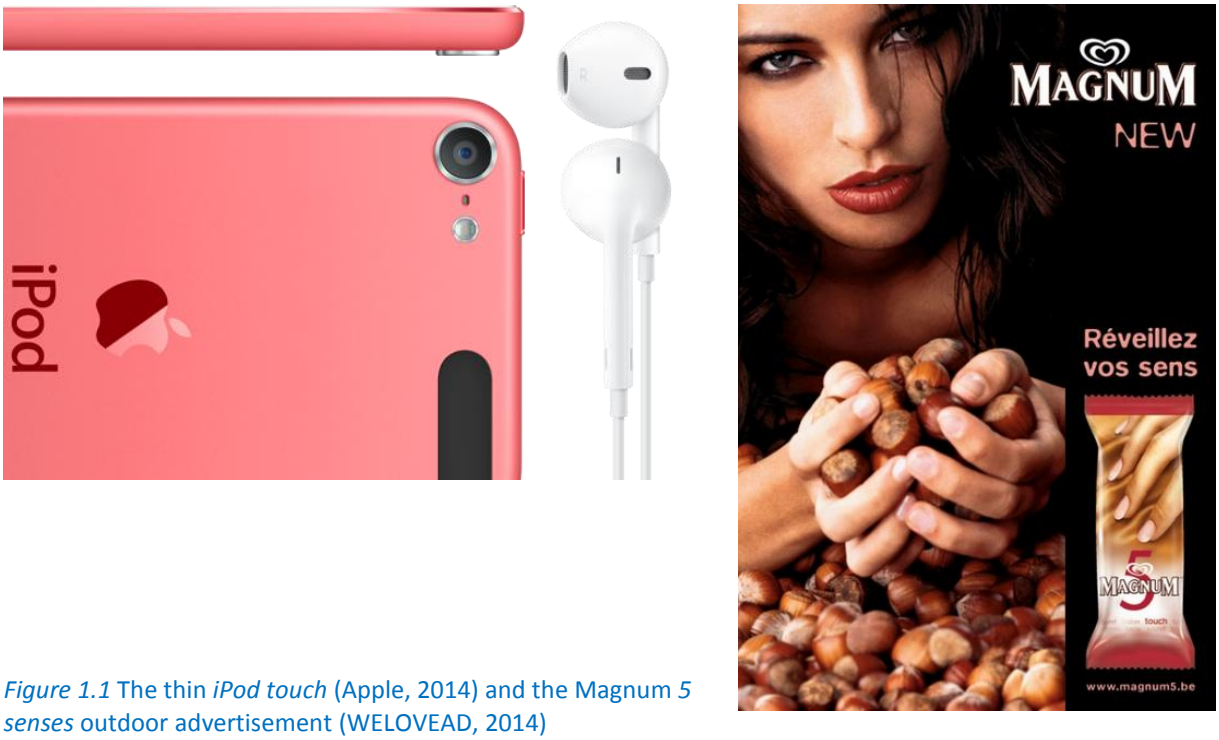


Figure 1.1 The thin *iPod touch* (Apple, 2014) and the Magnum *5 senses* outdoor advertisement (WELOVEAD, 2014)

1.1.2 Sensory marketing

> *Brands have started to adopt sensory marketing, which refers to 'marketing that engages the consumers' senses and affects their perception, judgment and behavior.'*
>
> (Krishna, 2012 pp. 333)

Sensory marketing is based on the relationship between our senses and product perception. The information conveyed by our senses – the way products look, sound, smell, taste or feel – is innately related to the way we perceive products (Krishna, 2010). Our sensory input is interpreted by our brain, which result in an particular perceptual experience. In this way our senses affect our emotions, perceptions, memories, preferences, choices and consumption behavior: what products we like and what we buy.

Hence, increasing focus on the sensory aspects of experience makes sense. The importance of the senses to develop positive product evaluation is increasingly recognized (see De Chernatony & McDonald, 1992; Lindstrom, 2005; Neff, 2000; Spence, 2002; Springer, 2008). Especially now sensory marketing will become more and more valuable for brand managers, because the consumer need for experience in brands of product will be continue to increase. As well as the need for marketers to influence consumers in a subconscious way.

1.1.3. The consumer's need for experience

The increasing importance of the role of our sensory experience in marketing and product design seems to co-occur with an increasing focus on consumption experience. *Welcome to the emerging experience economy!* is a statement that Pine & Gilmore (1998; 1999) already made before the Millennium (and the onset of Web 2.0). According to their vision the economy has made a progression throughout stages to an experience economy today, where experiences are the primary economic offerings. Schmitt (2011) suggests that experience is more a new way of marketing, rather than entering a new economic stage. According to him the experiential value do not per se exist in products or services, but in the marketing that is used to promote them.

It is clear that the highly competitive environment demand the use of new experiential dimensions added to a product or service to compete for consumers´ attention and loyalty. Just a functionally adequate product is not enough anymore, the consumer expects an exclusive product experience during consumption, coming from its visual characteristics, its smell, taste, sound or material properties (e.g. Pine & Gilmore, 1999).

> *In a world in which most consumers have their basic needs satisfied, value is easily provided by satisfying customers' experiential needs - their aesthetic needs'*
>
> (Schmitt & Simonson, 1997, p. 3)

1.1.4. The marketer's need for sensory triggers

In addition to adding experiential dimensions, environmental cues that appeal to our senses, 'sensory triggers', can affect consumer behavior in a subconscious way. This is especially interesting for marketers since economic globalization and mass production resulted in thousands of available products and brands (Allen, 1999; Bildtgard, 2008; Feagan, 2007; Krishna, 2012; Pearson, Henryks, Trott, & Jones et al., 2011). The overload of advertisements and choices and the lack of knowledge of the unique product characteristics, goes beyond our capacity and motivation consider every option in a conscious fashion to make a deliberate product choice (Gaskell, Allum, Wagner, & Nielson et al., 2001; Kjaernes, 2006; Meyer, Coveney, Henderson, & Ward et al., 2012; Norberg-Hodge, 2007; Pearson et al., 2011).

> *Wheel a trolley down the aisle of any modern Western hypermarket, and the choice of all sorts is dazzling. The average American supermarket now carries 48,750 items, according to the Food Marketing Institute, more than five times the number in 1975. Britain's Tesco stocks 91 different shampoos, 93 varieties of toothpaste and 115 of household cleaner. Carrefour's hypermarket in the Paris suburb of Montesson, a hangar-like place filled with everything from mountain bikes to foie gras, is so vast that staff circulate on rollerblades.*
>
> (The Economist, 2010)

We need a strategy to cope with this sensory overload. Therefore, a substantial part of our shopping decisions is taken unconscious or almost unconsciously (see Dijksterhuis, Smith, Van Baaren & Wigboldus, 2005). This type of shopping is called 'inconspicuous consumption', because it often take place in a way which is nearly invisible to consumers themselves (Gronow & Warde,

2001; Shove, 2003; Shove & Warde, 1997). As a consequence, the average consumer can hardly explain his choices when he prompted to do this at the checkout (Dijksterhuis et al., 2005).

The Elaboration Likelihood Model (Petty & Cacioppo, 1986) explains this phenomenon by the fact that people can process incoming sensory information in two ways. First, they can use the central route of processing whereby a person considers information consciously in a thoroughly and critical way. For example, by reading attentively the description on a packaging before buying. Consumers could use the central way of information processing when they have the capacity (time and energy) and the motivation to consider products a conscious fashion. However, this high-involvement way of information processing asks for a lot of effort. In the rush of the daily life consumers often save this energy for purchase decisions related to new, personal relevant, important and expensive products (Dijksterhuis et al., 2005; Petty & Cacioppo, 1986).

That is why people often use the second, peripheral way of information processing for less important purchase decisions. This is the fast and effortless way to guide behavior. Consumers act fast and effortless based on superficial characteristics of the environment without a lot of thoughts in an automatic way.

It can be assumed that the purchase of fast moving consumer goods (FMCG) during the daily groceries is often guided by the peripheral, low-involvement way of information processing. The supermarket consumer often uses routines and automatically react on triggers of the environment to cope with this sensory overload which drives inconspicuous consumption (e.g. Dijksterhuis et al., 2005). For example, taking the pink flacon shampoo, because you always do so or buying some fresh croissant, because the smell of them make you hungry.

Therefore, manipulation of superficial characteristics of the environment seems to be a better strategy to appeal to inconspicuous consumers, instead of roaring down other advertising efforts. The use of subconscious, sensory triggers may be a way affect consumer behavior unconsciously (Krishna, 2012). An interesting aspect of the retail environment that could carry this subconscious sensory triggers is the packaging of products. Sensory packaging cues could enrich the product experience and affect consumer behavior by engaging multiple senses in a unconscious way.

Conclusion

- Brands increasingly focus on ways to engage our senses in products and services.
- This interest in sensory marketing makes sense, because sensory marketing strategies have the potential to enhance product experience and to influence consumer perception and behaviour in a subconscious way.

1.2 CARTILS Branding & Packaging Consultants

1.2.1. CARTILS

The international packaging design agency CARTILS noticed the rising focus of leading brands on multisensory marketing. CARTILS advises international companies in the area of branding strategy, brand portfolio management and packaging design in the premium fast moving consumer goods market. With three offices in Amsterdam (HQ), London and Hong Kong a total staff of 70 people, CARTILS handles projects in more than 40 countries. Clients of CARTILS are leading brands (brand owners) of fast moving consumer goods, especially in the beverage, tobacco and fragrance industries.

CARTILS is getting more and more demand of brand owners for a multisensory approach to packaging design. This implies that a product´s packaging not only has to involve vision (sight), but also the other senses, like touch, audition, olfaction and taste to create 'the right sensory mix' in a brand's packaging.

1.2.2. Relevance

The agency noticed two main reasons for the rising need for multisensory packaging. First, like previously discussed (e.g. Pine & Gilmore, 1999; Schmitt & Simonson, 1997) the increasing competitive environment demands the addition of new entertainment and experiential dimensions to a product or service to compete for consumers´ attention and loyalty. Just the product is not enough anymore, the consumer expects an exclusive product experience in line with the brand's core values.

Second, the legal regulations regarding the advertising and packaging of alcoholic beverages and tobacco are becoming stricter, which impairs the possibilities for marketing efforts to promote those brands and products. Therefore, these industries are looking for innovative and alternative ways to increase brand distinctiveness, recognition and recall by means of packaging. The attempt to create an implicit 'Marlboro-like' atmosphere in clubs illustrates this motivation.

A multisensory approach to packaging design could become a competitive and distinctive advantage for the brands CARTILS serve. Among fast moving consumer goods, the product intrinsics are in general very similar. The distinction can be made by the branding. Therefore, brand owners might want to develop their own 'sensory signature' to maintain a distinctive position in the market. For example like the way Singapore Airlines uses its own signature aroma (see Krishna, 2010).

In addition, multisensory packaging design allow brands to service their consumers by reinforcing the brands' image and / or the consumer's own identity during buying and consumption. For example, the popping sound during the opening of the Grolsch beer bottle and the force consumers have to put to open the beer, reinforce the masculine image of the brand during product use.

1.2.3. Research objective

CARTILS is questioning to which degree the use of a multisensory approach can contribute to its packaging designs and strategic advisory. The *what-is-in-it-for-me* question still needs to be answered. What will be the pros and cons of the multisensory marketing approach? To which degree do consumers value this approach to package design? Does it bring competitive advantage or is it not worth the costs?

The agency wants to develop a clear understanding of the multisensory approach. Therefore the agency approached the University of Twente to investigate the way it can use multisensory marketing strategies in packaging design and strategic advisory. This research request is addressed in a Master graduation project which investigates the following general research question:

> *How affects multisensory packaging design brand and product perception and evaluation?*

CARTILS mainly advices and designs packaging for premium fast moving consumer goods in the alcoholic and nonalcoholic beverage product category. Therefore, this graduation project focuses on the effects of the integration of multisensory branding strategies in the packaging of premium beverage products.

1.2.4. Two objectives, one report

This graduation project is a collaboration between packaging design agency CARTILS and the University of Twente. Therefore, it has the aim to contribute to the academic and to the professional field of sensory marketing. The academic field tries to investigate how sensorial input and experience are related and how this will affect consumer behavior.

> *From a research perspective sensory marketing implies an understanding of sensation and perception as it applies to consumer behavior*
>
> (Krishna, 2012, pp. 333)

The last few years the sensory perception and marketing field is growing fast (Peck & Childers, 2008). However, because of the recent development of the innovative field, it lacks cohesiveness between the findings. Although for example Krishna and colleagues (2010) created an important framework of sensory research, there is much research to be done (Krishna, 2012).

More clarity is also needed to investigate how managers can benefit from sensory marketing strategies and in which way they can apply sensory marketing on their brands, products and services. Krishna (2012) defined sensory marketing from a managerial and from a research perspective in the following way:

> *From a managerial perspective sensory marketing can be used to create subconscious triggers that define consumer perceptions of abstract notions of the product (e. g. its sophistication, quality, elegance, innovativeness, modernity, interactivity) – the brand's personality'. It can also be used to affect the perceived quality of an abstract attribute, like its color, taste, smell or shape.'*
>
> (Krishna, 2012, pp. 333)

Although brands and companies are paying more and more attention to sensory marketing, it is unclear how they can use sensory marketing to enhance brand and product experience. There is no clear overview of the way marketing managers can apply multisensory marketing strategies successfully to generate added value for commercial goals. Because multisensory marketing is a emerging field, academic literature lacks cohesion among this topic.

Therefore, the objective of this graduation project is to provide cohesion in literature related to multisensory packaging and provide a relevant strategy to apply a multisensory marketing on packaging design, based on a clear theoretical framework, a correlational study and an experimental research.

| Conclusion

- This graduation project is a collaboration between packaging design agency CARTILS and the University of Twente with the goal investigate how multisensory packaging affects brand and product perception and evaluation.
- A strategy for multisensory packaging will be provided based on a clear overview of academic literature and two studies.

2 Theoretical framework

The development of a multisensory packaging strategy starts with understanding of the fundaments of multisensory experience. Therefore, this section explains the theoretical framework underlying multisensory experience. Subsequently, this theoretical framework is applied in the context of products, brands and packaging design which results in the formulation of a hypothesized framework of multisensory packaging. In addition, this section considers which roles the senses play within this framework and provides an overview of cross-modal research relevant for multisensory packaging within the beverage category.

2.1 Multisensory experience

2.1.1 Multisensory integration

Imaging yourself opening a fresh pilsner at a terrace on a hot summer day. You see the small drops on the cold beer bottle and hear the popping sound followed by strong carbonation after opening. The beer bottle feels smooth and cold and you smell the aroma of beer. The fresh beer taste you expect is confirmed by a tingly, fresh flavour. The warm sun on your face and cheerful sounds of the surrounding terrace make this multisensory experience complete.

The example illustrates that we perceive the world around us by an immediate, unified experience which consist of the sensory information that our five senses – vision, audition, touch, olfaction and taste – deliver. Each sense makes its own contributing to a greater or a lesser extent depending on the situation. For example, taste plays a major role during beer consumption, but the other senses also contribute to the consumption experience. Without a hearing strong carbonating sound after opening or the feeling of cold drops on the beer bottle, you probably would not have that strong perceptions of the freshness of the beer.

Multisensory experience starts with multisensory integration. During sensory processing in the brain, the information from our different senses is synthesized and integrated to create a multisensory experience of the world around us.

Multisensory integration is the process in which the inputs from the various senses is integrated to give rise to a unified multisensory experience

(Schifferstein & Spence, 2007)

Our multisensory experiences are formed with all the incoming sensations, if they are conscious perceived or not (see Schifferstein & Spence, 2007). Many studies have indicated that the greater the number of modalities that are stimulated at any time, the richer and memorable our experiences will be (Bahrick & Lickliter, 2000; Spence, 2002; Stein & Meredith, 1993). Like the beer consumption example illustrated. Therefore, it is important for marketers to know which strategies they can use to stimulate multisensory integration with a rich multisensory experiences as a result.

2.1.2 Cross-modal congruence

Multisensory integration results in a rich experience when several of the consumer's senses are engaged in a congruent way (Schifferstein & Spence, 2007). Cue congruence refers to the degree of fit among characteristics of a stimulus (Bone & Ellen, 1999; Peracchio & Tybout, 1996). When sensory stimuli across or within modalities match they are congruent. This phenomenon is called cross-modal correspondence.

> *Cross-modal correspondence is the tendency for a sensory stimulus in one modality to be matched, or associated, with a sensory stimulus in another sensory modality*
>
> (Parise & Spence, 2013)

People intuitively develop cross-modal associations. These associations rise expectations in people about which combinations of stimuli tend to co-occur and seem to belong together and which not. Therefore, they believe that certain combinations of characteristics perceived by distinctive sensory modalities, occur together. People are often completely unaware of the occurrence of such cross-modal effects (Schifferstein & Spence, 2007).

For example, red and sweetness are cross-modal congruent cues as well as green and freshness. So when a redness is present in the visual modality the expectation increases that sweetness , another corresponding stimulus, should be present too in the olfaction modality (Garber, Hyatt, & Starr, 2001; Schifferstein, 2001). Therefore, consumers turned out to expect for perfume in a red colored packaging a sweeter odor, while they believe that perfume in a pastel green packaging would have a more fresh fragrance (Scharf & Volkmer, 2000).

Summarized, congruency among sensory input of different modalities facilitates multisensory integration which result in a richer multisensory experience. However, that is not yet the complete story. There are also several types of congruency identified that influence multisensory integration: temporal, spatial, synaesthetic and semantic congruency (Spence, 2007; Schifferstein & Spence, 2007). These types of congruence will be introduced below briefly.

2.1.2.1.Temporal and spatial congruency

Temporal congruency implies that multisensory integration is more likely the closer stimuli are presented to different sensory modalities in time (Schifferstein & Spence, 2007). So when I open a

beer bottle and I hear a popping sound simultaneously, I believe the sound will come from the bottle that is opened. Spatial congruency refers to the phenomenon that stimuli that seem to come from the same spatial location are more likely to be attributed to the same single source than to separate sources. So it is more likely that sensory stimuli will be integrated if they appear to originate from the same spatial location, than from different locations. As a consequence, an alarm signal for example, results in faster responses among car drivers when it originates from the same direction as the treating stimulus (Ho & Spence, 2005).

2.1.2.2. Synaesthetic congruency

People perceive some natural associations across sensory modalities, because they share certain dimensions of sensory experience. Multisensory integration is more likely when these basic stimulus features correspondent in different modalities.

> Synaesthetic congruence is the fit of certain basic dimensions of sensory experience across modalities
>
> (see Keetels & Vroomen, 2011)

These correspondence across modalities comes close to phenomenon synaesthesia which is experienced by some special individuals who are mixing the senses (Cytowic, 1989). Synaesthetia occurs when stimulation in one sensory modalitie results in a definite and reliable sensation in another modality (Grossenbacher & Lovelace, 2001). A well-known example is grapheme-color synaesthesia where letters and numbers are perceived as coloured (Hubbard & Ramachandran, 2005; Rich, Bradshaw, & Mattingley, 2005; Rich & Mattingley, 2002).

There is growing evidence that neurocognitive normal individuals experience some synaesthetic associations between modalities as well which is indicated as synaesthetic congruence. For example intensity (weak versus strong), duration, spatial location and brightness are suprasensory dimensions that involve the same sensations across different modalities (Boring, 1942; Von Hornbostel, 1931; Marks, 1978). In addition, synaesthetic associations are found between visual dimensions of brightness, lightness, size, and shape and the auditory dimensions pitch and loudness (Evans & Treisman, 2010; Gallace & Spence, 2006; Makovac & Gerbino, 2010; Marks, 1987; Walker, Bremner, Mason, & Spring et al., 2010).

For example taste and colour share the dimension intensity. Because people associate the red colour with a sweet taste, they also tend to evaluate more intense, dark red coloured strawberry-flavoured beverages as sweeter, than less intense light red coloured solutions (Lavin & Lawless, 1998). Another known example of synesthetic congruency is the positive association between small-sized visual objects and high pitches and between large-sized visual objects and low pitches (Parise & Spence, 2009). When you hear a squeaking sound you would not expect an elephant.

2.1.2.3. Semantic congruency

Multisensory integration is also stimulated by a higher degree of identity in meaning among stimuli in different modalities. Synaesthetic congruence refers to a natural association where

congruence is perceived between basic stimuli in an automatic way. This type of congruence seems to occurs on a more basic sensory level, so there is no clear semantic explanation for the association. In contrast, semantic congruence between stimuli is explained by a linguistic metaphor. An ecologically meaningful stimulus is matched with a matching counterpart (see Keetels & Vroomen, 2010).

> Semantic congruence is the fit of the semantic associations among characteristics
>
> (see Krishna, Elder & Caldara, 2010)

For example a woofing cat is semantic incongruent and confusing, because the woofing sound refers semantically to a dog and the visual object to a cat.

Sensory inputs obtain semantic meaning, because of their common associations with certain experiences. These semantic associations are based on real-life experience, because they are learned through repeated exposure to different stimuli in different contexts (Krisnha , Elder & Caldara, 2010). For example, many people developed a semantic association between a citrus scent and cleaning behaviour from repeating exposure in several situations to a citrus scenting detergent (Holland, Hendriks & Aarts, 2005). Such semantic associations that are present across sensory modalities can also affect perception and behavior (Meyers-Levy & Zhu, 2010; Stevenson & Boakes, 2003). For example, participants showed more cleaning behaviour after eating cookies when a citrus scent was present, than it was not (Holland, Hendriks & Aarts, 2005).

2.1.3. Theoretical framework

Figure 2.1 summarized the fundaments of multisensory experience in a theoretical framework. Multisensory integration constitutes the core of multisensory experience and is facilitated by cross-modal congruence among sensory input. This means that when sensory inputs from multiple modalities match temporal, spatial, synaesthetic or semantic, multisensory integration is stimulated which results in a richer experience.

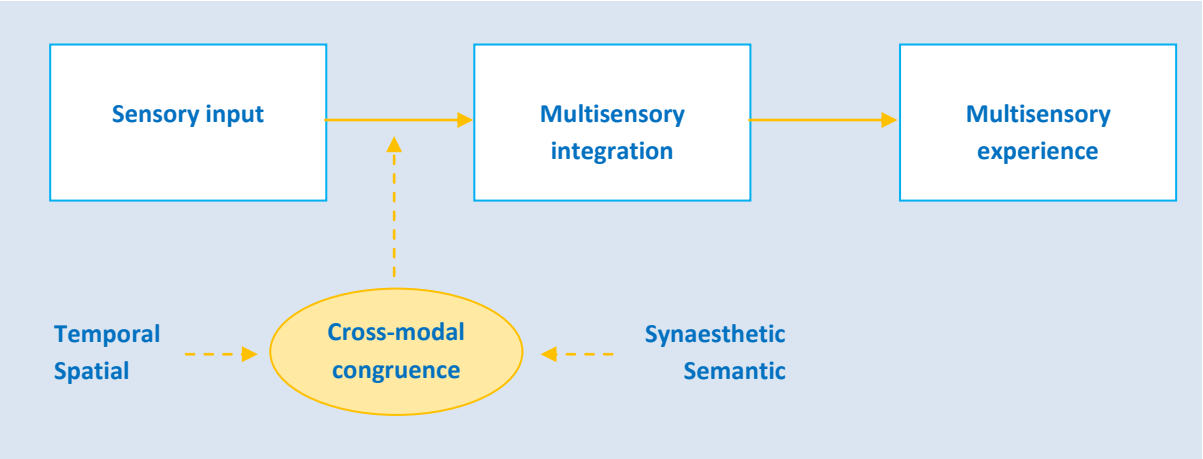


Figure 2.1. The theoretical framework underlying multisensory experience.

2.2 Multisensory packaging

2.2.1. From multisensory experience to packaging

Now the fundamental ingredients of multisensory experience are identified, it can be investigated how these insights can be applied on packaging design. In the introduction Krishna (2012) suggested that sensory marketing can be used to communicate abstract attributes of product and brands by implementing subconscious sensory triggers in marketing efforts.

Packaging is often preliminary designed to protect the product it contains. However, this protection often creates an almost invisible barrier to product experience. Therefore it could be valuable to add sensory characteristics in the packaging that set expectations about the product experience – how the product looks, sounds, feels, smells or tastes – or even raises the actual consumption experience. Moreover, sensory aspects of the packaging may make a brand more distinguishing or translate an abstract brand in a more tangible experience.

According to the theoretical framework product or brand experience would be enriched when multisensory integration is stimulated by congruency among incoming sensory stimuli. This suggest that when stimuli a packaging design are congruent with characteristics of the product or the brand, multisensory integration is facilitated as well as the resulting experience. Thus, the implementation of stimuli in packaging design that match with brands or products may affect multisensory product or brand experience (see Schifferstein & Spence, 2007).

In addition, the framework suggests the existence of four types of congruency between stimuli in packaging and products or brands. A packaging contains a product, so temporal and spatial congruency with the brand or product are logically assumed to be present during interaction with a packaging.

The other two types of congruence, synaesthetic and semantic congruence are more interesting for the development of a multisensory packaging design. Cross-modal research discussed below suggests the existence of semantic or synaesthetic congruent relationships between sensory stimuli and attributes of products and brands. In addition, this research suggest that implementation of these matching sensory stimuli in a packaging may have the potential to influence product or brand experience by affecting perception and perhaps even evaluation.

2.2.2. Changing product and brand perception

A substantial amount of research supports the existence of cross-modal congruent associated stimuli and the potential of these matching combinations to alter product perception by inducing multisensory illusions. For example, the colour yellow matches with a lemon taste, so soft drink 7-Up was evaluated as tasting more lemony when 15% of yellow was added to the original green of the cans (Hine, 1995). In addition, pointy shaped figures match with a sharp taste, thus pointy

shaped cheese was evaluated as having a shaper taste than round shaped variants (Gal, Wheeler & Shiv, 2007).

Not only visual stimuli affect product perceptions by cross-modal congruent relationships. For example, potato chips were perceived as crispier when the packaging made a noisier rustling sound (Spence, Shankar, & Blumenthal, 2011) and yoghurt samples were perceived as more dense and satiating when these were consumed from a heavy bowl compared to a light bowl (Piqueras-Fiszman, Alcaide, Roura, & Spence, 2011). More of these examples will be discussed in the section 2.2.

In the same way that multisensory illusions induced by synaesthetic and semantic matching stimuli may change product perception, semantic congruence may also have the potential to affect brand perception. Brands position themselves by communicating their brand values to the target group: the attributes those stand for (Meffert, Burmann & Kirchgeorg, 2008). Like product characteristics, some brand values might be semantic congruent with certain stimuli.

For example, masculinity and femininity are known brand values in marketing used to position a brand (see Grohmann, 2009). Cross-modal research of Krishna, Elder and Caldara (2010) showed that a rough feeling paper and a masculine smell were semantically associated, because these stimuli shared characteristics of masculinity. In the same way smooth paper and the feminine smell were semantically associated, because these stimuli shared feminine characteristics.

This suggest that sensory stimuli might be implemented in packaging design that share semantic meanings with brands. For example, a female perfume may be perceived as more feminine in a smooth packaging, than in a packaging with rough textured elements. This last packaging may be a better match with a male perfume.

The theoretical framework assumes that the more the consumer's senses are engaged in a congruent way, the richer the experience will be resulting from multisensory integration (Schifferstein & Spence, 2007). Moreover, cross-modal research showed the existence of matching relationships between certain sensory stimuli and product attributes which suggest the existence of similar relationships between sensory stimuli and brand values. Multisensory integration of these matching stimuli produces multisensory illusions that change the multisensory experience. Combined these insights indicate that the implementation of brand or product congruent sensory stimuli in packaging design may result in a richer brand experience in line with the brand's values or product's attributes.

For example, the taste of water is evaluated as higher in quality, when it was served in a firm instead of a flimsy cup (Krishna & Morrin, 2008). A brand that promises quality rises the expectation of quality among consumers. It is more likely that this promise and expectation is reinforced when the brand presents its product in a semantic congruent firm packaging, than a semantic incongruent flimsy packaging. As a result the brand may be perceived as more in line with the brand value qualitative, because the packaging contributes to a richer, uniform, qualitative experience.

It is important for a brand to act consistent on all brand touch points to ensure congruency between the expectations of the brand among consumers and their actual brand experience (Meffert, Burmann & Kirchgeorg, 2008).

2.2.3. Changing product and brand evaluation

Research not only suggests that matching sensory stimuli could change product or eventually brand perception, but also that these could change evaluation in a more favorable direction. Indeed, the haptic qualities of smooth paper were evaluated more positively when a feminine smell was present, than when a masculine smell was present. In contrast, a masculine smell led to more positive haptic evaluations of rough paper, than a feminine smell (Krishna, Elder & Caldara, 2010). Moreover, when the scent in a clothing store for women was congruent with the products that were sold (feminine ambient scent) the evaluation of the products and the store was much higher, than when the smell was semantically incongruent (masculine) (Spangenberg, Sprott, Grohmann, & Tracey, 2006).

Although these examples suggest the possibility for sensory congruent stimuli to enhance product evaluation, there also seem to be possibilities for brands. Littel and Orth (2013) found that water brands were perceived as more competent, qualitative and sophisticated when a visual and tactile semantic congruent packaging design was presented, instead of an incongruent packaging design. The brands with a multisensory congruent packaging were also evaluated as aesthetically more attractive and perceived as more expensive, than the brands with the incongruent packaging. Consumers have higher price expectations for aesthetic appealing designs (Orth, Campana, & Malkewitz, 2010).

There are two accounts in academic literature that explains for the findings that sensory congruent stimuli enhance evaluation: the processing fluency and the expectation account. According to the processing fluency account positive affect is the result of fluid multisensory integration. Neurological research showed that congruence within stimuli improves processing fluency and stimulates faster multisensory integration (Gottfried & Dolan, 2003; Sathian, Zangaladze, Hoffman, & Grafton, 1997). Stimuli that are easy to process are generally evaluated more positively, because fast and effortless processing of this stimuli is experienced as more pleasant (Labroo, Dhar & Schwarz, 2008; Lee & Labroo, 2004; Reber, Schwarz & Winkielman, 2004).

According to the expectation account, people enjoy products that are predictable and conform to their expectations (Meyers-Levy & Tybout, 1989). When the product or brand experience is congruent with expectations this often results in positive affect. This affect is transferred to overall evaluation (Fiske, 1982). Thus, by making sure that expectations are met, the likelihood increases that a consumer will enjoy the product or brand more (Cardello, 1994; Pinson, 1986; Piqueras-Fiszman & Spence, 2012; Schifferstein, 2001; Yeomans, Chambers, Blumenthal, & Blake, 2008). Sensory stimuli can be used to set-up (sub conscious) expectations in the mind of consumers which are reinforced by the product experience or reinforce expectations of the abstract brand by making these more tangible.

2.2.4. But… how about surprise?

The positive effects of congruency among stimuli are discussed. However, what are the effects of stimuli incongruency? Some marketers and designers use especially an incongruent sensory marketing strategy with the aim to evoke surprise (Schifferstein & Spence, 2007). The use of sensory incongruence and surprise could be a strategy to break through the routines of inconspicuous consumption by directing the attention of potential customers to a novel, surprising product (see Knowles & Riner, 2007). Littel & Orth (2013) found that brands were evaluated as more exciting when they used a incongruent packaging design. However, within the beverages category it is more interesting to explore the potential of a sensory congruent strategy for the following three reasons:

First, people may be especially sensitive to disconfirmed expectations when food and beverages are involved, because people actually have to take in these products and need to avoid the risk of poisoning (Koza, Cilmi, Dolese, & Zellner, 2005; Piqueras-Fiszman & Spence, 2012; Spence, 2012; Wheatley, 1973). Therefore, people like foods and drinks more when these products meet their expectations, then when they do not (Peterson & Ross, 1972; Pinson, 1986; Piqueras-Fiszman & Spence, 2012). Moreover, when a food or beverage product fails to meet expectations, the effects on negative product evaluation will be more substantial, than the effects of meeting expectations on positive evaluation (Cardello, 1994; Deliza & MacFie, 1997; Deliza, MacFie, & Hedderley, 2003; Schifferstein, 2001; Yeomans et al., 2008).

Second, multisensory congruence could be useful in the context of long-term relationships. The processing fluency caused by sensory congruence not only enhances evaluation, but also results in other positive outcomes like faster stimulus discrimination (Pavani, Spence & Driver, 2000) classification (Marks, 2004) and recognition (Grunwald, Weiss, Krauss, & Beyer et al., 2001; Laurienti, Burdette, Wallace & Yen et al., 2002; Newell, 2004). Faster product recognition is beneficial to retain the inconspicuous consumer who tends to choose the product based on recognizable cues that are processed easily and effortless in an automatically way (e.g. Dijksterhuis et al., 2005).

In addition, sensory congruence helps to set (realistic) expectations among consumers, that makes the product more predictable and will result in more positive affect when expectations are met. In this way, congruent multisensory strategies could reinforce a positive product experience, which maintain the automatic cycle of repetition and reinforcement (Anderson, 1982) that could constitute the base of customer retention and ultimate loyalty (Court, Elzinga, Mulder & Vetvik, 2009).

Third, even marketers and designers who want to create surprise by using incongruence, generally have to make sure that the majority of the sensory elements are congruent, while only one particular incongruent aspect evokes the element of surprise. Creating surprise in an effective way is challenging, because familiarity and originality have to be combined within the same design (see Hekkert, Snelders, & van Wieringen, 2007; Schifferstein & Spence, 2007).

2.2.5. Research objective

2.2.5.1. Research question

Insights from academic literature suggest that pairing products and brands with sensory congruent stimuli could change product perception and evaluation. This implies that the use of sensory stimuli in packaging design that match synaesthetic or semantically with a product or brand could affect perception and evaluation in a favorable direction. When these insights are applied on the theoretical framework underlying multisensory experience, a hypothesized framework of multisensory packaging results. This hypothesized framework defines multisensory packaging as the use of brand or product congruent stimuli in packaging design and is presented in figure 2.2.

The hypothesized framework is based on indirectly supporting research which did not explicitly investigated brand or product congruent relationships in the context of a packaging design. Krishna, Elder and Caldara (2010) showed the existence of sensory stimuli that match with product characteristics which affected product evaluation. This research suggested the existence of similar relationships and effects for brands. However no attempt is made yet to replicate these findings in the context of brands and packaging design.

In addition, Littel and Orth (2013) showed how matching tactile and visual sensory stimuli within packaging design, changed brand evaluation. However, these tactile and visual stimuli were unrelated to the brand, thus it is still unclear how stimuli in packaging design that match with brand values would affect brand evaluation.

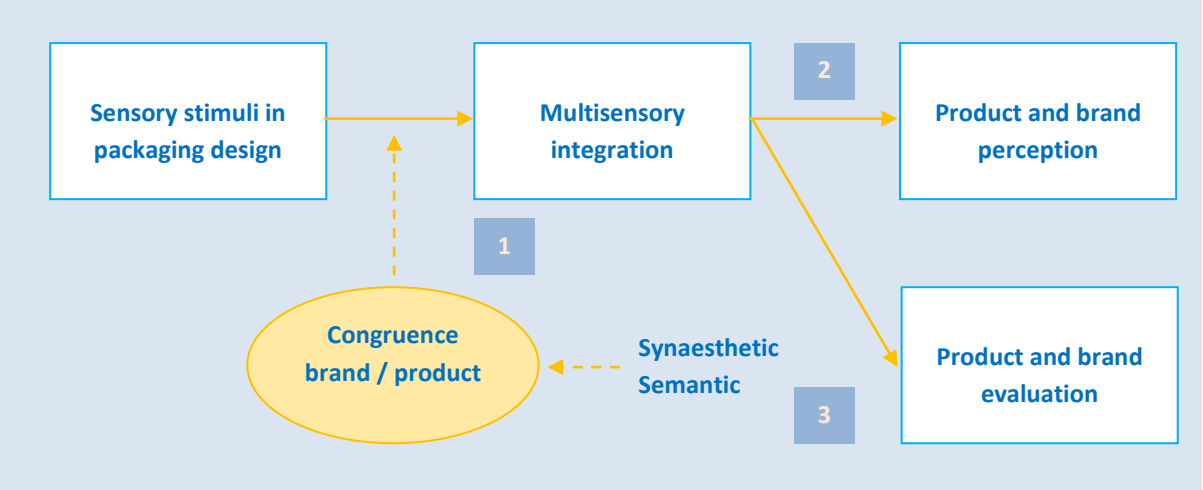


Figure 2.2. The hypothesized framework of multisensory packaging.

It is clear that directly supporting research for the hypothesized framework of multisensory packaging is scarce. Therefore, this research will investigate which sensory stimuli combine well with certain product characteristics and brand values and how these stimuli can be used in packaging design to affect product and brand perception and evaluation (see Spence, 2012). Because beer brand owners are the major client group of CARTILS, the framework will be tested on beer bottle design which lead the following research question:

How do brand and product congruent sensory stimuli in a beer bottle design affect brand and product evaluation?

2.2.5.2. Hypothesis

The hypothesized framework assumes that multisensory packaging involves the use of product or brand congruent stimuli in packaging design which may affect product or brand evaluation. This means that the framework of multisensory packaging is based on the following three hypothesis (which are numbered in figure 2.2):

1) Congruent associations exist between sensory stimuli in beer bottle design and product characteristics of beer and brand values of beer brands.
2) The use of these product or brand congruent stimuli in packaging design makes brands or products perceived as more in line with their attributes or values.
3) Responses to beer brands and products are more favorable when a beer bottle design contains sensory stimuli that are congruent with the brand values and product characteristics, than when packaging design contains incongruent or no congruent stimuli.

2.2.5.3. Approach

The validation of the hypothesized framework of packaging design is structured as follows:

- First, a literature study is conducted to examine if previous research provides evidence for the existence of relevant sensory stimuli that match with product attributes or brand values.
- Second, an online survey is conducted to investigate if such matching relationships between sensory stimuli and product attributes and brand values also exist in the context of beer bottle design.
- Third, an experiment is conducted to investigate the effect of product and brand matching sensory stimuli in beer bottle design on product expectations and brand evaluation.

| Conclusion

- A hypothesized framework of multisensory packaging is formulated.
- A literature study, online survey and experimental study will be conducted to test the validity of this hypothesized framework.

2.3. Primary and secondary product attributes

2.3.1 Role division

Findings from academic literature suggest that the implementation of product or brand congruent sensory stimuli in packaging design could be an effective multisensory marketing strategy to serve brand owners within the beverage category. To apply this strategy it is important to consider which roles the senses play in multisensory packaging. This by dividing them in primary and secondary product attributes.

2.3.1.1. Primary product attributes

Primary product attributes are the sensory stimuli that are the primary reason for buying products or brands (Morrin, 2010). Taste is a primary product attribute of beverage products, because the taste experience resulting from product consumption is the primary reason for buying these products.

In addition to taste, brands could also be the primary reasons for buying beverage products. Although *Coca-Cola* and *Pepsi* have a nearly identical chemical composition, consumers show dramatic changes in preferences and brand responses when the brand name became present (McClure, Li, Tomlin, & Cypert et al., 2004). Moreover, experienced beer drinkers could not correctly discriminate between beers during a blind beer test. However, when the beer was labeled with the brand, the beer drinkers rated the beer of their favorite brand higher than the other beers (Allison & Uhl, 1964).

2.3.1.2. Secondary product attributes

We are not able to discern tastes very well from each other when we only rely on the taste sense itself. The taste we experience is strongly affected by the other modalities. It is difficult to distinguish the taste of red wine from the taste of coffee, when we cannot see or smell these beverages (Herz, 2007). The fact that taste perception is influenced by external influences suggests that marketers have the potential to manipulate taste perception by implementing congruent associated stimuli in packaging design.

Moreover, brands are intangible constructs that are expressed by sensory stimuli. Besides for example visual logos (which is the most known way to express brands) may more semantic associated sensory stimuli enable abstract brand values to become tangible.

Therefore, visual, auditive, tactile and perhaps also olfactive sensory stimuli could serve as secondary product attributes. Those are sensory stimuli that are not the primary reason for buying, but help the brand and product to distinguish from competitive offerings (Morrin, 2010). Implementation of such secondary product attributes in packaging design may support the product or brand values by sensory congruent associations. Figure 2.3 presents this role division.

In the next section are relevant cross-modal relationships discussed that are identified by previous research that support the potential for the visual, auditive, tactile and olfactive modalities to serve as secondary product attributes. Because taste is already the primary product attribute for beverages products and because it is difficult to add taste to packaging design as a secondary product attribute, this modality is not relevant for further discussion.

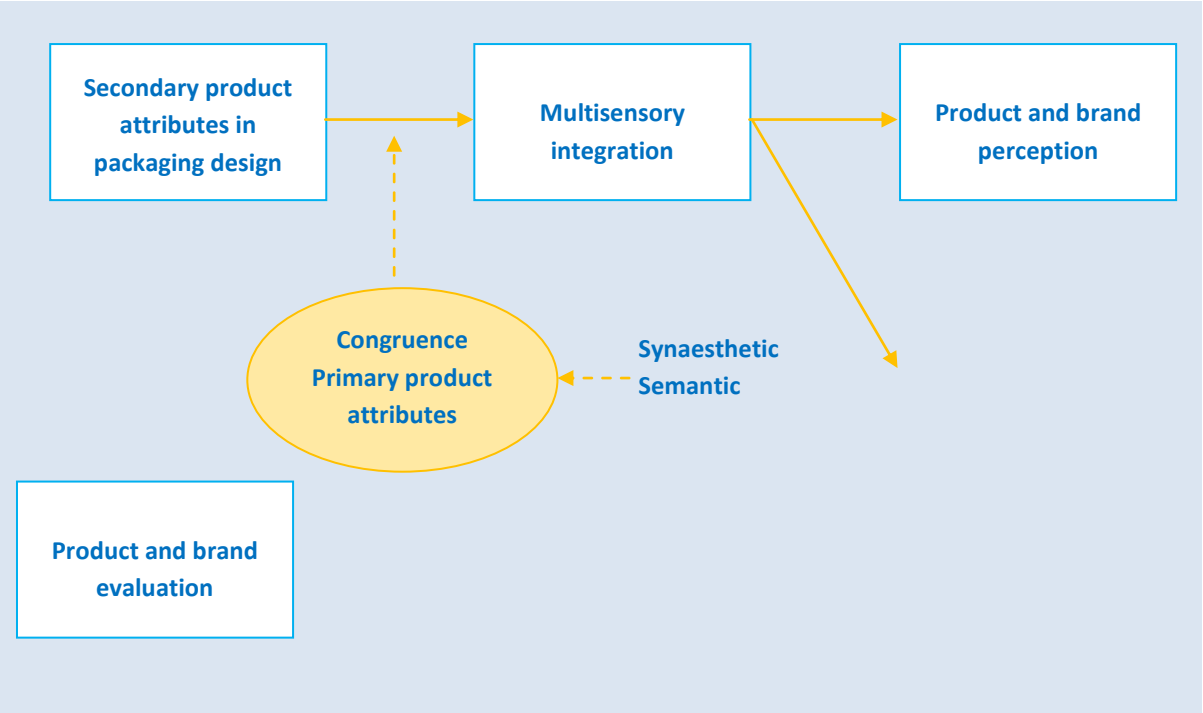


Figure 2.3. Role division of primary and secondary product attributes in the hypothesized framework.

2.3.2. The dual role of olfaction

Smell plays a dual role in the framework of multisensory packaging. First, smell has the most important influence on taste perception of all the senses. Without smell, *Coke* and *Sprite* would taste the same (Herz, 2007). Although the qualities of most foods are identified by the nose, this is experienced as coming from the mouth. The combined experience generated by taste and olfactive stimuli is defined as flavour (Rozin & Hormes, 2010; Small & Prescott, 2005). Since smell is essential for flavour perception, olfactive stimuli that are internally perceived as coming from the mouth can also be considered as a primary product attributes of beverages, because the flavour experience is a primary reason for buying.

However, smell stimuli that are perceived as coming from external sources (outside the mouth) may also function as secondary product attributes. For example by adding scent to a packaging. Though some caution needed here, because too much scent and probably flavour intensity will be evaluated as unpleasant among consumers (Moskowitz, Dravnieks & Klarman, 1976).

The *Mary Biscuit* container of *Alessi* is a nice example of appropriate application of smell in a food packaging context. The biscuit-box is impregnated with a vanilla-like odour that becomes

noticeable when the box is opened and enhances the experience of tasting a cookie. This classic cookie smell might also induce nostalgic memories (like getting a home-made cookie from Grandma), because scents share emotion-based semantic connections that link products and memories. This link to a fine memory also enhances product evaluation(see Schifferstein & Spence 2007).
Research supports that pleasant and / or congruent scents enhance evaluation of products and stores (Bosmans, 2006; Ellen & Bone, 1998; Spangenberg, Crowley & Henderson, 1996; Spangenberg, Grohmann, & Sprott, 2005). For example Krishna, Elder and Carrera (2010) showed that rough paper was evaluated more favorably in presence of a congruent (masculine) scent, instead of incongruent (female) scent and that warm gel-packs were evaluated more positive when combined with a warm smell (pumpkin-cinnamon), than a cold smell (seal-island cotton). This because these smells were semantically congruent to the texture of the paper and the temperature.

In addition, research supports a promising role for smell in product and brand evaluation and recall.
Pleasant ambient scents increased brand recall and recognition (independent of the scent was congruent or incongruent), probably because consumers looked longer to a product packaging when there is a pleasant scent in the environment (Morrin & Ratneshwar, 2000; 2003). Perhaps a pleasant ambient scent might stimulate the attention mechanism which results in longer attention for products and brands.

The strong link between scent, emotion and memory is explained because none of the other senses has such a direct, intimate connection with areas of the brain that process emotion, associative learning and memory as olfaction (Herz, 2010). As a consequence, compared other sensory stimuli, scents are superior in evoking retrieval of autobiographical memories or memories of events that happened a long time ago. Information that is processed together with a scent (scent-encoded information) stays longer in memory than information processed together with other sensory information: these inputs decay at a much faster rate (Aggleton & Waskett, 1999; Engen, Kuisma & Eismas, 1973; Engen & Ross, 1973; Zucco, 2003).

The sustainability of scent-encoded information in memory may be explained by the tendency for scents to evoke memories that are more emotional in nature, than those evoked by visual, auditory, verbal or tactile cues (Herz, 1998; 2000; 2004). In this way the olfactive system serves an adaptive function: associating an emotional experience with a scent in memory allows the odour to elicit immediately the associated emotions (positive or negative) when the odour is encountered again. These emotions will affect thoughts and behavior to generate an adaptive response based on previous experience.

For brands and products it means that they can become associated with certain smells which allow them to benefit from effects on evaluation and memory. Therefore, companies are increasingly looking for unique aroma's to create 'signature scents', that will function as distinctive competitive characteristics in the company's environment (Davies, Kooijman, & Ward, 2003). The introduction already discussed *Singapore Airlines* who uses its own signature aroma *Floridian waters*, which is especially mixed for this brand and is infused into its planes (see

Krishna, 2010). In addition, department store Harrods experimented with 12 different fragrances in its departments (Rosenthal, 2008).

Smell stimuli could also be applied in multisensory packaging design. The packaging can release a subtle, pleasant brand or product congruent odour. In addition, the packaging can be designed in a congruent way with an ambient scent or the scent of the contained product. For example consumers consistently match certain odours to specific colours and respond more rapidly on congruent odour-colour pairings compared to incongruent pairings (Demattè, Sanabria & Spence, 2006).

Moreover, colour can make an odour more saillant, because it affects judgments of odour intensity (Blackwell, 1995; Davis, 1981; Engen, 1972; Morrot, Brochet & Dubourdieu, 2001; Parr, White & Heatherbell, 2003; Zellner & Kautz, 1990; Zellner & Whitten, 1999) and odour identification (Zellner, Bartoli & Eckard, 1991). Further turn certain odours out to be congruent with certain shapes, like lemon and pepper odours that are associated with angular shapes, while raspberry and vanilla odours are associated with a rounded shapes. In general are more unpleasant and intense smells associated with more angular forms (Hanson-Vaux, Crisinel & Spence, 2013).

Finally, emotional associations with scents and preferences for particular scents are not innate. Instead, they are learned over time by associative learning based on previous experiences during exposure to an odour (Engen, 1988; Herz, Beland & Hellerstein, 2004). As a consequence are there differences among cultures in what scents are liked and disliked (Herz, 2007). Moreover, research has not shown cross-cultural consensus in evaluations of either common odours or 'offensive' scents (see Herz, 2010). Therefore, it is important to take individual and cultural differences in account when scents are applied in marketing. Cognitive and behavioral effects of ambient odours depend simply on the individual's past history.

2.3.3. Vision

A lot is known about the effects of vision, because it is probably the most investigated sense (see Hekkert & Schifferstein, 2008; Spence, 2002; Treasure, 2007). Especially for the visual dimensions colour, shape and size are interesting cross-modal associations identified.

2.3.3.1. Colour

Colour is important for products and packaging, because it plays a major role in the flavour identification of food and beverages (DuBose, Cardello & Maller, 1980; Institute of Food Technologists, 1980; Levitan, Zampini, Li & Spence, 2008; Sakai, 2004; Shankar, Levitan, Prescott & Spence, 2009; Stillman, 1993; Zampini et al., 2007; Zampini, Wantling, Phillips & Spence, 2008; Dolnick, 2008). During taste discrimination tasks colour appeared to dominate taste over other sensory information as labels and brand names (Hoegg and Alba, 2007). The number of beverages of which the taste is misidentified increases when the colouring is inappropriate. For example,

26% of a sample participants identified cherry-flavoured drink as lemon or lime-flavoured when it was green coloured (DuBose et al., 1980).

The natural relationship between colour and taste may explanation these effects. Many fruits make as they ripen a transition from colours at the green end of the spectrum, through yellow, to the colours at the red end of the spectrum (Kostyla, 1978; Lavin & Lawless, 1998; Maga, 1974; Zampini, Sanabria, Phillips & Spence, 2007). Therefore, the red colour is strongly associated with sweetness and the green colour with sourness. As a consequence, the addition of a red colouring to food increases the perception of a sweet taste (Kostyla, 1978; Strugnell, 1997) and reduces the taste of bitterness (Maga, 1974). Such effects can also be applied in packaging design to change product perception. For example, the taste of *7-Up* was evaluated as more lemony in a cans to which was added 15% of yellow to the green, compared to the original green cans (Hine, 1995).

In addition, consumers perceive particular colors as appropriate for a product and these associations may vary among products and product types. For example, consumers perceive red as appropriate for the active sports car, while they match purple-blue with the relaxed van (Hanss, Böhm & Pfister, 2012). Within the beverage category, consumers associate both still and sparkling water consistently with a blue label colour. So blue is perceived as more appropriate to represent both water types, than red or green.

However, when still and sparkling water products needs to be distinguished, blue is perceived as more appropriate to represent still water than red or green, because still water is stronger associated with the blue colour than sparkling water. Although label colour was more important for identification, when it concerned the bottle for still water a clear variant was preferred over the blue or green transparent bottles. Green or clear material turned out to be the best matching colour for the sparkling water bottle (Ngo, Piqueras-Fiszman & Spence, 2012).

Although there are colour-taste associations that occur consistent across cultures, it is important to take in account that there are some colour-taste associations that differ among countries and cultures. For example, British participants associate a brown colour with a Cola taste, while Taiwanese participants associate brown with a grape taste (Shankar, Levitan, Prescott, & Spence, 2009).

In the water bottle research consumers saw green as slightly better representing still and sparking water than red, which suggests that red plays a less important role in bottled water than that always have been assumed (Ngo, Piqueras-Fiszman & Spence, 2012). However, because about 50% of the respondents was British and given that green water bottles dominate the British market, some caution with this results is needed.

Finally, colours are not only associated with certain product types or characteristics, but also claimed by certain brands. The blue colored bag of Tiffany & Co, the red shoe sole of Louboutin's, the Pink Ribbon shape and the purple Milka packaging are known examples of sensory signatures based on vision (see Krishna, 2010). These brands are clearly associated and therefore semantic congruent with a specific colour. The red shoe soles of high heels define these shoes as *Laboutins* and the purple packaging immediately identifies chocolate as *Milka*.

2.3.3.2. Shapes

Although shape is a dimension of vision and touch, shape is discussed here because often visual effects of shape are investigated. People associate abstract shapes with specific sensory stimuli, a cross-modal correspondence phenomenon that is called *shape symbolism* (Spence, 2012). The association between sharp, pointy and angular shapes and carbonation in beverage is an example of shape symbolism (Chandrashekar, Yarmolinsky, von Buchholtz, & Oka et al., 2009; Deroy & Valentin, 2011; Ngo, Piqueras-Fiszman & Spence, 2012; Spence, 2012; Spence & Gallace, 2011).

Consumers associate roundness with sweeter and creamier foods and beverages (Ares & Deliza, 2010; Dichter, 1971; see also Spence, 2012) and still water (Chandrashekar et al., 2009; Spence & Gallace, 2011). In contrast, they match angular shapes on the packaging with bitter, carbonating, sour, sharper and crunchy food and beverage products (Chandrashekar et al., 2009; Gal, Wheeler & Shiv, 2007; Ngo, Misra & Spence, 2011; Spence & Gallace, 2011; see also Spence, 2012). For example pointy shaped cheese is evaluated as having a more sharper taste, than round shaped cheese (Gal, Wheeler & Shiv, 2007). In addition, chocolate with a higher cacao content which increases the taste of bitterness are matched with angular shapes (Ngo, Misra & Spence, 2011).

Participants in a blind test even associated tastes of beer products of different brands with certain types of visual perceived shapes (Deroy & Valentin, 2011). Rounded, voluminous, regular shapes were associated with the sweet taste of *Adelscott* beer; angular shapes with fuzzy edges were associated with the sparkling, bitter taste of *Bitburger* beer; and flat, thin shapes seen as congruent with the acid taste of *1664 blanche* beer.

The water bottle research of Ngo, Piqueras-Fiszman & Spence (2012) suggest the existence of cross-modal relationships between colours and shapes for bottled water. Still water was best represented by blue coloured organic shapes on the label and sparkling by blue or green coloured angular shapes on the label. When colour and shape conflict (for example when a red-organic shape or a blue-angular shape were presented) the shape information tend to dominate, what suggests that consumers might rely more on shape than colour information to distinguish bottled water products.

The interaction between colours and shapes is also interesting for brands, because shapes as circles and square combine well with passive (relaxing) colours like blue and purple, and triangles and diamonds combine well with active (energizing) colours like red and green (Daye, 2011). Brands with an energizing or relaxing image like *Red Bull* can benefit from this shared semantic meaning in packaging design.

2.3.3.3. Size

Interesting effects of size on volume perception are found within the beverage category. People are susceptible for the elongation bias, because they tend to associate tall-tin containers with more volume than short-fat containers (Holmberg, 1975). As a result bartenders often pour more alcoholic beverages in short-fat containers than into tall-thin ones (Wansink & Van Ittersum,

2003), and after consumption drinkers tend to think that they have drunk more from the short-fat containers than from the tall-tin variants (Raghubir & Krishna, 1999).

These contrast effects occur, because people exaggerate the difference between expectations and their actual drinking experiences. These illusions especially occur for short, fat packaging designs like the bottles of the Belgian beer brands *Vedett* or *Duvel*.

2.3.4. Audition

Recently, the role of sound in consumer experience has received more attention. The sound of food itself, its packaging, and even of the production (coffeemaker) and the consumption environment affects the consumption experience in an important way (see Spence, 2012).

2.3.4.1. Pitch

People match certain foods and flavours with different sound pitches (Belkin, Martin, Kemp & Gilbert, 1997; Holt-Hansen, 1968; 1976; Rudmin & Cappelli, 1983). The majority of studies supports cross-modal correspondence between bitterness and lower-pitch (Crisinel & Spence, 2010; Crisinel, Cosser, King, & Jones, et al., 2012; Mesz, Trevisan, & Sigman, 2011; Simmer, Cuskley & Kirby, 2010).

An old study showed that consumers associated the more bitter tasting Carlsberg's beer with a lower pitch, than the less bitter tasting Carlsberg's beer (Holt-Hansen, 1968; 1976). This study is later replicated by Rudmin & Cappelli (1983). Furthermore, the pitch of a soundscape influenced perception because participants rated the bitter taste of a bittersweet toffee as more prominent, when a low-pitched soundscape was presented and rated the sweeter taste as more prominent when a high-pitched soundscape was presented (Crisinel et al., 2012).

There are two possible explanations for the association between sweet tastes and high-pitched sounds and bitter tastes and low-pitched sounds (Spence, 2012). First, the oro-facial account that suggest that the association develops, because the tongue protrudes upwards in response to pleasant tastes or during the production of high-pitched sounds and downwards in response to aversive tastes or during the production of low-pitched sounds (Berridge, 2000; Ngo, Misra & Spence, 2011; Steiner, Glaser, Hawilo & Berridge, 2001). Second, according the hedonic valence account is the association simply based on hedonic valence. Both sweet tastes and high-pitched tones are generally evaluated as more pleasant than bitter tastes and low-pitched tones (Crisinel & Spence, 2012; Spence, 2011).

Sweetness is in general associated with a high-pitching sound (Crisinel & Spence, 2010b; Crisinel et al., 2012), but some studies report an association between sweetness and a low-pitching sound (Spence & Gallace, 2011). This might be explained by the fact that high-pitch match with sweet-sour tastes (like fruit juice) and low-pitch with sweet, less sour tastes (like caramel). For example, sweet fruit juices low in sourness were associated with lower-pitching sounds and sourer-tasting

juices were associated with higher pitching-sounds (Ngo, Velasco, Salgado & Spence, 2013). Sour-tasting food is generally associated with high-pitching sounds (Crisinel & Spence, 2010b).

Relations between tastes and pitches are also found for product and brand names. Consumers use the pitch of phonemes in brand or food names to infer product attributes and to evaluate brands and products. Participants expected an ice-cream named *Frosh* to be creamier, smoother and richer than an ice-cream named *Frish* (Yorkston & Menon, 2004). Also, ketchup with the fictional brand name *nodax* was expected to thicker, than with the fictional brand name *nidax*. Likewise, the fictional brand name *godan* turned out to be associated with darker beer than the brand name *gidan* (Klink, 2000).

These effects are driven by the difference in the vowel sounds between the high-pitching [i] and the low-pitching [o]. Brand names associated with frontal vowels ([i] like in hit) will be perceived smaller, faster, lighter (compared to darker), lighter (compared to heavier), milder, softer, weaker, thinner, colder, prettier, friendlier, feminine and more bitter, compared to brand names associated with back vowels ([u] like in burn or [o] like in home) (Klink, 2000; Walker & Smith, 1985).

These associations are based on the known cross-modal tendency to associate larger objects (elephants) with lower pitching sounds and that smaller objects (mousses) with associated higher-pitched sounds (Paris & Spence, 2009; Walker & Smith, 1985). In line with these findings, Spence (2012) suggest that brands and companies associated with small objects and prices (like *Lidl*) do well to include the [i] sound in the name.

Such relationships are the result of *sound symbolism,* a cross-modal phenomenon related to shape symbolism. Sound symbolism is the association people experience between specific sounds (including speech sound) and particular stimuli (Spence, 2012). Products like sparking water and cranberry juice are associated to with angular shapes and high-pitched meaningless words such as *kiki*, *tuki* and *takete* which require sharp inflection of the mouth. Also chips and other crispy and crunchy foods are associated with these plosive sounding words. In contrast, still water and creamy dairy products like brie were associated with rounded shapes and lower-pitched meaningless words that sound softer, like *bouba*, *maluma*, *lula* or *bolobo* (see Spence & Gallace, 2011).

The examples above are based on responses of American respondents (Klink, 2000). However, research of Ngo et al. (2013) even supported cross-cultural patterns of sound and shape symbolism. Both British and Colombian participants associated fruit juices that were sweet and low in sourness with organic shapes, lower-pitched sounds and 'rounder' words, like 'maluma' and 'buba'. Sourer-tasting juices were associated with angular forms, higher pitched-sounds and sharper words like 'takete' and 'kiki' by both populations. Although it is important to take cultural differences in account when applying sensory congruent strategies, this research suggest the existence of universal cross-modal correspondence phenomena.

2.3.4.2. Volume

Like pitch is also sound volume associated with certain product characteristics. Therefore, the sound volume related to product consumption can change product perception. For example, consumers evaluated the taste of potato chips as significant more crispier and fresher when the sound level of their bites was higher or increased and as staler and softer when the sound intensity or frequency was reduced (Dacremont, 1995, Zampini & Spence, 2004). Water samples were judged as more carbonated, when the level of the popping sound was louder or the speed at which the bubbles were heard was increased (Zampini & Spence, 2004; 2005).

On the first sight these kinds of effects seem to have more potential for noisy foods or beverages (like crackers and champagne) than quieter ones (like fruit juice). However, Spence (2012) suggests that a sensory congruent opening sound can be developed for the packaging of foods and beverages that can function as a distinctive signature (Spence & Zampini, 2006; Spence 2011). For example, the bottles of beer brand *Grolsch* and fruit juice brand *Snapple* have distinctive opening sounds that are associated with their brands. Further, packaging sounds affect the expectations of the product inside. For example, potato chips were perceived as more crispier in a packaging that made a more noisy rustling sound, compared to packaging that made a less loud sound (Spence, Shankar, & Blumenthal, 2011).

2.3.5. Touch

Compared to vision and audition are tactual aspects of products and brands relatively still unexamined within the academic field (Hekkert & Schifferstein, 2008; Spence, 2002; Treasure, 2007).
However, the increasing emphasize on tactile product and brand properties in advertising (like *iPod Touch*) suggests growing awareness of the role of touch in marketing (Spence & Gallace, 2011). This promising role is increasingly supported by academic evidence. Especially because of the potential of tactile stimuli to develop an emotional connection (Schifferstein & Hekkert , 2011; Sonneveld & Schifferstein, 2008).

2.3.5.1. Emotional value

Research suggests that touch has a highly emotional value (Haans & Ijsselsteijn, 2006; Sonneveld & Schifferstein, 2008). The fact that touch is a proximal sense that do not work with a medium (like air for vision, audition and smell or salvia for taste) explains this link with emotion. Tactile sensation requires direct contact (Peck, 2010) which makes touch an accurate sense that has a low variance and noise during multisensory stimulation (Ernst & Banks, 2002). The skin contains receptors that directly elicit emotions when stimulated, which makes touch specialized for the coding of affective responses (Field, 1998; Francis, Rolls, Bowtell, McGlone, et al., 1999; Löken, Wessberg, Morrison & McGlone et al., 2009; Spence, 2002). Hand-held tools and objects are also rapidly incorporated in the body schema (Holmes & Spence, 2006).

For this reason Spence & Gallace (2011) even hypothesized that tactile cues will dominate the overall multisensory affective response to a product. Touch provides a less noisy and thus a more reliable estimate of the hedonic value of a product, than for example audition or vision. The contribution of tactile input may therefore dominate other sensory input, because the less noisy and thus the most reliable sensory input will dominate in multisensory integration.

This suggested effect is called 'affective ventriloquism', a sensory phenomenon (and an analogy of the original ventriloquism effect of Radeau (1994)) that occurs within the emotional domain when emotional sensations elicited by one sensory modality might modulate the sensations perceived by other sensory modalities and therefore people's overall multisensory product experience (see Dolan, Morris, & de Gelder, 2001; de Gelder & Vroomen, 2000; Tanaka, Koizumi, Imai, & Hiramatsu et al., 2009).

Consequently, Spence & Gallace (2011) expect that the pleasantness of the feel of a product or packaging, could have a stronger and a more dominant effect on affective response than other product-related sensory cues. Although this claim is not confirmed yet by research, the main point is that the academic literature suggests a strong emotional role of touch. Therefore, congruent tactile product or brand dimensions may contribute to competitive benefits, because touch provides an important mean to develop an emotional connection with a product or brand (Schifferstein & Hekkert, 2011; Sonneveld & Schifferstein, 2008).

The high emotional value of touch is primarily supported by studies of interpersonal touch (Spence & Gallace, 2011). For example, participants who held a warm cup in their hands judged another person as being warmer, while the other person was judged as being colder when they held a cold cup (Williams & Bargh, 2008). In addition, persons who held a warm drink in their hands were more likely to buy a gift for a friend, while persons who held a cold drink were more likely to buy a present for themselves. This effect is explained by the involvement of the same brain area in the processing of warmth (temperature) and social warmth (trust). For this reason it was perhaps a smart strategy of Innocent drinks to add a warm knitted hat to their cold smoothies during a charity action (see http://thebigknit.co.uk/).

The affective effects of interpersonal touch could also be true for human-product interactions, because touch provides a more direct and intimate relationship with a product (Spence & Gallace, 2011). Touching an object resulted in greater feelings of psychological ownership and a higher willingness to pay (Peck & Su, 2009). Consumers also prefer products from retailers who allow their products to be touched (McCabe & Nowlis, 2003).

Lack of touch result in alienation: participants even perceived familiar products as being more foreign when they could not feel them (Schifferstein & Desmet, 2007). Therefore, people like a product more when they have hold it in their hands which also enhances the chance of purchase. Moreover, touching products generally enhances quality beliefs (unless the quality is very bad) and increases confidence in purchase behaviour (Peck & Childers, 2003). These insights stress that it is important to create a tactile feel in the packaging which seduces consumers to pick it up. This could subsequently enhance product or brand evaluation (Underhill, 1999).

Finaly, it is important to note that people differ in their need for tactile input. For example, women have a greater need for touch than men when evaluating products (Citrin, Stem, Spangenberg, & Clark et al., 2003).

2.3.5.2. Touch and product perception

Besides emotions, it is known that touch affects perception by cross-modal associations. For example, in many product categories there is a clear association between weight and quality (see Lindstrom, 2005). A heavier weight is often perceived as congruent with quality and a lighter weight as incongruent. Therefore, perceived quality and liking for yoghurt samples increased when the yoghurt sample was tasted with a heavier stainless steel spoon compared to a lighter plastic spoon with a metallic finish (Piqueras-Fiszman & Spence, 2011).

There also exist an association between weight and expected density: the weight-density illusion. Yoghurt samples were also perceived as more dense and satiating, when they were consumed from a heavy bowl, instead of an identical lighter bowl (Piqueras-Fiszman et al., 2011; Piqueras-Fiszman & Spence, 2012b).

There are also examples of sensation transference between what people feel in their hands and what they perceive in their mouths (Spence & Piqueras-Fiszman, 2012). In the previous section is already discussed how water is perceived of higher quality when it is served in a (congruent) firm cup, than when it is served in a (incongruent) flimsy one (Krishna & Morrin, 2008).

In the same line, a stale pretzel was evaluated as more fresher and crispier when participants held a fresh, hard part of the food in their hands. In contrasts, a fresh pretzel was evaluated as staler and softer when they held a stale, soft pretzel in their hands (Barnett-Cowan, 2010). This because a hard feel matches with fresh pretzel, while a soft feel does not match with freshness.

2.3.5.3. Brands: create a 'signature' feel

Tactile qualities of a packaging might be implicitly associated with a brand or product content (Ballesteros & Reales, 2004). Therefore, companies are starting to trademark the 'signature feel' of their brands (Howes, 2005; Lindstrom, 2005; Schifferstein & Spence, 2007). For example toilet paper brand *Page* claims softness by portraying an iconic puppy on its packaging (Kimberly-Clark Worldwide, 2013).

The signature feel of a brand of product could be most effective when tactile properties are is semantic or synaesthetic congruent with the product characteristics or overall brand image. So for example by adding a soft-feeling coating to the packaging of *Page*. As discussed earlier, the research of Krishna, Elder and Carrera (2010) supports the possibility of this suggestion.

Although physical warmth is associated with interpersonal warmth and prosocial behaviour (Williams & Bargh, 2008), research on the relationship between temperature and product or brand experience is scarce. People are vulnerable to anthropomorphism, the tendency to attribute human-like characteristics (motivations, intentions, and emotions) to non-human

objects (Fournier, 1998; Epley Waytz & Cacioppo, 2007) like brands. This suggest the potential for a brand to be perceived as having a warmer 'personality' by making the feel its products or packaging warmer. For example by increasing their temperature or the use of warm materials like wood or wool.

| Conclusion

- Visual, auditive, tactile and olfactive stimuli may serve as secondary product attributes in packaging design that support the primary product attributes: product attributes, and the brand values.
- Academic literature identified cross-modal associations among these stimuli that could be applied in multisensory packaging of beverage products.
- The stimuli which are perceived as matching combinations with brands and product may differ across brands, products and cultures. Therefore it is essential to investigate these relationships in packaging design within the beverage category.

3

Study 1: The beer bottle evaluation study

Academic literature identified matching combinations of sensory stimuli. The next step is to investigate if such congruent relationships also consist for sensory stimuli in packaging design and brand and product values. An online survey is conducted to reveal the consumer´s associative network of product or brand congruent sensory stimuli within the beer category.

3.1 Introduction

3.1.1. Research question

The academic literature showed a substantial amount of synaesthetic and semantic relationships among sensory stimuli. However, these combinations of matching stimuli are identified by research conducted within variety of different product categories, cultures and geographical populations.

Moreover, the majority of this research focuses on matching sensory stimuli with product characteristics. Such relationships are not yet identified for brands. Therefore, an explorative research is conducted to investigate how sensory stimuli in beer bottle design match with product characteristics and brand values within the beer category which leads to the following research question:

How are sensory stimuli related to brand values and taste descriptors of beer products?

3.1.2. Hypotheses

1. Based on the academic literature is expected that certain sensory stimuli in beer bottle design (secondary product attributes) are positive and negative associated and beer brand values and taste descriptors (the primary product attributes of beer).
2. Congruent sensory stimuli in beer bottle design that do match with certain beer brand values or beer taste descriptors are more appropriate to include in beer bottle design, than incongruent sensory stimuli that do not match with certain beer brand values and taste descriptors.

This leads to the hypothesized framework for beer bottle design that is presented in figure 4.1. This study focuses on the investigation of relationship 1 in this model. In the hypothesized framework are tactile, auditive and olfactive sensory stimuli operationalized as secondary product attributes. Brand values and taste descriptions are operationalized as the primary product attributes.

Besides taste is also smell separately assessed in this study to explore its role as secondary product attribute. Finally, the role of visual stimuli as secondary product attributes in packaging design is not investigated, because the literature review showed that this modality is already often investigated compared to the auditive and tactile modalities.

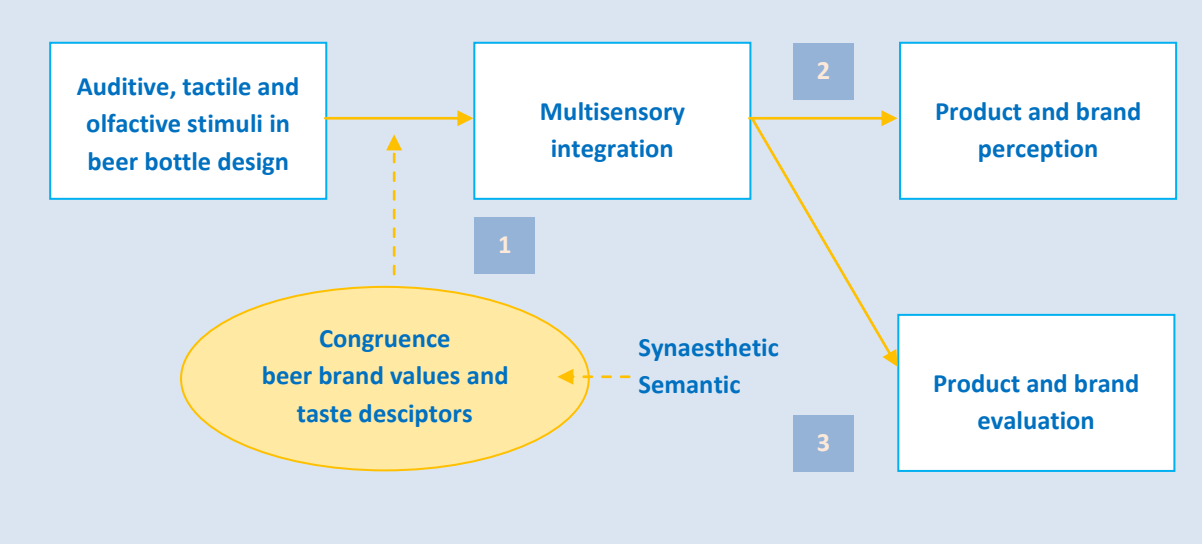


Figure 3.1. Hypothesized framework multisensory beer bottle design

3.1.3. Structure

The associative networks of beer drinkers is investigated in an online survey. Two pretests were conducted first, to develop scales to measure the evaluation of beer brand values and beer taste descriptors which are the primary product attributes within the beer category.

3.2 Method

3.2.1. Pretest 1: Brand value scale development

A content analysis is conducted on the brand values of 31 beer brands across the world (N=31) to identify the most common brand values among beer brands. The investigated brands were subject of projects by CARTILS in 2012 and 2013 (N=27) and the global brands *Miller*, *Peroni, Pilsner Urquell* and *Tuborg* (N=4). These global brands are included to avoid distorting effects on the research data due to the absence of information about brand values of Western brands present in the client base of CARTILS.

The brand values were extracted from client briefings and the brand manuals of the beer brands. For each value is rated how many brands claimed that value. Totally 47 distinctive brand values were identified, which are represented in appendix 2. The 27 most common brand values (which were claimed by two or more brands) were used in the online survey. Table 3.1 presents these brand values and figure 3.2 presents the number of beer brands that claimed those brand values.

Table 3.1 *Overview of the most claimed brand values among 31 brands across the world*

1. Quality	10. Authentic	19. Friendly
2. Modern	11. National Pride	20. Distinctive
3. Social	12. Premium	21. Hospitable
4. Origin	13. Relaxed	22. Masculine
5. Fun	14. Bold	23. Unpretentious
6. Energizing	15. Self-confident	24. Passionate
7. Young	16. Natural	25. Prestige
8. Reliable	17. Craftsmanship	26. Traditional
9. Fresh	18. Honest	27. Successful

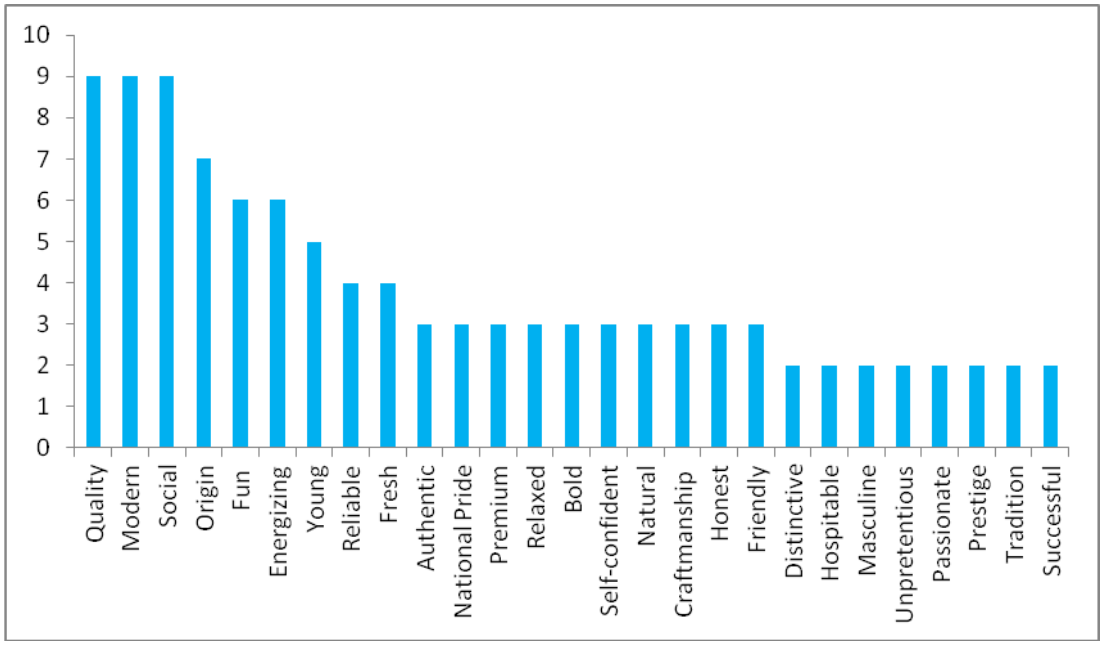


Figure 3.2 The number beer brands that claims a brand value (N=31)

3.2.2. Pretest 2: Taste descriptor scale development

A content analysis is conducted on the taste descriptors of 29 pilsners of a variety beer brands (N=29) to identify the most common taste descriptors that are used to describe pilsners. Only pilsners were included in this analysis, no specialty variants. The investigated beer brands were subject of projects by CARTILS in 2012 and 2013 (N=25) and the pilsners of the global brands *Miller*, *Peroni, Pilsner Urquell* and *Tuborg* (N=4) that were included to avoid distorting effects due to the absence of information about brand values of Western brands in the client base. The taste descriptors were extracted from client briefings and from the websites of the investigated pilsners.

For each taste descriptor is rated how many brands claimed that taste. The analysis identified 20 different taste descriptors that beer brands use to describe the taste of their pilsners which are presented in appendix 2. Although there was referred to *hop*, *malt, quality water* and *cold* for a substantial amount of pilsners, these descriptors were excluded from research. Hop, malt and quality water refers to ingredients and cold is a characteristic that depends on the way the beer is served.

The 11 most common taste descriptors (which were claimed by two of more beer brands) were used in the online survey. Table 3.2 shows these taste descriptors and figure 3.3 presents the number of beer brands that claimed these tastes.

Table 3.2. *Overview of the most claimed brand values among 31 brands across the world*

1. Slightly bitter	6. Foamy
2. Refreshing	7. Easy to drink
3. Full-bodied	8. Light
4. Crispy	9. Natural
5. Smooth	10. Mild
	11. Thirst quenching

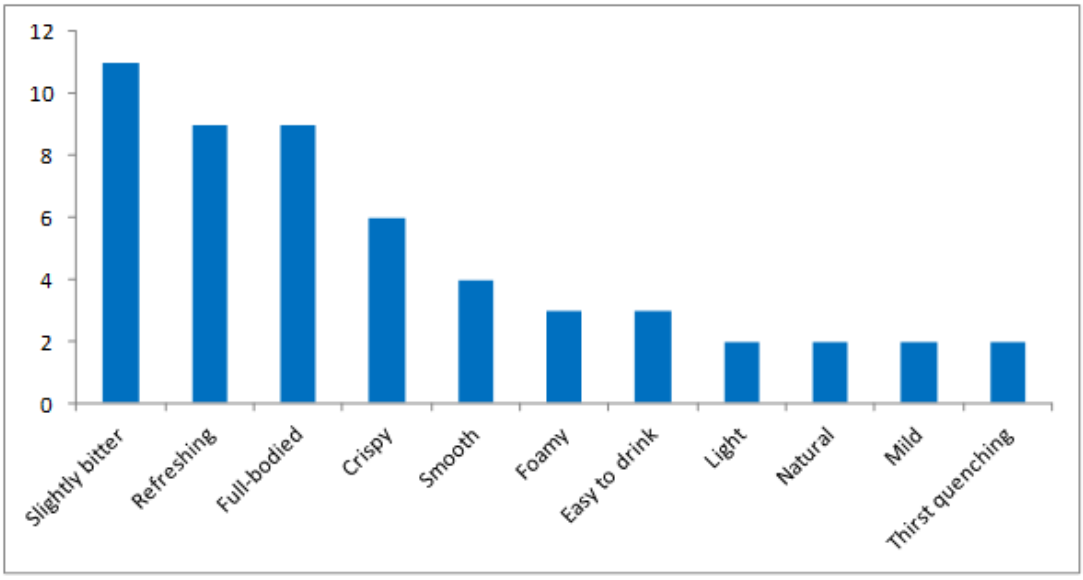


Figure 3.3 The number beer brands that claims a taste descriptor (N=29)

3.2.3. Research design

A study is performed in which participants evaluated five beer bottles of different brands on the following dimensions: brand values, tactile, sound and smell characteristics, and taste descriptions. The aim of the study was to investigate whether consumers associate certain brand values and taste descriptors with specific sensory properties of the beer bottle.

3.2.4. Procedure

The participants completed an online survey at home. This survey was distributed through the online social network *Facebook* where participants clicked on a link that directed them to the online survey. After reading the research goal and instructions participants started the questionnaire. First, they filled in their personal data. Subsequently, the picture of the first foreign beer bottle was presented together with the instruction to inspect the bottle well.

Next, participants indicated if they were familiar with the presented pilsner and if they had consumed this product before. Thereafter, the participants evaluated a list of statements about the degree to which they associated certain brand values, tactile characteristics, sounds, smells and taste descriptors with the depicted beer bottle.

This procedure was repeated for each presented beer bottle, so participants evaluated five beer bottles on the same list characteristics. There were three different versions of the survey in which the bottles were presented in different orders. Participants were at random assigned to these different versions to prevent distorting sequence effects. For each participant the experiment took approximately 20 minutes. The data was gathered between March 27 and April 10, 2014.

3.2.5. Participants

The participants were recruited on the online social network *Facebook*. The author placed a call to participate together with a link to the online questionnaire on her *Facebook* profile and on the *Master Marketing Communications Twente* page.

42 Dutch individuals (N=42) participated voluntary in study 1. The sample consisted of 21 men (50%) and 21 women (50%). The mean age of the sample was 27,05 years (SD = 9,39). The youngest participants was 18 years old, the oldest participant was 56 years old. The sample consisted of higher educated participants (52,40% possessed an university degree; 26,20% completed a higher professional education; 9,50% completed a vocational training; and 12,00% is in possession of a high school diploma).

Although it is assumed that the participants were Dutch-speaking, the questionnaire was presented to them in the English language to keep consistency in the expression of the brand values.

In general participants were regularly consuming beer products: 57,10% of the participants consumed beer on a weekly basis; 21,40% monthly; 14,30% a few times a year; and 7,10% claimed never to drink beer.

To prevent biasing effects on the results due to prior knowledge and associations with the depicted beer brand and product (for example as a result of prior consumption experience or marketing campaigns), participants in general had to be unknown with the depicted pilsner. Table 3.3 shows that the Dutch sample in general was unfamiliar with *Baltika Cooler* (Russian beer market), *Bohemia* (Brazilian beer market), *Brahma* (Brazilian beer market) and *Kamenitza* (Bulgarian beer market)and mostly had not consumed these pilsners before. Although *Bud Light* (American beer market) was a more familiar pilsner, the majority had never drunk the beer before.

Not all participants completed the total questionnaire. On average every participant evaluated three of the five bottles (*M* = 3,33, *SD* = 1,86). Although, 52,40% of the participants evaluated all the five bottles, 31,00% evaluated just one bottle. As a result, the *Kamenitza 1881* was evaluated 32 times, the *Baltika Cooler* 30 times, the *Bohemia Cerveja* 27 times, the *Brahma Chopp* 25 times, and the *Budlight* was evaluated 25 times.

Table 3.3 *The prior product knowledge of the participants*

	Prior brand and product knowledge	
	% unfamiliar with this brand	% has never the consumed this beer product
Baltika Cooler	90,00	93,00
Bohemia	85,20	92,60
Brahma	76,90	88,50
Kamenitza	78,10	96,90
Bud Light	52,00	88,00

3.2.6. Stimulus material

Five pictures were presented of distinctive beer bottles from a (in The Netherlands) generally unknown, foreign brand. Participants were asked to evaluate the five depicted beer bottles that are presented in figure 3.4. These stimuli were selected by two professionals of CARTILS who evaluated these beer bottles as substantial distinctive from each other in terms of bottle design and brand proposition (see table 3.4).

Figure 3.4 Starting left: *Baltika Cooler*, *Bohemia*, *Brahma*, *Bud Light* and *Kamenitza*

Table 3.4. *Brand values assigned by professionals to the investigated pilsner brands*

	Pilsners				
	Baltika Cooler	Bohemia	Brahma	Bud Light	Kamenitza
Claimed brand values	Young Modern	Tradition Quality	Hospitable Friendly	Young Energetic Friendly	Traditional Quality Modern Fresh

3.2.7. Measures

The online survey was developed in the online questionnaire tool *ThesisTools* (Van Rixtel, 2013). The total questionnaire is shown in appendix 3. The questionnaire started with 4 closed questions that asked for personal data. For each depicted beer bottle the participants had to evaluate familiarity with the beer product and prior consumption which was measured by 2 items. 60 items measured the degree to which participants associated specific brand values, tactile, auditive and olfactive stimuli, and taste descriptors with the depicted bottle.

3.2.7.1. Brand values scale

Pretest 1 resulted in a beer brand value scale which consisted of the 27 most common brand values among beer brands. The participants evaluated for each brand value the extent to which they associated the depicted beer brand with the value by rating this on a 7-point Likert scale ranging from 1 ‘strongly disagree’ to 7 ‘strongly agree’.

3.2.7.2. Tactile value scale

5 items measured the tactile values that participants associated with the depicted bottle on a 7-point semantic differentiation scale. The items were based on the taxonomy of touch in consumer behaviour of Peck (2010) which presents ways of instrumental touch to obtain haptic product information. An example of a question measuring touch is: 'How do you expect this bottle to feel? smooth versus rough'.

3.2.7.3. Auditive value scale

3 items measured the characteristics of the opening sound and 2 items measured the brand names that participants associated with the depicted beer bottle on a 7-point semantic differentiation scale. The items were based on measures used in cross-modal research discussed in the previous section on sound volume (e.g. Dacremont, 1995; Spence, Shankar, & Blumenthal, 2011; Zampini & Spence, 2004), carbonation sound (e.g. Zampini & Spence, 2004; 2005), sound pitch (e.g. Holt-Hansen, 1968; 1976; Rudmin & Cappelli, 1983) and brand names (e.g. Yorkston & Menon, 2004). An example of a question measuring touch is: 'How will the bottle sound when opened? Low-pitched versus high-pitched?'.

3.2.7.4. Olfactive value scale

7 items were used to evaluate the extent to which participants associated specific smell characteristics (like 'fruity' or 'bitter) with the depicted beer bottle. This was rated on a 7-point Likert scale ranging from 1 'strongly disagree' to 7 'strongly agree'. The items were based on the *Beer Aroma Wheel* of Schmelzle (2013).

3.2.7.5. Taste descriptor scale

Pretest 2 resulted in the taste descriptor scale which consisted of the 11 most common taste descriptors used by beer brands to describe their pilsners. Participants evaluated the extent to which they associated these 11 taste descriptors with the depicted beer bottle on a 7-point Likert scale ranging from 1 'strongly disagree' to 7 'strongly agree. Five additional taste descriptors – *sweet*, *sour*, *tingly*, *watery* and *sharp* – were included in the scale based on cross-modal research discussed in the previous section on sweet (e.g. Crisinel & Spence, 2010b; Crisinel et al., 2012), sour (e.g. Crisinel & Spence, 2010b; Ngo et al., 2013); tingly, watery and sharp tastes (DuBose et al., 1980; Ngo, Piqueras-Fiszman & Spence, 2012).

3.3 Results

3.3.1 Distinction between bottles

SPSS Statistics 22.0 was used to analyze the results. A GLM multivariate analysis with beer bottle as factor and the brand values as dependent variables revealed a main effect of beer bottle on the brand values (F (108, 435) = 2,68, p = .00). This is a strong effect (eta² = .40). This means that the beer bottles were associated with significant different brand values by the participants.

A second GLM multivariate analysis with beer bottle as factor and the beer taste descriptors as dependent variables also demonstrated a main effect of beer bottle on the taste descriptors (F (64, 472) = 2,68, p = .00). This effect is strong (eta² = .26). Based on these results it can be concluded that the professionals (N=2) selected appropriate distinctive beer bottle designs for this study to identify associations with diverse brand values and taste descriptors.

3.3.2. Developing brand value dimensions

A Principal Components Analysis (PCA) with Varimax rotation was conducted on the brand value data to structure the multiple brand values and sensory stimuli in a clear associative network. A PCA is a statistical method to investigate if the 27 individual brand values were related to common underlying factor dimensions. In this way the large number of brand values can be classified in a few groups of related brand values. This resulted in a 6 components solution accounting for 75% of the variance among the brand value evaluations associated with the presented beer bottles.

The satisfied solution was reached after the exclusion of the brand values *unpretentious*, *honest*, *craftsmanship*, *natural* and *social*. These brand values showed low loading values on the factors or did not conceptually fit in the loading factor. This means that the satisfying six factor solution was based on the data of the remaining 22 brand values and that only these brand values continued to be part of this study.

Table 3.5 presents the resulting rotated component matrix and the variances explained by each of the six factors. This matrix and the component plot presented in figure 3.5 show how 22 beer brand values were divided in six groups of brand values that belonged together, because they loaded on the same factor.

This means that although the individual brand values had different meanings, these results demonstrated that they shared a common underlying dimension in the minds of the participants. Nearly all the brand values were clearly loading on distinctive dimensions. Only the brand value *relaxed* loaded on the first and on the fourth factor. Although *relaxed* loaded slightly higher on factor one, it is decided to group relaxed under the fourth factor because this fitted conceptually better.

Table 3.6 shows the resulting structure of the brand values in six dimensions. This structure served in this study as the basis of the associative network of brand values and sensory stimuli. The names of the brand value dimensions referred to corresponding components of the CARTILS BrandStarTM method, a structural way of evaluating design (see Cartils Group, 2014 for further information).

Table 3.5 *Rotated component matrix with loadings and accounted cumulative percent variances*

	Component					
	1	2	3	4	5	6
Energizing	.87					
Young	.86					
Fun	.79					
Fresh	.78					
Modern	.77					
Relaxed	.56			.54		
Quality		.84				
Passionate		.78				
Prestige		.75				
Reliable		.72				
Premium		.62				
Successful		.60				
National pride			.83			
Authentic			.72			
Traditional			.68			
Hospitable				.85		
Friendly				.77		
Self-conscious					.79	
Bold					.72	
Masculine					.62	
Original						.75
Distinctive						.54
Cumulative % variance	35.36	56.29	62.51	67.56	71.56	75.34

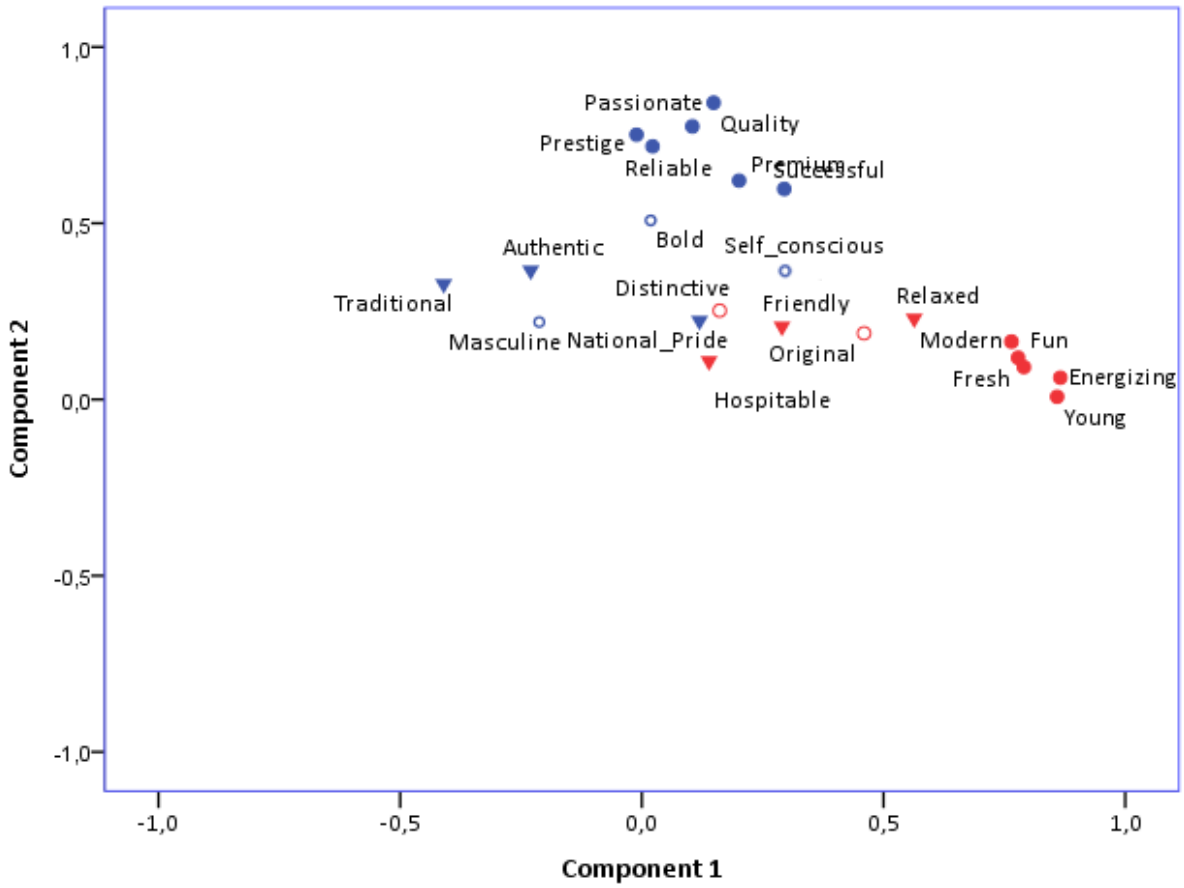


Figure 3.5. Component plot presenting the brand values that loaded on similar factors.

Table 3.6 *The six identified factors and their related brand values*

Clusters					
1. Aspirational	2. Premium	3. Real	4. Accessible	5. Confident	6. Unique
Energizing	Quality	National pride	Hospitable	Self-conscious	Original
Young	Passionate	Authentic	Friendly	Bold	Distinctive
Fun	Prestige	Traditional	Relaxed	Masculine	
Fresh	Reliable				
Modern	Premium				
	Successful				

3.3.3. The consumer´s associative network

The semantic associative networks of participants are mapped for beer brand values and taste descriptors.

3.3.3.1. Brand value dimensions

For each brand value dimension a score was computed by taking the average of the scores of the individual brand values that loaded on the dimension. Subsequently, a multiple regression

analysis (MRA) was conducted to identify correlations between the brand value dimension scores and tactile, auditive, olfactive and taste stimuli. Table 3.7 presents the resulting significant correlations that were found between the six brand value dimensions and sensory stimuli.

The conventions of Cohen (1988) were used to interpret the value of the correlations: $r = .10$ was interpreted as a small effect, $r = .30$ was interpreted as a medium effect and $r = .50$ was interpreted as a large effect. The stronger the correlation between brand value dimensions and sensory properties, the more effect they would have.

3.3.3.2. Taste descriptors

A second MRA was conducted to investigate how taste descriptors were related to tactile and auditive stimuli. The correlations between taste descriptors and tactile stimuli are presented in table 3.8 and the relationships between taste descriptors and auditive stimuli are shown in table 3.9.

Table 3.7 *Correlations between the brand value dimensions and sensory stimuli*

		Brand value dimensions					
Sensory modality		**Aspirational**	**Premium**	**Real**	**Accessible**	**Confident**	**Unique**
Touch	Temperature (cold vs warm)	-.20*	-.17*				
	Hardness (flimsy vs. firm)		.36**	.43**		.30**	
	Texture (soft vs. hard)	-.20*		.27**		.20*	
	Texture (smooth vs. rough)						-20*
	Weight (light vs. heavy)	-.34**	.18*	.33**	-.17*	.33**	
Sound	Opening sound loudness (quiet vs. loud)	-.17*	.19*	.24**		.23**	
	Carbonating opening sound (weak vs. strong carbonating)		.21*			.27**	.24**
	Sound name (frosh vs. frish)	.40**		-.30**	.22**		
	Sound name (maluma vs takete)			-.21*			
Smell	Fruity	.37**			.26**		
	Floral	.23**			.18*		
	Spicy	-.17*		.27**		.23**	
	Sweet	.28**			.17*		
	Bitter	-.24**	.39**	.45**		.34**	
	Intense		.62**	.56**	.20*	.61**	.42**
	Subtle	.37**			.25**		
Taste	Bitter	-.24**	.40**	.45**		.48**	.19*
	Refreshing	.63**	.32**		.31**	.30**	.40**
	Full-bodied		.61**	.57**	.18*	.61**	.37**
	Smooth	.38**			.46**		.25**

Crispy					.21*	
Foamy		.19*			.23**	.20*
Easy to drink	.52**		-.18*	.40**		.17*
Light	.46**	-.22**	-.44**	.27**	-.23**	
Natural		.31**	.27*	.41**		.24**
Mild	.32**		-.22	.18*		
Thirst-quenching	.44**	.28**		.43**	.23**	.23**
Sweet	.42**		-.30**	.22**		
Tingly				.19*		
Watery	.18*	-.53**	-.46**		-.49**	-.28**
Sharp	-.21*	.26**	.33**		.26**	

* Correlation is significant at the .05 level

** Correlation is significant at the .01 level

N=140

Table 3.8 *Correlations between the taste descriptors and tactile stimuli*

	Sensory modality touch				
Taste descriptor	**Temperature (warm vs. cold)**	**Hardness (flimsy vs. firm)**	**Texture (smooth vs. rough)**	**Texture (soft vs. hard)**	**Weight (light vs. heavy)**
Bitter		.20*		.27**	.29**
Refreshing	.36**		-.19*		-.20*
Full-bodied		.33**		.25**	.33**
Crispy			.27**		
Smooth			-.26**		-.29
Foamy					
Easy to drink	.30**		-.27**	-.19*	-.32**
Light	.23**		-.23**	-.21*	-.34**
Natural	.22**	.19*			
Mild				-.20*	-.26**
Thirst-quenching	.39**		-.18*		
Sweet					-.26**
Tingly		.26**		.28**	
Watery		-.22**			-.37**
Sharp		.33**		.34**	.34**

N=140, * Correlation is significant at the .05 level, ** Correlation is significant at the .01 level

Table 3.9 *Correlations between the taste descriptors and auditive stimuli*

	Sensory modality audition			
Taste descriptor	**Opening sound loudness (quiet vs. loud)**	**Carbonating opening sound (weak vs. strong)**	**Sound name (frosh vs. frish)**	**Opening sound (low vs. high pitch)**
Bitter	.25**			
Refreshing		.17*	.26**	
Full-bodied	.36**	.28**	-.23	
Crispy				
Smooth			.31**	
Foamy		.27**		
Easy to drink			.42**	
Light			.42**	
Natural				
Mild			.21*	
Thirst-quenching			.23**	
Sweet			.17*	
Tingly	.21*	.38**		.23**
Watery	-.23**		.37**	
Sharp	.22*	.21*	-.24**	

N=140, * Correlation is significant at the .05 level, ** Correlation is significant at the .01 level

3.4 Discussion study 1

3.4.1. Research goal

This study investigated how sensory stimuli in beer bottle design match with beer brand values and beer taste descriptors. Based on earlier research it was expected that there would exist relationships between sensory stimuli in beer bottle design and beer brand values and taste descriptors.

3.4.2. Main results

- The online survey confirmed that certain sensory stimuli in beer bottle design are positive and negative associated with beer brand values and taste descriptors.
- This means that specific sensory stimuli in beer bottle design do match or do not match with certain beer brand values and beer taste descriptors which makes these stimuli more or less appropriate to include in beer bottle design.
- The study validates relationship 1 in the hypothesized framework of beer bottle design which is presented in figure 3.6.

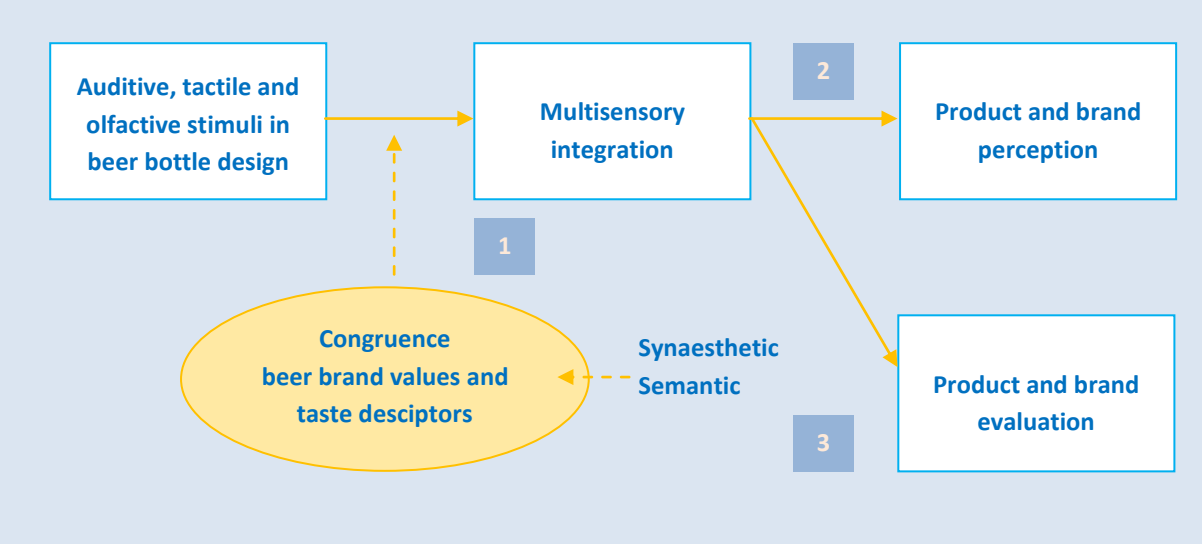


Figure 3.6. The hypothesized framework of multisensory beer bottle design

3.4.3. Brand values

This study supports the existence of specific semantic congruent relationships between sensory stimuli and beer brand value dimensions. Beer consumers hold a semantic associative network wherein the most common brand values among beer brands are related with tactile, auditive,

olfactive and taste stimuli [1]. These beer brand values are classified in groups that share an underlying dimensions to structure their relationships with sensory stimuli. Based on this structure it is assumed that the brand values belonging to these dimensions are in a similar way related sensory stimuli.

Table 3.7 shows that the brand value dimensions may be positively or negatively related with certain sensory stimuli. This means that the brand values belonging to a positively related dimension match with these sensory stimuli. In contrast, brand values belonging to a negatively relayed dimension do not match with these sensory stimuli. According to the hypothesized framework are sensory stimuli that match with the values of a brand appropriate to use in multisensory beer bottle design, while sensory stimuli that do not match with the brand´s values are considered as inappropriate for multisensory beer bottle design.

The brand value dimensions differ in the type of sensory stimuli they are related to and the nature (positive or negative) and the strength of these relationships. Positive and strong related sensory stimuli are the most appropriate stimuli to use for a brand in beer bottle design. Besides negative related stimuli also weak related stimuli are less useful for multisensory beer bottle design, because these sensory stimuli only have a weak semantic relationship with a particular brand value. The main findings within the relationships of beer brand values and other sensory stimuli is discussed below.

3.4.3.1. Dichotomy

Although there is a lot of variation in the associative networks around distinctive brand value dimensions, there is a dichotomy visible. Especially the brand value dimensions *premium, real* and *confident* show corresponding patterns in related sensory stimuli, while the brand value dimensions *aspirational* and *accessible* also share a substantial amount of correlations. This dichotomy is supported during the factor analysis process, because the PCA initially provided a two factor solution.

This suggests that sensory stimuli in beer bottle design would be especially useful to differentiate *premium, real,* and *confident* brand value dimensions from *aspirational and accessible* brand value dimensions, while it may be more challenging to develop a multisensory beer bottle design to differentiate within these groups.

3.4.3.2. The beer brand flavour

Table 3.7 shows that consumers match beer brand value dimensions stronger to taste and smell stimuli, than auditive and tactile stimuli. These stronger relationships for taste and smell stimuli are no surprise, because these flavour characteristics are the primary product attributes of beer.

[1] The term ‘semantic associative network’ is chosen to refer to the relationships found between sensory stimuli and brand and product values. This term is used instead of ‘synaesthetic associative network’, because participants consciously searched for sensory stimuli which shared identity in meaning with brand values and taste descriptors described by brands.

The taste characteristics *full-bodied, refreshing,* and *thirst-quenching* and the smell characteristic *intense* were strongly associated with multiple brand values dimensions, which suggests that these sensory stimuli are perceived as matching with beer brands in general. These stimuli are less distinctive, but are expected to be generally present for beer brands.

Certain beer brand value dimensions are specifically associated with certain taste descriptors and olfactive stimuli. This means that consumers expect specific beer flavours for distinctive beer brands. These findings correspond to earlier research within the beverage category that demonstrated that consumers distinguished tastes of beer and cola better in presence of brand names, than when this information was absent (e.g. Allison & Uhl, 1964; McClure, Li, Tomlin, & Cypert et al., 2004).

The dichotomy in the correlational patterns between the brand three values dimensions *premium*, *real* and *confident* and the two brand value dimensions *aspirational* and *accessible* are clearly visible for taste. Consumers match the brand value dimensions *premium*, *real* and *confident* with *bitterness* and *sharpness*, while they do not match these dimensions with a *light* and *watery* taste. These brand value dimensions are also stronger associated with *full-bodied* taste than other brand value dimensions.

In contrast, the brand value dimension *aspirational* and *unique* are matched with the taste descriptors *smooth*, *easy to drink*, *light*, *mild* and *sweet*. The brand value dimension *aspirational* also shows a contrasting pattern to *premium, real* and *confident*, because *aspirational* is perceived as not matching with *bitter* and *sharp* tastes and as matching with a *watery* taste.

The brand value dimension *unique* shows a more irregular pattern which is in line with its name. There are some similarities with the brand values *aspirational* and *accessible* like the match with the taste descriptors *smooth* and *easy to drink*. However, like the brand value dimensions *premium, real* and *confident* is *unique* perceived as matching with *bitterness* and as mismatching with a *watery* taste.

Consumers do also expect specific beer smells for certain brand value dimensions and the dichotomy is as well clearly presented in the correlational pattern between the brand value dimensions and olfactive stimuli. Although an *intense* smell is associated with nearly all the brand value dimensions (except for *aspirational*), an *intense* smell is more strongly associated with *premium, real* and *confident*. A *bitter* smell also match with these brand value dimensions.

In contrast, the *aspirational* and *accessible* brand value dimensions do match with *subtle*, *fruity*, *floral* and *sweet* smells. The *aspirational* brand value dimension do not match well with a *bitter* smell. Remarkable is the finding that the *accessible* brand value dimension is associated with both *subtle* and *intense* smell. However, this last relationship is slightly weaker.

A congruent product experience might reinforce the brand image or vice versa. However, like discussed earlier, it is hard to apply primary product attributes of food and beverages directly in packaging. The identification of relationships between the brand values and tactile and auditive

stimuli in this study suggest that these sensory stimuli are more appropriate to function as secondary product attributes.

3.4.3.3. Touching brands

A number of associations are identified between the brand value dimensions and aspects of touch. The tactile stimulus weight turned out to play an important role, because it is related to nearly all the brand value dimensions, except for *unique*. A *heavier weight* matches with the brand value dimensions *premium, real* and *confident*. In contrast, a *lighter weight* matches with the brand value dimensions *aspirational* and *accessible*. According to literature (Lindstrom, 2005; Piqueras-Fiszman & Spence, 2011) a heavier weighting bottle should be associated with higher product quality and a lighter weighting bottle should be associated with lower quality.

In addition, the *premium, real* and *confident* brand value dimensions turned out to match with *firm material* and mismatch with *flimsy material*. Especially for *premium* this was expected, because also firmness is a tactile sensation associated with high quality, while flimsiness is associated with low quality (Krishna & Morrin, 2008).

Another remarkable finding is that there was no significant correlation identified between the brand value dimension *confident* and *roughness*. Based on earlier research of Krishna, Elder & Carrera (2010) was expected that rough material should be associated with these ´masculine´ brand values. Only the unique brand value dimension is associated with a smooth bottle texture.

3.4.3.4. How a brand sounds

The brand value dimensions are also associated with several auditive stimuli. Especially interesting are the relationships found between the brand value dimensions and the opening sounds. The brand value dimensions *premium, real* and *confident* match a *loud opening sound*. In contrast, the brand value dimension *aspirational* match with a *quiet opening sound*. In addition, the brand value dimensions *premium*, *confident* and *unique* match with a *strong carbonating opening sound*. *Premium* and *confident* may match with a more voluminous opening sound, because the product is more prominent presented, while the *aspirational* brand may match with a somewhat more unobtrusive, but refined sound.

The brand value dimensions *aspirational* and *accessible* match with brand names sounding like *Frish.* Such high frequency words are associated with friendly objects which is in line with the brand value dimension *accessible*, and with fast objects which corresponds with the brand value dimension *aspirational* (Klink, 2000; Paris & Spence, 2009; Spence, 2012; Walker & Smith, 1985). The brand value dimension *real* is associated with the low frequency brand names *Frosh* and *Maluma*. These sounds are related to a rich product (Yorkston & Menon, 2004; Spence & Gallace, 2011).

- This study revealed the semantic associative networks of beer consumers which demonstrated that consumers perceive certain sensory stimuli as matching and other sensory stimuli as mismatching with beer brand values.
- Consumers match specific beer brands with specific beer flavours, the primary product attributes of beer.
- Tactile and auditive stimuli match with certain brand values which makes these sensory stimuli appropriate to serve as secondary product attributes in multisensory beer bottle design.

3.4.4. Taste descriptors

This study demonstrated that beer consumers hold a semantic associative network of relationships between certain beer taste descriptors and other auditive and olfactive sensory stimuli. It is investigated how the most common taste descriptors used by beer brands that represent the primary product attributes of beer, are related to tactile and auditive stimuli which could function as secondary product attributes.

3.4.4.1. How taste feels

Table 3.8 shows that weight is the tactile stimulus that is most and strongest associated with the beer taste descriptors. A heavy weight (instead of a light weight) matches with *sharp*, *full-bodied*, and *bitter* tastes. Light weight matches with *watery*, *light*, *easy to drink*, *smooth*, *mild*, *sweet* and *refreshing* tastes. These findings are in line previous research that demonstrated that heavy weight is associated with a fuller and richer taste, while the opposite is true for light weight (Piqueras-Fiszman et al., 2011; Piqueras-Fiszman & Spence, 2012). *Light*, *watery*, *smooth*, *mild*, *sweet* and *refreshing* tasting pilsners that are *easy to drink* match with a light weighting bottle.

Cold temperature matches with *thirst-quenching*, *refreshing, easy to drink, light a*nd *natural* tastes. Firm material matches with *full-bodied*, *sharp, bitter, tingly* and *natural* tastes. A *watery* taste is perceived as matching with flimsy material. Probably, because a watery taste is just like flimsy material associated with lower quality (Krishna & Morrin, 2008).

The taste descriptors *easy to drink, smooth, light, refreshing* and *thirst-quenching* match with a smooth texture. Only a *crispy* taste is perceived as matching with a rough texture. 'Stronger' tastes as *sharp, tingly, bitter* and *full-bodied* match with a hard texture. In contrast, milder tastes, like *light*, *mild* and *easy to drink* match with a softer texture.

3.4.4.2. Audition

Table 3.9 demonstrates that within the auditive modality the most and strongest relationships are found between the taste descriptors and the sound of the product or brand name. High-pitched brand or product names sounding like *Frish* are matched with the taste descriptors *easy to drink*,

light, *watery*, *smooth, refreshing, thirst-quenching, mild* and *sweet*. These findings correspond with earlier research that found that high frequency words like *Frish* are associated with smaller, cheaper, faster, lighter (in color and weight), milder, softer, thinner, colder and objects (Crisinel et al., 2012; Crisinel & Spence, 2010; Klink, 2000; Paris & Spence, 2009; Spence, 2012; Walker & Smith, 1985). High-pitching words are perceived as mismatching with richness (Yorkston & Menon, 2004).

The taste descriptors *sharp* and *full-bodied* are matched with the low-pitching brand or product names like *Frosh*. This is in line with findings of earlier research that low-pitching sounds are associated with richness (Yorkston & Menon, 2004). Although a substantial amount of research (e.g. Crisinel et al., 2012; Crisinel & Spence, 2010; Holt-Hansen, 1968; Holt-Hansen, 1976; Metz et al., 2011; Rudmin & Capelli, 1983) demonstrated associations between low-pitching sounds and bitterness, this matching association was not found in this study.

The taste descriptors *tingly, full-bodied, foamy, sharp* and *refreshing* are matched with a strong carbonating sound. *Full-bodied, tingly* and *sharp* are also perceived as matching with a loud opening sound, as well as *bitterness*. It is interesting that *bitterness* is perceived as matching with a louder opening sound in this study instead of a soft sound. The match with a soft sound was expected, because a substantial body of earlier research showed associations between *bitterness* with low soft sounds (e.g. Crisinel et al., 2012; Crisinel & Spence, 2010; Holt-Hansen, 1968; Holt-Hansen, 1976; Metz et al., 2011; Rudmin & Capelli, 1983).

A *watery* taste is matched with a quieter opening sound. This is in line earlier with research of Ngo et al. (2011) and Spence & Gallace (2011) that showed that still water was associated with low, soft sounds. Finally, respondents associate a *tingly* taste with high-pitching sounds, which supports findings of earlier research (Spence & Gallace, 2011; Spence, Shankar & Blumenthal, 2011; Zampini & Spence, 2004; 2005).

- This study demonstrated that consumers hold semantic associative networks of relationships between taste descriptors and tactile and auditive stimuli.
- This means that beer drinkers perceive certain beer taste descriptors as matching or mismatching with specific types of tactile and auditive stimuli
- Especially weight, the sound of the brand or product name and the opening sound are promising sensory aspects to set and reinforce taste expectations.

3.4.5. Limitations and future research

Although the research generated promising results, there are some limitations in the research design to take in account.

3.4.5.1. Limitations

First, the research used an online survey which presented sensory stimuli in words. Participants had to imagine how a loud sound would sound or how a rough bottle would feel. Exposure to real samples of sensory stimuli might have resulted in more valid estimates. For example when respondents could feel a sample of a rough glass or hear an audio fragment of a high pitching sound.

In addition the associative networks identified in this study are based on conscious evaluation of stimuli. Therefore they are called 'semantic' associative network instead of 'synaesthetic'. However, sensory triggers offer effect consumer behavior in an unconscious way (Krishna, 2012), experience of real sensory stimuli may have generated other results.

Second, the absence of real sensory stimuli could be an explanation of the absence of certain relationships in the current research, which would be expected based on earlier research. It could account for the absence of the relationships between the brand value dimension *confident* and *rough material* which would be expected based on research of Krishna, Elder & Carrera (2010) and between low-pitching sounds and bitterness that is found by earlier research (e.g. Crisinel et al., 2012; Crisinel & Spence, 2010; Holt-Hansen, 1968; Holt-Hansen, 1976; Metz et al., 2011; Rudmin & Capelli, 1983.

The participants were Dutch speaking, but the questionnaire was presented in English to keep consistency in the meaning of the brand values. However, the brand values were somewhat difficult to interpret and the English language did not made it easier. Participants may have experienced some difficulties with the interpretation of the meanings of the brand value and relating these 'vage' brand values to design.

Presenting brand values in the Dutch language may make it easier for respondents to understand the brand values. To prevent distorting effects of misinterpretation, brand values that loaded on brand value dimensions that did not fit conceptually, were excluded from the research. It was expected that these brand values were too difficult to interpret.

Third, the sample consist of relative young, higher educated participants. Therefore, this study is vulnerable of the sampling bias, because some members of the population (young, high educated) are overrepresented and others (middle aged / old, low educated) are underrepresented. Because beer is a popular drink among students, it is assumed they have developed a substantial amount of realistic associations with beer products and brands. Though, remains the question if older or average educated individuals hold the same semantic network of associations.

Not all the bottles were evaluated by all participants in the sample. On average each participant evaluated three of the five bottles. Probably fatigue and repetition has prevented the participants from completing the questionnaire. Some respondents reported after the study that the evaluation of a beer bottle took a lot of time. In addition, the questionnaire became monotonous, because participants repetitious had to evaluate the same list of statements for each of the five

depicted beer bottles. This could have made them less serious along the questionnaire and could have raised automatic responses.

3.4.5.4. *Suggestions for future research*

Study 1 suggests a promising role for tactile and auditive stimuli to serve as secondary product characteristics in beer bottle design. A subsequent study is needed to validate the other relationships within the hypothesized framework of beer bottle design by investigating how brand and product congruent stimuli in beer bottle design affect brand and product perception and evaluation. Investigation of the real experience induced by actual exposure to a multisensory beer bottle design among a more diverse sample of participants makes the findings of study 1 more valid.

3.5.7. Conclusion

| Conclusion study 1

- **Research goal:**

  Study 1 investigated how sensory stimuli in beer bottle design are related to brand values and taste descriptors of beer products.

- **Main findings:**

  The study demonstrated that beer consumer´s hold semantic associative network of relationships between beer brand values, taste descriptors and sensory stimuli.

  → This means that consumers perceive certain brand values and taste descriptors as matching or mismatching with specific sensory stimuli which confirms the role of congruence in the hypothesized framework of beer bottle design.

- **Implications for future research:**

  Future research is needed to investigate the promising role of tactile and auditive stimuli to serve as brand and product congruent secondary product attributes in packaging design.

4

Study 2: The beer bottle experiment

Study 1 demonstrated that consumers perceive certain brand values and taste descriptors as matching or mismatching with specific sensory stimuli. Now this semantic associative network of beer consumers is revealed, it is possible to investigate how implementation of brand or product congruent sensory stimuli in beer design will affect brand and product perception and evaluation. The relationships found in study 1 suggest a promising role for tactile stimuli to serve as secondary product attributes in beer bottle design. Therefore, in study 2 an empirical experiment is conducted to investigate how brand and product congruent tactile stimuli in beer bottle design affect perception and evaluation.

4.1 Introduction

4.1.1. Research question

Study 1 demonstrated that consumers pair sensory stimuli with beer brand values and taste descriptors which confirmed the first relationship in the hypothesized framework of beer bottle design (see figure 5.1). Now the question raises what will happen when sensory stimuli that match with beer brand or product values are included in beer bottle design.

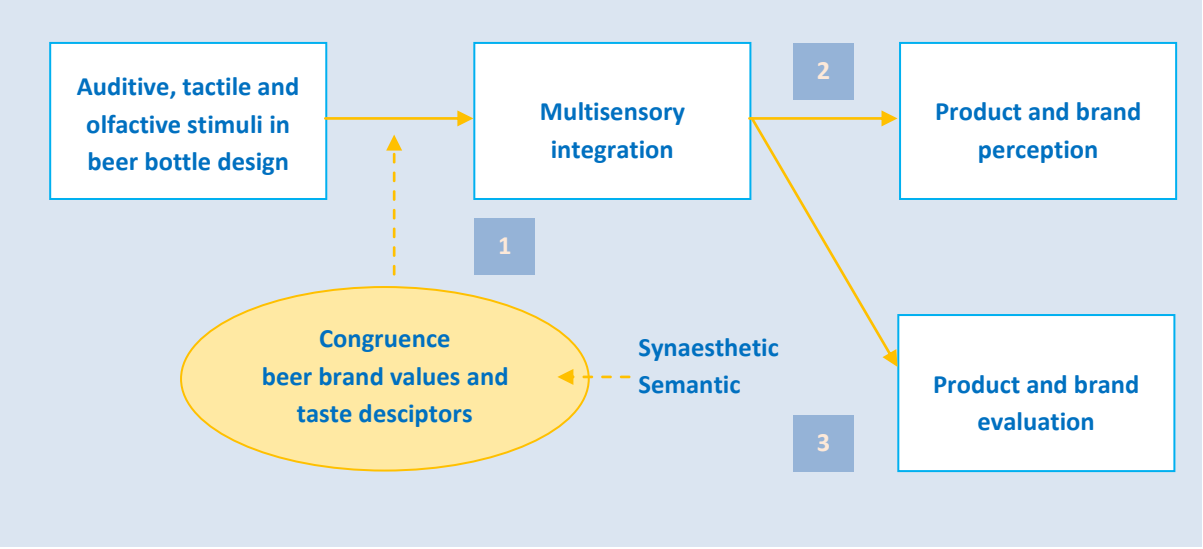


Figure 4.1. The hypothesized framework of multisensory beer bottle design

Previous research showed that pairing products with synaesthetic and semantic associated stimuli affect product perception (e.g. Gal, Wheeler & Shiv, 2007; Hine, 1995; Piqueras-Fiszman et al.,

2011; Spence, Shankar, & Blumenthal, 2011) Moreover, brand perception may also be affected by matching sensory stimuli (Krishna, Elder & Caldara, 2010; Krishna & Morrin, 2008). These findings suggests the existence of the second relationship in the hypothesized framework.

In addition, findings from academic literature indicate that product and brand congruent stimuli also have the potential to affect product and brand evaluation (Krishna, Elder & Caldara, 2010; Spangenberg, et al., 2006; Littel & Orth, 2013). For example, positives outcomes of sensory congruence are found on perceived quality and packaging design attractiveness (Little & Orth, 2013). Consumers also expect higher prices for aesthetic appealing designs (Orth, Campana, & Malkewitz, 2010). Although such positive outcomes also suggest a higher purchase intention for the brand, a higher price expectation may change this intention. These findings provide evidence for the existence of the third relationship presented in the hypothesized framework.

Based on the findings discussed above it is expected that inclusion of matching stimuli in beer bottle design, will affect product and brand perception and evaluation in a favorable direction. Study 1 identified relationships between tactile stimuli and beer brand value dimensions and taste descriptors. Therefore matching tactile stimuli could be included in beer bottle design to investigate the hypothesized effects of a matching beer bottle design.

Although study 1 also found promising relationships for auditive stimuli, study 2 will test relationships 2 and 3 from the hypothesized framework by manipulating tactile stimuli. This is chosen, because effects of touch on consumer behaviour are relative uninvestigated within the academic field compared to vision and audition (Hekkert & Schifferstein, 2008; Spence, 2002; Treasure, 2007). This leads to the following research question for study 2:

How do brand and product congruent tactile attributes of a beer bottle design affect brand and product perception and evaluation?

Brand perception is operationalized as the brand value dimensions the brand is attributed to based on the brand values and dimensions identified in study 1. In the same way product perception is operationalized as the taste description of the beer product based on the taste descriptors identified in study 1. Brand evaluation is operationalized as the brand attitude, purchase intention and price expectation for the brand and product evaluation is operationalized as the perceived quality of the brand's product and the attractiveness of its packaging design.

4.1.2. Hypothesis

Based on the insights from study 1 and the academic literature the following hypothesis is formulated:

- It is expected that responses to a beer brand are more in line with its brand values, taste descriptions and more favorable when a beer bottle design contains tactile stimuli that match with the brand and product values, than when packaging design contains mismatching or no matching stimuli.

4.1.3. Structure

Two experiments were conducted to test this hypothesis: one experiment that tested the hypothesis for a beer brand in line with the *aspirational* brand value dimension and one experiment that tested the hypothesis on a beer brand in line with the *confident* brand value dimension. These two types of brands are chosen based on the dichotomy that was found in the relationships between brand value dimensions and sensory stimuli. Because the *aspirational* and *confident* brand value dimensions generally related in an opposite way to sensory stimuli, clear contradictions were also expected in the research results for these brands.

This study only investigates the effect of tactile stimuli in bottle design that match with the brand on brand and product perception and evaluation. The effects of product congruent stimuli on product evaluation is not investigated, because such effects require confirmation or disconfirmation of an expected taste (Meyers-Levy & Tybout, 1989). A real taste test goes beyond the scope of this study.

4.1.4. Tactile stimuli

The tactile stimuli that were manipulated in this experiment were *weight* and *texture*, because the results of study 1 provide grounds for to further investigation of these tactile stimuli.

4.1.4.1. Weight

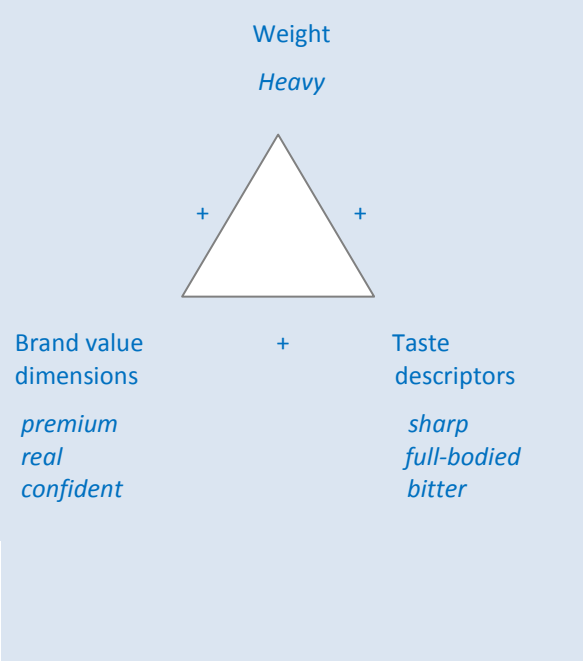
The first study identified a substantial amount of interesting matching relationships between the tactile dimension weight and brand value dimensions and taste descriptors. Heavy weight matched with the brand value dimensions *premium*, *real* and *confident* as well as the taste descriptors *sharp*, *full-bodied* and *bitter*. Furthermore, these brand values and taste descriptors were on their turn also perceived as matching.

In a similar way light weight matched with the *aspirational* and *accessible* brand value dimensions as well as the taste descriptors *light*, *easy to drink*, *smooth*, *mild*, *sweet* and *refreshing*. These brand value dimensions and taste descriptors also matched with each other again. The findings suggest that the tactile dimension weight may play a key role as secondary product attribute in packaging design. It was, indeed, related to brand and product attributes that were also mutually related in a similar way (see figure 4.2 and 4.3).

Investigation of the weight of a beer bottle is valuable, because it builds on the current academic literature on weight. Earlier research showed effects of weight on perception of quality (Piqueras-Fiszman & Spence, 2011) and density and satiety of food products (Piqueras-Fiszman et al. 2011; Piqueras-Fiszman & Spence, 2012b). This may be in line with the perception of a more premium beer brand or more full-bodied beer taste.

From practical perspective it is interesting to investigate the effects of weight on the consumer experience, because beverage brand owners increasingly request packaging designers to minimize

the material use to reduce environmental impact. However, it is not clear how the resulting lighter packaging designs will affect brand or product perception and evaluation.



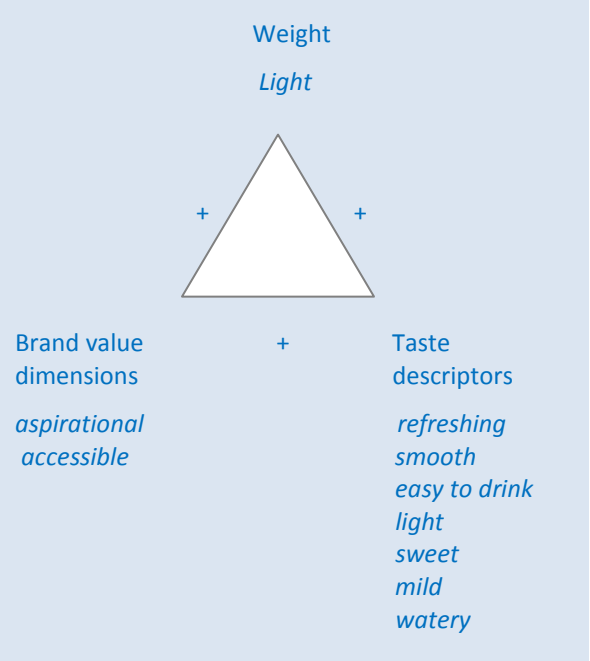


Figure 4.2 and 4.3 The matching relationships between weight, brand values and product characteristics.

Based on these insights the following sub hypotheses are formulated for the tactile dimension weight:

Sub hypothesis 1:

a) For both beer brands is expected that a heavy weighting beer bottle design will result in higher ratings on the *premium*, *real* and *confident* brand value dimensions and in lower ratings on the *aspirational* and *accessible* brand value dimensions, while for the light weighting bottle design the opposite pattern is expected.

b) For both brands it is expected that a heavy weighting beer bottle design will result in more *bitter*, *full-bodied* and *sharper* taste expectations and less *refreshing*, *smooth*, *easy to drink*, *light*, *mild*, *sweet* and *watery* taste expectations, while for the light weighting beer bottle design the opposite pattern is expected.

c) It is expected that both brands and their products are evaluated more positive in the matching condition (when the *confident* brand is paired with a heavy bottle and the *aspirational* brand is paired with a light bottle) than in the mismatching condition (when the *confident* brand is paired with a light bottle and the *aspirational* brand is paired with a heavy bottle) on brand attitude valence, product quality, purchase intention, price expectation and packaging design attractiveness.

4.1.4.2. Texture

Study 1 only identified one matching relationship for texture: the *unique* brand value dimension turned out to be congruent with smoothness. Although earlier research of Krishna, Elder & Carrera (2010) suggested that rough tactile design features would match with masculinity, the

study did not identified a significant matching relationship between the confident brand value dimension and roughness of a beer bottle.

There were also no relations found between texture and the *aspirational* brand value dimension, while this dimension turned out to match with a smooth taste. Moreover, the *aspirational* brand value dimension matched with the same taste descriptors as smooth textured stimuli. These findings suggested that the *aspirational* brand value dimension might match with a smooth texture. Based on these insights the identified and expected relationships of the *confident* and *aspirational* brand value dimensions with texture and taste expectations are shown in figure 4.4 and 4.5.

The absence of expected matching relationships in study 1 might be due to the dependence on imagination in this study instead of exposure to real rough or smooth textured stimulus material. Therefore, it is interesting to investigate the effect of texture in an experiment that allows physical exposure to the texture qualities of a beer bottle. This might result in findings that are more in line the expectations discussed above.

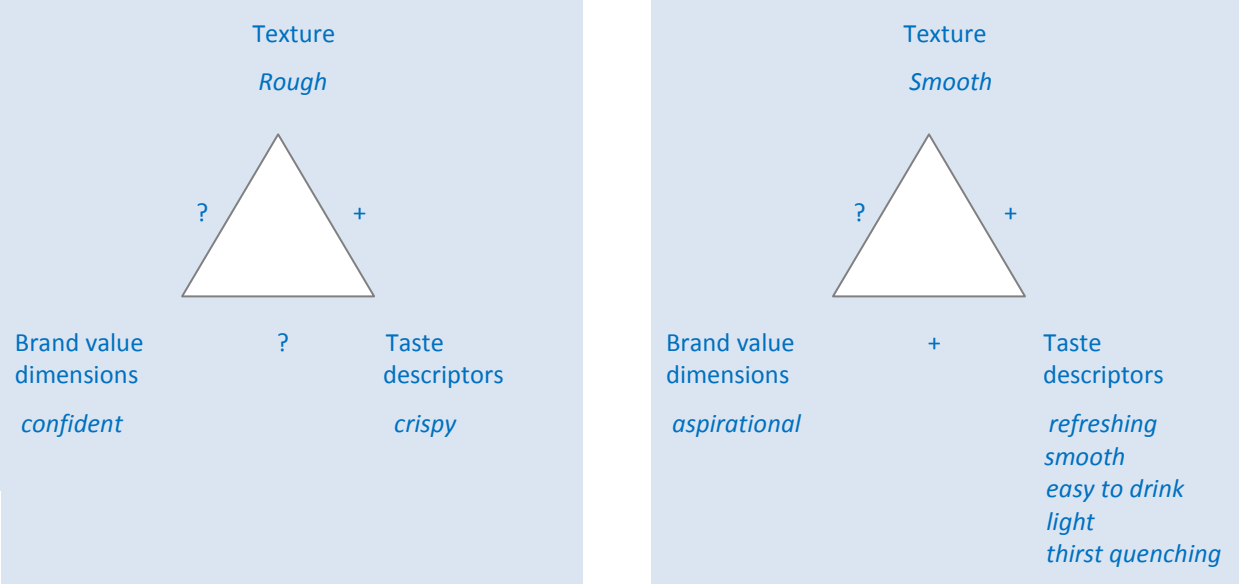


Figure 4.4 and 4.5 The identified (+) and expected (?) matching relationships between dimensions of texture, brand values and product characteristics.

A few relationships were identified in study 1 between the texture of the bottle and the taste descriptors. A rough textured bottle was positively related to *crispiness* and negatively related to *refreshing*, *smooth*, *easy to drink*, *light* and *thirst quenching*.

It is interesting that such relationships between roughness and a beverage product are found, because Piqueras-Fiszman and Spence (2012) could only find an effect of a rough textured packaging on crunchy products (biscuits) and not on liquid products (yoghurt). They attributed the absence of an effect of packaging texture for liquid products to the incongruency between the texture of the food product and the texture of the packaging. In addition, the finding of study 1 that a rough textured packaging was positively associated with crispiness is in line with the findings of Piqueras-Fiszman and Spence (2012).

Besides contradictions between the results of study 1 and the academic literature, the investigation of texture is interesting for commercial purposes. Many beer brands use an embossing in their bottle designs (often with the intention to serve as a visual stimulus). However, it is not clear how the tactile texture of this embossing will affect product and brand evaluation.

The following sub hypotheses are formulated for the tactile dimension texture based on the insights discussed above:

Sub hypothesis 2:

a) For both beer brands it is expected that a rough textured beer bottle design will result in higher ratings on the *confident* brand value dimension and in lower ratings on the *aspirational* and *unique* brand value dimensions, while for the smooth textured beer bottle design the opposite pattern is expected.

b) For both brands it is expected that a rough textured beer bottle design will result in a *crispier* beer taste expectation and a less *refreshing*, *smooth*, *easy to drink*, *light* an *thirst quenching* beer taste expectation, while for the smooth textured beer bottle design the opposite pattern is expected.

c) It is expected that both brands and their products are evaluated more positive in the matching condition (when the *confident* brand is paired with a rough textured bottle and the *aspirational* brand is paired with a smooth textured bottle), than in the mismatching condition (when the *confident* brand is paired with a smooth textured bottle and the *aspirational* brand is paired with a rough textured bottle) on brand attitude, product quality, purchase intention, price expectation and packaging design attractiveness.

4.1.4.3. Weight and texture combined

The more the consumer's senses are engaged in a matching way, the richer and probably also more coherent the experience that results from multisensory integration will be (Schifferstein & Spence, 2007). Based on this assumption and the findings of study 1 and the academic literature (Krishna, Elder & Carrera, 2010) a heavy, rough textured bottle will be a congruent multisensory packaging which match with the *confident* brand value dimension. Findings from study 1 suggest that a light, smooth textured bottle might be more in line the *aspirational* brand value dimension.

According to study 1 roughness matches with a *crispy* taste and heavy weight matches with a *sharp, full-bodied* and *bitter* taste. However, texture is not associated with these taste descriptors and weight not with *crispiness*. In contrast, light weight and smooth texture match both with the taste expectations *refreshing, smooth, easy to drink* and *light*. Based on these insights the following sub hypotheses are formulated for the combined effects of the tactile dimensions weight and texture:

Sub hypothesis 3:

a) An interaction effect is expected for weight and texture on brand perception. For both beer brands it is expected that a heavy, rough textured beer bottle design will result in higher ratings on the *confident* brand value dimension and in lower ratings on the *aspirational* brand value dimension, while for the light, smooth textured beer bottle design the opposite pattern is expected.

b) An interaction effect is expected for weight and texture on taste expectation. For both brands it is expected that a light, smooth textured beer bottle design will result in more *refreshing*, *smoother*, *easier to drink*, and *lighter* beer taste expectations, than a heavy rough textured bottle.

c) An interaction effect is expected for weight and texture on brand and product evaluation. It is expected that both brands and their products are evaluated more positive in the matching condition (when the *confident* brand is paired with a heavy, rough textured bottle design and the *aspirational* brand is paired with a light, smooth textured bottle), than in the mismatching condition (when the *confident* brand is paired with a light, smooth textured bottle and the *aspirational* brand is paired with a heavy, rough textured bottle) on brand attitude, product quality, purchase intention, price expectation and packaging design attractiveness.

4.2 Method

4.2.1. Research design

An experiment with a between-subjects design was conducted to test the hypotheses. The independent variables were 1) the weight of the beer bottle: heavy or light; and 2) the texture of the beer bottle: rough or smooth. Participants evaluated a beer bottle that varied in texture and weight on scales that measured 1) tactile dimensions; 2) brand values; 3) perceived quality; 4) brand attitude; 5) purchase intention; 6) price expectation; 7) attractiveness; and 8) taste expectations.

4.2.2. Procedure

Each participant participated in two similar experimental parts in which they evaluated the beer bottles of two foreign brand on the same items. The only difference was that participants were asked to evaluate the beer bottle of an *aspirational* brand in the one experimental part and the beer bottle of a *confident* brand in the other part. The sequence in which the bottles of the two brands were presented differed at random.

The experiment started when participants took a seat behind a table with a campaign poster of the assigned beer brand, the beer bottle of the brand, a questionnaire and a pen. This setting is presented in figure 4.6. After the participants read the instructions and signed the informed consent form that was included in the questionnaire, they filled in their personal data.

It was determined by random assignment with which experimental part (which beer brand) the participants started. They were instructed to inspect the campaign poster carefully to develop an initial impression of the brand. Subsequently, participants were asked to take the body of the brand's beer bottle (which was placed on the table) in their hands during the experiment. The feel of the bottle varied in weight and texture depending on the condition the participants were assigned to. The participants evaluated the received beer bottle by completing the first part of the questionnaire. After completion they returned the beer bottle and campaign poster at the research leader.

Subsequently, the second experimental part started and participants received a new campaign poster and the beer bottle of the other brand. The similar procedure as described above was repeated to evaluate the beer bottle of the second brand. For each participant the experiment took approximately 15 minutes.
The data was gathered between July 7 and 31, 2014.

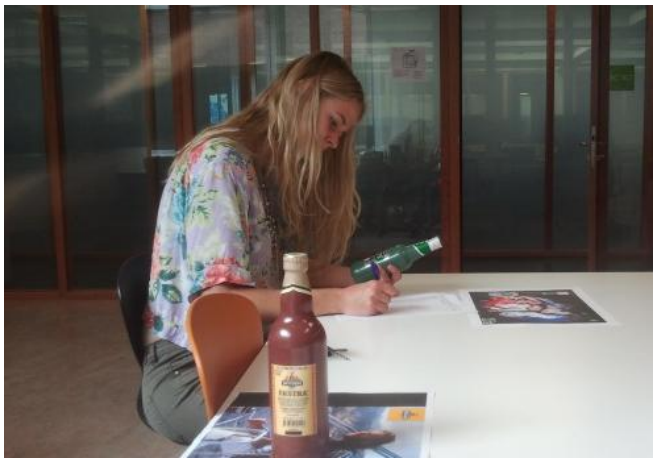


Figure 4.6. Experimental setting of study 2.

4.2.3. Participants

96 participants were recruited for the beer bottle experiment. Participants who never drank beer were not allowed to participate as well as participants under the 18 years. As a consequence, 2 participants were excluded from the research because they never consumed beer. In addition, 3 non-west European (Chinese, Bulgarian, Nepalese) participants were excluded due to their cultural different background and 1 participant was excluded from the research because there were too much missing values (>10%) identified in her questionnaire. The 90 remaining participants were included in the experiment.

34,40% of the participants were students recruited on the Wageningen UR; 37,80% of the participants were visitors of a Dutch bar; and 27.80% of the sample consisted of participants who participated earlier in study 1. The main recruitment sources (the university and the bar) were chosen to create a sample with a more diverse distribution of age and education level by combining students with the middle-aged target group of the bar. Participants received a small snack on the university or a drink voucher in the bar as a compensation for participation.

The sample consisted of 62 men (68,90%) and 28 women (31,10%). The mean age of the sample was 35,00 years (SD = 17,20): the youngest participant was 18 years old and the oldest participant was 82 years old. The sample consisted of 81 participants with the Dutch nationality (90,00%), 7 participants with the German nationality (7,80%) and 2 Belgian (Flemish) participants (2,20%). 92,20% of the participants were Dutch-speaking, so the questionnaire was presented to them in the Dutch language. The German participants (7,80%) received the English version of the questionnaire.
The participants were higher educated: 36,70 % completed an university education, 26,70% a higher professional education and 14,40% a secondary vocational training.

In general the participants consumed beer on a regular base: 72,20 % of the participants drank beer on a weekly basis, 13,10 % monthly and 13,10 % a few times a year. The amount of participants who knew the investigated beer brands was kept as low as possible. 85,60% of the sample was unfamiliar with the brand *Castle Lite* and 94,40% of the sample had never drunk this beer before. 94,40% of the participants was unfamiliar with the brand *Švyturys* and 98,90% had never consumed this beer before.

4.2.4. Stimulus materials

The study consisted of two experimental parts in which participants were exposed to beer bottles of two types of brands: the *aspirational* brand *Castle Lite* and *confident* brand *Švyturys*.

5.2.4.1. The aspirational brand

Two experts of CARTILS selected the South African brand *Castle Lite* for the experimental part that investigated the effects of tactile stimuli that match or mismatch with a brand that endorses the *aspirational* brand values. The experts judged the brand *Castle Lite* as representing the brand values of the *aspirational* dimension: *energizing*, *young*, *fun*, *fresh* and *modern*. A foreign brand is

chosen instead of a familiar brand to avoid biasing effects of prior brand knowledge derived from earlier consumption experiences or exposure to marketing communication.

The participants received the branding poster of *Castle Lite* to provide them prior knowledge of the *aspirational* brand image of *Castle Lite*. The poster was based on an existing image retrieved from the Facebook page of *Castle Lite* and showed young people making fun in an energizing, fresh and modern environment which was in line with the *aspirational* brand values. A picture of the bottle that the participants would receive was placed on the poster. Therefore, participants in the rough textured condition were exposed to the poster presented in figure 4.7. and participants in the smooth textured condition received the poster presented in figure 4.8.

After exposure to the *Castle Lite* branding poster the participants received a *Castle Lite* beer bottle which tactile values matched or mismatched with the brand's values. Four different bottles were developed that varied on weight and texture. Weight was manipulated by the weight of the substance that the bottle contained: a heavy versus a light content. Texture was manipulated by the embossing on the body of the bottle: a rough feeling embossing versus a smooth bottle without embossing.

This resulted in four types of *Castle Lite* bottles for each condition: 1) the smooth and light bottle; 2) the smooth and heavy bottle; 3) the rough and light bottle and 4) the rough and heavy bottle. The current 34 ml bottle of *Castle Lite* pilsner was used in the rough conditions, because it had a rough embossing on both sides. This rough bottle is presented in figure 4.10. In the smooth conditions a previous version of this bottle was used which looked similar to the rough bottle, but possessed a smooth body without embossing. This smooth bottle is presented in figure 4.11.

In the light condition the bottles were completely filled with water which was approximately as heavy as beer (SoortelijkGewicht.com, n.d.). Thus, the *Castle Lite* bottles in the light condition weighted 520 gram which was their regular weight (as when they are filled with beer). In the heavy weight condition the *Castle Lite* bottle weighted with 780 gram half times as much (150 %) as the light bottle (100 %). This because the bottles were filled with shell sand which had a higher specific gravity (SoortelijkGewicht.com, n.d.).

4.2.4.2. The confident brand

The two experts of CARTILS selected the Lithuanian brand *Švyturys* as stimulus material to investigate the effects of tactile stimuli that match or mismatch with a brand with *confident* brand values. The brand *Švyturys* was evaluated by the experts as representing the brand values of the *confident* dimension: self-conscious, bold and masculine. This foreign and (in the Netherlands) unfamiliar brand was also chosen to avoid biasing effects of prior brand knowledge and experience.

Participants received the campaign poster of *Švyturys* which also showed an original image retrieved from the homepage of *Švyturys*. The branding poster provided the participants prior knowledge of the *confident* brand image of *Švyturys* by presenting a strong, self-conscious man with a bold appearance who steers a ship and seem to know what he is doing.

Figure 4.7. The *Castle Lite* branding poster presented to participants in the rough textured conditions.

Figure 4.8. The *Castle Lite* branding poster presented to the participants in the smooth textured conditions.

Figure 4.10. The rough *Castle Lite* bottle design design

Figure 4.11. The smooth *Castle Lite* bottle

Figure 4.12 shows the poster that was presented to participants in the rough textured conditions and figure 4.13 the poster that was presented in the smooth textured conditions. After the exposure to the branding poster participants received a *Švyturys* beer bottle which tactile values matched or mismatched with the brand. For *Švyturys* were also four different bottle designs developed that varied on weight and texture: 1) the smooth and light bottle; 2) the smooth and heavy bottle; 3) the rough and light bottle and 4) the rough and heavy bottle.

In the rough conditions participants received a *Švyturys Extra Draught* 500 ml bottle with a rough embossing on both sides. This rough bottle is presented in figure 4.14. In the smooth conditions participants received a previous version of the current 500 ml *Švyturys Extra bottle*. This smooth bottle which is presented in figure 4.15 had a similar appearance as the rough bottle, but possessed a smooth body with a label instead of a rough embossing which served as label.

The original *Švyturys* 500 ml bottles were heavy bottle designs. Therefore in the heavy condition the bottles were completely filled with water what resulted in the weight of 840 gram. This was similar to the regular weight of the *Švyturys* bottle when it was filled with beer. The heavy bottle designs weighted half times as much (150%) as the light *Švyturys* bottle designs (100 %). The light bottles were filled with stuffing of pillows mixed with flour: substances that were lighter than water (SoortelijkGewicht.com, n.d.).

Figure 4.12. The *Švyturys* branding poster presented to participants in the rough textured conditions.

Figure 4.13. The *Švyturys* branding poster presented to participants in the smooth textured conditions.

Figure 4.14. The rough *Švyturys* bottle design

Figure 4.15. The smooth *Švyturys* bottle design

4.2.5. Measures

The participants completed a paper questionnaire that totally consisted of 133 items. The questionnaire started with 2 open questions and 3 closed questions related to their personal data. The remaining of the questionnaire consisted of two identical sections to evaluate the beer bottles of the *aspirational* and the *confident* brand on the same items. The original questionnaire is found in annex IV.

Each section consisted of two closed questions to check the familiarity of the participants with the brand. Further, participants evaluated 14 properties on a 7 –point semantic differentiation scale that measured the perceived tactile dimensions of the beer bottle, brand quality, brand attitude and packaging attractiveness of the beer bottle design. In addition, the participants evaluated 48 statements on a 7-point Likert scale ranging from 1 ‘strongly disagree’ to 7 ‘strongly agree’. These statements belonged to the scales that measured the brand values, purchase intention, price expectation and taste expectations.

Items of existing standardized scales and the scales developed during the pretest were formulated in the English language. However, the questionnaire used for Dutch participants in this study was translated in the Dutch language to make the tool more understandable. A standardization

method is used to prevent changes in the meaning of the items due to translation. The author translated the English questionnaire in Dutch. Subsequently an expert (a master student English Languages of Radboud University Nijmegen) translated the questionnaire back in English. Finally, discrepancies between the original and back-translated version of the questionnaire were identified and resolved by choosing new Dutch translations that did not resulted in a change of meaning.

4.2.5.1. Tactile dimension scale

The same 5 items that were used in study 1 were also used in study 2 to measure the tactile dimensions that participants perceived during holding the bottles. Participants evaluated their tactile perceptions on a 7-point semantic differentiation scale. An example of a question measuring touch is: 'How does the *Castle Lite* bottle to feel? Light versus heavy'.

4.2.5.2. Brand value scale

The participants evaluated the extent to which they attributed the 27 brand values (identified in study 1) to the presented beer bottle. They evaluated each brand value on a 7-point Likert scale ranging from 1 'strongly disagree' to 7 'strongly agree'. Examples of brand values that consumers evaluated were *quality*, *modern* and *bold*.

4.2.5.3. Taste descriptor scale

Participants described the taste they would expect for the beer in the presented bottle by evaluating the 16 taste descriptors identified in study 1. The participants rated the extent to which they would attribute a certain taste descriptor to the beer on a 7-point Likert scale ranging from 1 'strongly disagree' to 7 'strongly agree'. Examples of evaluated taste descriptors were *bitter*, *full-bodied* and *refreshing*.

4.2.5.4. Perceived quality scale

Perceived quality was measured by 1 item that was borrowed from the research of Piqueras-Fiszman & Spence (2012) on weight and perceived quality. Participants specified what quality they would expect for the received beer bottle on a 7-point semantic differentiation scale ranging from 1 'low' to 7 'high'.

4.2.5.5. Attitude valence scale

3 items of the 'attitude valence scale' of Park, MacInnis, Priester, & Eisingerich et al. (2010) were used to measure the valence of the brand attitude. Participants indicated how they perceived the beer brand of the presented bottle on a 7-point semantic differentiation scale. For example participants had to specify to which degree they saw a beer brand as *positive* versus *negative*.

4.2.5.6. Purchase intention scale

Purchase intention is measured by 3 items of the purchase intention scale of Putrevu & Lord (1994). Participants evaluated statements related to purchase intention on a 7-point Likert scale ranging from 1 'strongly disagree' to 7 'strongly agree'. One of these statement was 'I will definitely try this beer brand'.

4.2.5.7. Price expectation scale

Price expectation is measured by two items developed by the author. Participants indicated on a 7-point Likert scale ranging from 1 'strongly disagree' to 7 'strongly agree' to which extent they agreed with the statements. An example of these statements is 'I expect a high price for this beer brand, compared to other beer brands'.

4.2.5.8. Aesthetic emotional scale

Packaging attractiveness was measured by 5 items of the aesthetic / emotional scale of Hirschman (1986). Participants evaluated the attractiveness of the beer bottle on a 7-point semantic differentiation scale ranging from 1 'low' to 7 'high' that consisted of semantic contradictory items like 'not attractive' versus 'attractive' and 'not beautiful' versus 'beautiful'.

4.2.6. Preparation of the data set

The preparation process of the data set consisted of reliability analyses on the items of each scale and the manipulation checks.

4.2.6.1. Reliability analyses

Table 4.1 presents the outcomes of the reliability analyses that were conducted on the data collected for *Castle Lite*. These analyzes revealed that the items of the brand value dimensions *aspirational* (five items; α = .88); *premium* (six items; α = .83); *real* (three items; α = .71); *accessible* (three items; α = .74); and *unique* (two items; α = .74) were internally consistent and therefore reliable. However, the *confident* brand value dimension turned out to be less reliable(three items; α = .59), than the other brand value dimension scales.

Table 4.1. *Summary of the reliability analyses of the brand values scales for Castle Lite*

Scale	Number of items	Chronbach's Alpha
Aspirational	5	.88
Premium	6	.83
Real	3	.71
Accessible	3	.74
Confident	3	.59
Unique	2	.74

Table 4.2 presents the results of the reliability analyses conducted on the *Švyturys* data. The analyses showed that the items of the brand value dimensions *aspirational* (five items; α = .81);

premium (six items; α = .82); *real* (three items; α = .72); and *confident* (three items; α = .82) were internal consistent and therefore reliable. However, the brand value dimensions *accessible* (three items; α = .63); and *unique* (two items; α = .68) turned out to be less reliable, than the other brand value dimension scales.

Table 4.2. *Summary of the reliability analyses of the brand values scales for Švyturys*

Scale	Number of items	Chronbach's Alpha
Aspirational	5	.81
Premium	6	.82
Real	3	.72
Accessible	3	.63
Confident	3	.82
Unique	2	.68

Table 4.3 presents the results of the reliability analyses that were conducted for the brand and product evaluation scales for *Castle Lite.* The items that constitute the attitude valence scale (three items; α = .71); the purchase intention scale (three items α = .79) the price expectation scale (two items; α = .81); and the aesthetic emotional scale (five items; α = .90) were internally consistent and therefore reliable.

Table 4.3. *Summary of the reliability analyses of the brand and product evaluation scales for Castle Lite*

Scale	Number of items	Chronbach's Alpha
Attitude valence scale	3	.71
Purchase intention scale	3	.79
Price expectation scale	2	.81
Aesthetic emotional scale	5	.90

Table 4.4 presents the results of the reliability analyses that were conducted for the brand and evaluation scales for *Švyturys.* The reliability analyses showed that the items of the attitude valence scale (three items; α = .72), purchase intention scale (three items α = .85), price expectation scale(two items; α = .84), and of the aesthetic emotional scale (five items; α = .93) were internally consistent and therefore reliable.

Table 4.4. *Summary of the reliability analyses of the brand and product evaluation scales for Castle Lite*

Scale	Number of items	Chronbach's Alpha
Attitude valence scale	3	.72
Purchase intention scale	3	.85
Price expectation scale	2	.84
Aesthetic emotional scale	5	.93

4.2.6.2. Manipulation check

A GLM multivariate analysis was conducted on the *Castle Lite* data with texture and weight as factors and the scores on the 5 tactile dimensions as dependent variables. This manipulation check resulted in a main effect of weight on the weight perception of the bottle (F (1, 83) = 9.67, *p*

< .01). This was a medium effect (eta^2 = .11). The participants evaluated the heavier bottles as significant heavier (*M* = 5.45, *SD* = 1.56, *N* = 46), than the lighter bottles (*M* = 4.44, *SD* = 1.55, *N* = 41).

However, the manipulation check did not resulted in an main effect of texture on the tactile perception of the bottles. Participants did not evaluated the rough bottles as having a more rough texture than the smooth bottles. Therefore, the weight manipulation of the *Castle Lite* bottle has been adequate in experiment, but the texture manipulation might be in adequate in this study.

Further, an unexpected moderate significant effect of weight was found on temperature (F (1, 83) = 3.79, *p* = .055, eta^2 = .04) . The light *Castle Lite* bottles were perceived as having a colder temperature (*M* = 4.71, *SD* = 1.47, *N* = 41), than the heavy bottles (*M* = 4.13, *SD* = 1.28, *N* = 46).

A second GLM multivariate analysis was conducted on the *Švyturys* data with texture and weight as factors and the five tactile dimensions as dependent variables resulted in a main effect of the weight of the bottle design on the weight perception of the bottle. (*F* (1, 86) = 28.99, *p* < .00). This is a strong effect (eta^2 = .25). The participants evaluated the heavier *Švyturys* bottles as significant heavier (*M* = 6.02, *SD* = 1.00, *N* = 46), than the lighter bottles (*M* = 4.39, *SD* = 1.81, *N* = 44).

In addition, a main effect of texture of the bottle on the perception of roughness versus smoothness was found (*F* (1, 86) = 24.35, *p* < .00). This effect is strong (eta^2 = .22). The rough *Švyturys* bottle was evaluated as feeling significant rougher textured (*M* = 5.07, *SD* = 1.45, *N* = 46) than the smooth *Švyturys* bottle (*M* = 3.41, *SD* = 1.81, *N* = 44). The manipulation check confirmed that the factors texture and weight were manipulated adequate enough in this study.

Besides the intended manipulation effects, other effects of the weight manipulation of the *Švyturys* bottle were found. There was a main effect of weight on the perceived hardness of the bottles (*F* (1, 86) = 4.72, *p* < .05). This effect is weak (eta2 = .05). Participants perceived the light bottles as significant firmer (*M* = 6.32, *SD* = .77, *N* = 44) and the heavy bottles as significant flimsier (*M* = 5.65, *SD* = 1.90, *N* = 46). A significant effect was also found of weight on texture (*F* (1, 86) = 3.96, *p* < .05). This effect is weak (eta^2 = .04). The heavy bottle was evaluated as significant rougher (*M* = 4.57, *SD* = 1.77, *N* = 46), than the light bottle (*M* = 3.93, *SD* = 1.85, *N* = 44).

4.3 Results for the *Castle Lite* beer bottle design

4.3.1. Data analysis

SPSS Statistics 22.0 is used to analyze the results. First, the scores for each scale were computed. Subsequently, the multivariate analyses and ANOVAs were conducted.

4.3.1.1. Calculation of the scores

The brand value dimension scores were calculated for each participants by taking the average scores on the brand values that belonged to each dimension. For example a participant's score on the brand value dimension *aspirational* was computed by adding his scores on the items *energizing, young, fun, fresh* and *modern* and by dividing this total then by the number of brand values that belong to this dimension which is 5 for *aspirational*. The score on each brand value dimension was computed in this way.

The attitude valence score was computed by adding its three items and by dividing this total score by three. The purchase intention score was computed by taking the average score on the three items of this scale. After the second item of the price expectation scale was reversed the price expectation score was computed by taking the average of the two items of the scale. Finally, the aesthetic emotional score was computed by adding the five items of the scale and by dividing this total by 5, the number of items of the scale.

4.3.1.2. *Analyses*

Multiple multivariate analyses were conducted to investigate the scores on the brand value dimension scales and taste descriptor scale. First a GLM multivariate analysis was conducted with weight and texture as factors and the six brand value dimension scores as dependent variables. Subsequently, a second GLM multivariate analysis was performed with weight and texture as factors and with the individual brand values as dependent variables. Next, a third GLM multivariate analysis was conducted with weight and texture as factors and the beer taste descriptors as dependent variables. Finally, a fourth GLM multivariate analysis was conducted with weight and texture as factors and the five items of the aesthetic emotional scale as dependent variables.

Several 2 x 2 ANOVAs were conducted to investigate the brand and product evaluation scores. The first 2 x 2 ANOVA was performed with weight and texture as factors and with the perceived quality score as dependent variable. A second 2 x 2 ANOVA was conducted with weight and texture as factors and the attitude valence score as dependent variable. A third 2 x 2 ANOVA was performed with weight and texture as factors and the purchase intention score as dependent variable. A fourth 2 x 2 ANOVA was conducted with weight and texture as factors and the price expectation score as dependent variable. Finally a fifth 2 x 2 ANOVA with weight and texture as factors and the aesthetic emotional score as dependent variable was performed.

After the analysis of the main results moderating effects were investigated of gender and age on the relationships between weight and texture and the dependent variables. The median of the sample (*Mdn* = 24.50) was used to split the sample in two age conditions: participants below the 24.50 years old (*N* = 46) and participants older than 24.50 years (*N* = 44). In this way the factor ´age´ was developed. Subsequently, the GLM multivariate analysis described above were repeated, but then with weight and gender, texture and gender, weight and age and texture and age as factors. In a similar way the 2 x 2 ANOVAs were also repeated with weight and gender, texture and gender, weight and age and texture and age as factors.

4.3.2. Results for weight

4.3.2.1. Brand value dimensions

A main effect of weight was found on the brand value dimension *real* (F (1, 83) = 6.61, $p < .05$). This is a weak effect (eta^2 = .07). The brand *Castle Lite* scored higher on the *real* brand value dimension when the presented bottle was heavier (*M* = 3.62, *SD* = 1.26, *N* = 47) instead of lighter (*M* = 2.98, *SD* = 1.06, *N* = 40). There was no significant main effects found of weight on the other brand value dimensions. The perception of the brand on these brand value dimensions remained the same independent of the tactile stimuli in the beer bottle design.

Because also brand values without underlying brand value dimension were evaluated, analysis of the individual brand values resulted in a main effect of weight on *craftsmanship* (F (1,83) = 8.07, $p < .01$, eta^2 = . 90). The *Castle Lite* brand scored higher on *craftsmanship* (*M* = 3.55, *SD* = 1.61, *N* = 47) when a heavy bottle was presented, than when a light bottle design was shown (*M* = 2.63, *SD* = 1.33, *N* = 40).

4.3.2.2. Taste descriptors

Analysis resulted in a main effect of weight on the taste descriptor *easy to drink* (F (1,84) = 6.46, $p < .05$). This effect is weak (eta^2 = .07). *Castle Lite* beer scored higher on the taste descriptor *easy to drink* when it was presented in a light bottle (*M* = 5.95, *SD* = 1.01, *N* = 42), compared to heavy bottle (*M* = 5.26, *SD* = 1.483, *N* = 46). There were no effects found of weight on other taste descriptors. The scores of *Castle Lite* beer on these taste descriptors remained the same independent of the weight of the beer bottle.

4.3.2.3. Brand and product evaluation

There were no effects found of weight on the scores on perceived quality, brand attitude valence, purchase intention, price expectation, and the aesthetic emotional attractiveness of the packaging. The brand and product evaluation remained the same independent of the weight of the beer bottle design.

4.3.3. Results for texture

4.3.3.1. Brand value dimensions

There were no significant main effects found of texture on the brand value dimensions. The score of the *Castle Lite* brand on the brand value dimensions remained the same independent of the texture of the beer bottle.

4.3.3.2. Taste descriptors

The analysis did not resulted in effects of texture on the taste descriptors. The scores on the taste descriptors remained the same independent of the texture on the presented beer bottle.

4.3.3.3. Brand and product evaluation

No effects were found of texture on the scores on perceived quality, brand attitude valence, purchase intention, price expectation and the aesthetic emotional attractiveness of the packaging. The brand and product evaluation remained the same independent of the texture on the beer bottle.

4.3.4. Results for weight and texture

4.3.4.1. Brand value dimensions

An interaction effect was found of texture and weight on the brand value dimension *premium* (F (1, 83) = 4.55, $p < .05$). This is a weak effect (eta^2 = .05). Figure 4.16 shows this interaction effect. The *Castle Lite* brand scored higher on the *premium* brand value dimension when the light and rough bottle design was presented (M = 4.31, SD = 1.15, N = 20), compared to the light bottle and smooth bottle design (M = 3.61, SD = .97, N = 20). The *Castle Lite* brand also scored higher on the *premium* brand value dimension when the heavy and smooth bottle design was presented (M = 4.19, SD = .94, N = 22), instead of the heavy and rough design (M = 3.91, SD = 1.16, N = 25).

There were no significant interaction effects found of weight and texture on the scores on other brand value dimensions. The perception of *Castle Lite* on these brand value dimensions remained the same independent of the tactile stimuli in the beer bottle design.

Analysis of the individual brand values of these dimensions resulted in an interaction effect of texture and weight on the *aspirational* brand value *fun* (F (1,83) = 5.41, $p < .05$, eta^2 = .05). The *Castle Lite* brand scored higher on the brand value *fun* when its bottle was light and rough (M = 5.35, SD = 1.23, N = 20) instead of light and smooth (M = 4.40, SD = 1,73, N = 20) or when its bottle was heavy and smooth (M = 5.14, SD = 1.25, N = 22) instead of heavy and rough (M = 4.80, SD = 1.44, N = 25).

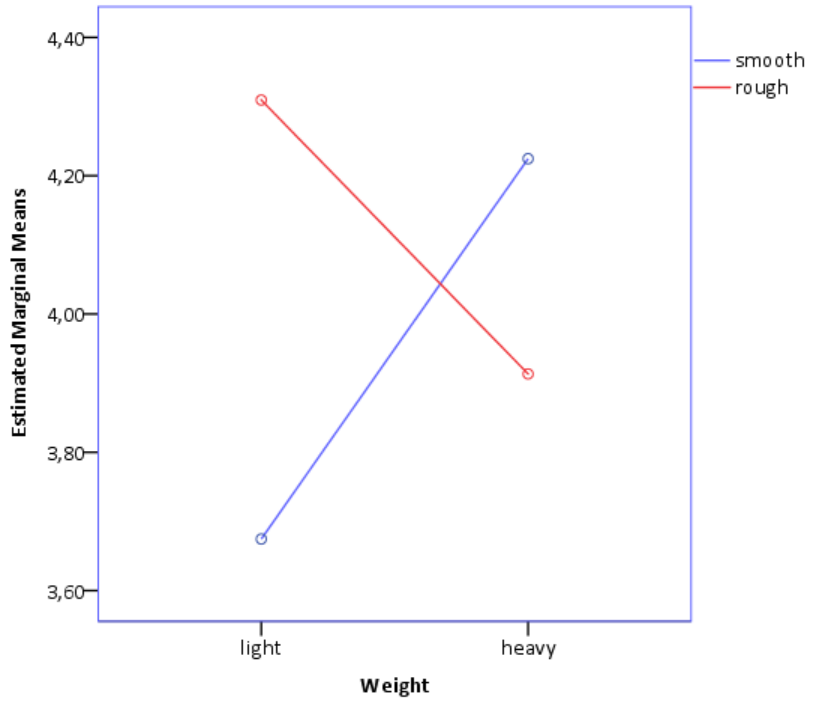


Figure 4.16. The interaction effect of texture and weight on score on the premium brand value dimension.

4.3.4.2. Taste descriptors

There were no significant interaction effects found of weight and texture on the taste descriptors. The scores for *Castle Lite* beer on the taste descriptors remained the same independent of the tactile stimuli of the beer bottle design.

4.3.4.3. Brand and product evaluation

Further analyses did not resulted in interaction effects of weight and texture on the scores on perceived quality, brand attitude valence, purchase intention, price expectation, and the aesthetic emotional attractiveness of the packaging. The brand and product evaluation remained the same independent of the tactile stimuli of the beer bottle design.

4.3.4.4. Summary

The results of the manipulation of weight and texture in beer bottle designs for *Castle Lite* are summarized for the brand value dimensions in table 4.5, for the taste descriptors in table 4.6 and for product and brand evaluation in table 4.7.

Table 4.5. *The effects of weight and texture on the brand value dimensions*

	Weight (heavy vs. light)		Texture (rough vs. smooth)		Interaction (weight x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Aspirational	.57	= .45	1.26	=.27	.24	=.63
Premium	.17	= .69	.86	=.36	4.55	**<.05**
Real	6.61	**< .01**	.01	=.95	2.75	=.10
Accessible	.27	= .61	.10	=.75	.11	=.75
Confident	.08	= .77	.43	=.51	2.05	=.16
Unique	.27	=.61	.19	=.66	.23	=.63

Table 4.6. *The effects of weight and texture on the taste descriptors*

	Weight (heavy vs. light)		Texture (rough vs. smooth)		Interaction (weight x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Bitter	.00	= .98	.03	= .86	.32	= .57
Full-bodied	.08	= .79	.33	= .57	.51	= .48
Refreshing	.28	= .60	.43	= .52	.04	= .85
Crispy	1.38	= .24	.15	= .70	.50	= .48
Smooth	.00	= 1.00	.61	= .44	1.58	= .21
Foamy	.10	= .76	1.16	= .28	.00	= 1.00
Easy to drink	6.46	**< .05**	1.22	= .27	.40	= .53
Light	1.52	= .22	1.15	= .29	.04	= .84
Natural	2.35	= .13	.10	= .76	3.39	= .07
Mild	.08	= .78	.04	= .84	.27	= .61
Thirst-quenching	2.27	= .14	.06	= .80	1.05	= .31
Sweet	.01	= .93	.27	= .61	.00	= .95
Sour	.21	= .65	.14	= .71	.40	= .53
Sparkling	1.23	= .27	.13	= .73	.31	= .58
Watery	.17	= .69	.37	=. 55	.02	= .88
Sharp	.39	= .54	.00	=. 99	.36	= .55

Table 4.7. *The effects of weight and texture on brand and product evaluation*

	Weight (heavy vs. light)		Texture (rough vs. smooth)		Interaction (weight x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Product quality	14	= .71	.21.	= .65	.04	= .85
Brand attitude	37	= .54	.17.	= .68	2.10	= .15
Purchase intention	.03	= .87	.11	= .74	.23	= .64
Price expectation	87	= .35	.20.	= .66	.16	= .69
Packaging attractiveness	.62	= .43	.01	= .91	.43	= .51

4.3.5. Moderating effects

4.3.5.1. Gender

A main effect of gender was found on the brand value dimensions *aspirational* (F (1, 85) = 7.37, p < .01, eta^2 = .08), *accessible* (F (1, 85) = 3.85, p = .05, eta^2 = .08) and *unique* (F (1, 85) = 6.08, p < .05, eta^2 = .08). Women scored the *Castle Lite* brand significant higher on the *aspirational* (M = 5.57, SD = 1.03, N = 27;), *accessible* (M = 4.84, SD = .97, N = 27) and *unique* brand value dimensions (M = 4.70, SD = 1.25, N = 27), than men did (M = 4.84, SD = 1.22, N = 60; M = 4.36, SD = 1.09, N = 60; M = 3.94, SD = 1.32, N = 60). However, gender did not moderate the relationships between weight or texture and the brand value dimensions.

A main effect of gender was also found on the aesthetic emotional attractiveness of the packaging (F (1, 87) = 4.56, p < .05, eta^2 = .05). Women evaluated the beer bottle design of *Castle Lite* in general as more attractive (M = 4.64, SD = 1.06, N = 28) than men did (M = 4.03, SD = 1.35, N = 61).

In addition, a significant moderating effect of gender was found on the relationship between the texture of the bottle design and the attitude valence score (F (1, 86) = 5.82, p < .02, eta^2 = .06). Figure 4.17 presents this moderating effect. Women reported a significant more positive brand attitude valence to *Castle Lite* when its bottle was smooth textured (M = 6.71, SD = .96, N = 17) compared to rough textured (M = 5.45, SD = 1.57, N = 17). The texture of the bottle had less effect on the attitude valence score of men. The rough bottle generated a slightly more positive brand attitude valence among men (M = 6.22, SD = 1.32, N = 35), than the smooth bottle (M = 5.97, SD = 1.91, N = 27).

The results of the effects of gender are summarized in table 4.8 for the brand value dimensions and 4.9 for product and brand evaluation.

Table 4.8. *The effect of gender on the evaluation of Castle Lite on the brand value dimensions*

	Gender (men vs. women)		Interaction (gender x weight)		Interaction (gender x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Aspirational	**7.37**	**< .01**	.68	= .41	.16	=. 69
Premium	.06	= .81	.80	= .37	.02	= .90
Real	.16	= .69	.21	= .65	.99	= .32
Accessible	**3.85**	**= .05**	.03	= .88	.12	= .74
Confident	.10	= .76	.04	= .84	.12	= .73
Unique	**6.08**	**< .05**	1.96	= .17	3.59	= .06

Table 4.9. *The (moderating) effects of gender on tactility and brand and product evaluation*

	Gender (men vs. women)		Interaction (gender x weight)		Interaction (gender x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Product quality	.20	= .65	3.22	= .08	1.92	= .17
Brand attitude	.27	= .60	.03	= .87	**5.82**	**< .05**
Purchase intention	2.32	= .13	.63	= .43	2.59	= .11
Price expectation	1.02	= .32	.00	= .99	1.02	= .19
Packaging attractiveness	**4.56**	**< .05**	.01	= .93	1.90	= .17

4.3.5.2. Age

A significant moderating effect of age was found on the relationship between the texture of the bottle design and the taste descriptors *bitter* (F (1, 84) = 5.79, $p < .05$, $eta^2 = .06$) and *mild* (F (1, 84) = 4.48, $p < .05$, $eta^2 = .05$). Figure 4.18 presents the moderating effect on the expected bitterness. *Castle Lite* beer scored higher on the taste descriptor bitter in the younger age group when the smooth bottle was presented (M = 3.83, SD = 1.56, N = 23), instead of the rough bottle (M = 3.17, SD = 1.44, N = 23). In contrast, *Castle Lite* beer scored higher in the older age group on the taste descriptor bitter when the rough bottle was presented (M = 3.78, SD = 1.31, N = 23), instead of the smooth bottle (M = 2.95, SD = 1.47, N = 19).

Figure 4.19 presents the moderating effect of age on the mild taste expectation. *Castle Lite* beer scored higher in the younger age group on the taste descriptor mild when the rough bottle was presented (M = 5.17, SD = 1.34, N = 23) and scored the beer lower on mildness when a smooth bottle was presented (M = 4.52, SD = 1.24, N = 23). The older age group showed an opposite pattern. In this group the beer scored higher on the taste descriptor mild when the smooth bottle was presented (M = 5.10, SD = 1.05, N = 19), compared to a rough bottle (M = 4.52, SD = 1.70, N = 23). Table 4.10 summarizes the effects of age on tactility and the taste descriptors.

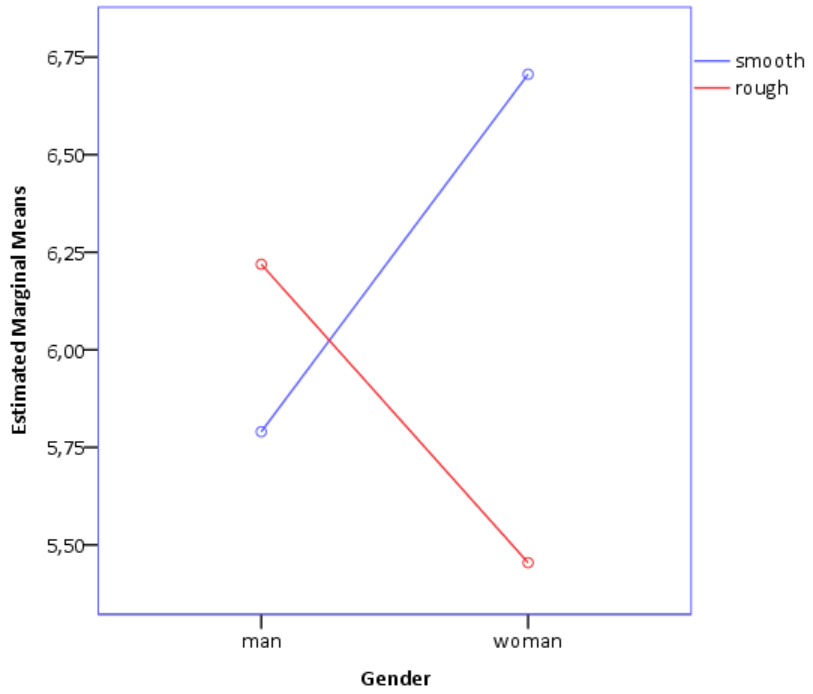


Figure 4.17 The moderating effect of gender on the relationship between texture and the attitude valence.

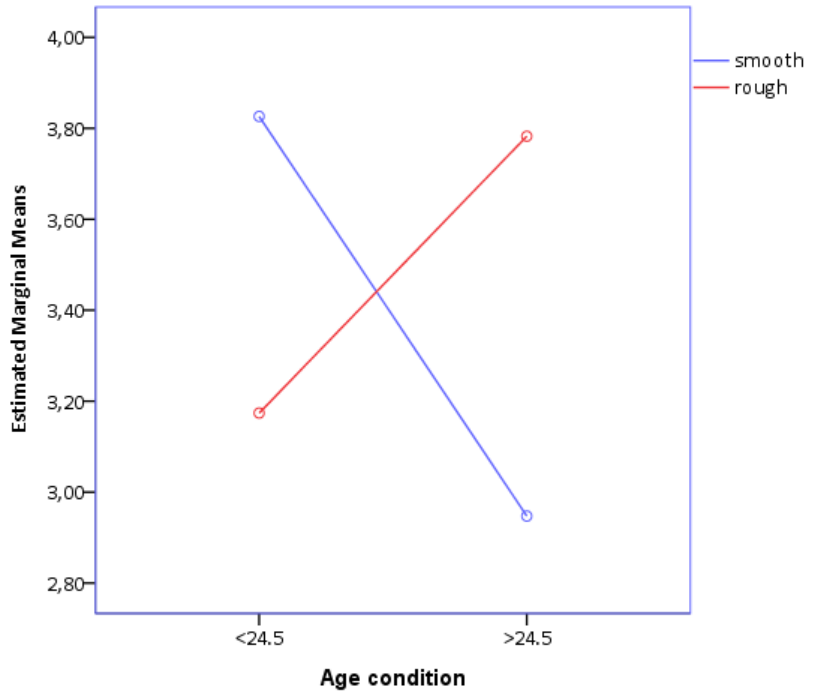


Figure 4.18 The moderating effect of age on the relationship between texture and the score on bitterness.

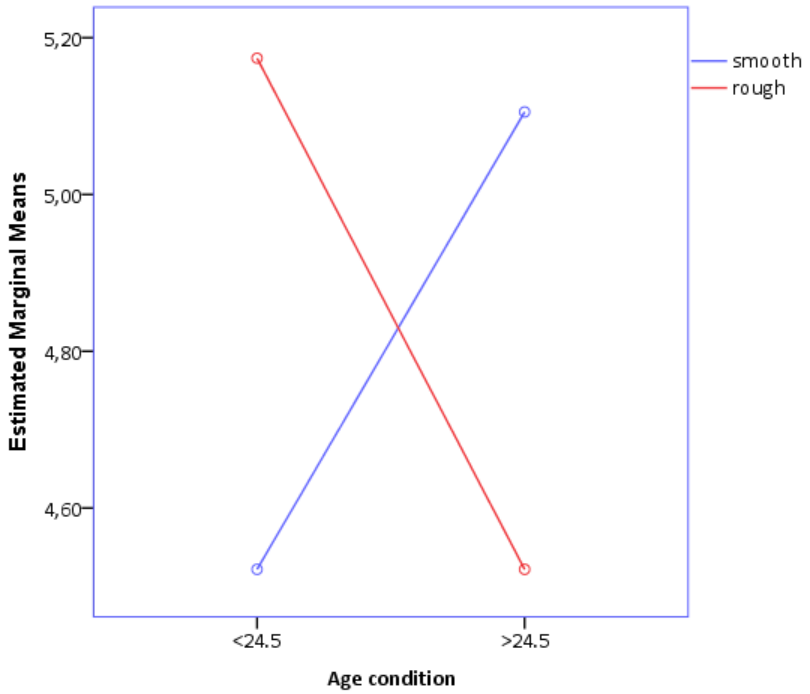


Figure 4.19 The moderating effect of age on the relationship between texture and score on mild taste.

Table 4.10. *The effects of age on tactility and the taste descriptors*

	Age (younger vs. older)		Interaction (age x weight)		Interaction (age x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Bitter	.09	= .76	1.36	.25	**5.79**	**< .05**
Full-bodied	.76	= .39	.34	.56	3.27	= .07
Refreshing	2.13	= .15	.08	.77	1,55	= .22
Crispy	3.52	= .06	.52	.47	.42	= .52
Smooth	.33	= .57	.89	.35	1.73	= .19
Foamy	1.29	= .26	.03	.86	.00	= .95
Easy to drink	.02	= .90	.60	.44	2.57	= .11
Light	1.37	= .25	.02	.89	1.49	= .23
Natural	1.38	= .24	.02	.90	1.58	= .21
Mild	.04	= .83	.02	.88	**4.48**	**< .05**
Thirst-quenching	.10	= .75	.20	.65	.86	= .36
Sweet	.66	= .42	.00	.97	.44	= .51
Sour	.23	= .64	2.55	.11	1.30	= .26
Sparkling	.41	= .53	.45	.50	.64	= .43
Watery	2.94	= .09	.98	.33	.28	= .60
Sharp	.37	= .55	.12	.73	1.51	= .22

5.3.6. Summary of the results for the *Castle Lite* beer bottle design

Weight

- The *Castle Lite* brand scored higher on the *real* brand value dimension when the heavy bottle design was presented, compared the light bottle design.
- The *Castle Lite* brand scored higher on the brand value *craftsmanship* when the heavy beer bottle design was presented, compared to the light beer bottle design.
- *Castle Lite* beer scored higher on the taste descriptor *easy to drink* when it was presented in a light bottle design, instead of a heavy bottle design.
- The light bottle design was perceived as having a colder temperature, than the heavy bottle.

Texture

- No effects were found of the texture of the beer bottle design on the independent variables.

Weight x Texture

- The *Castle Lite* brand scored higher on the *premium* brand value dimension when a light and rough or heavy and smooth bottle design was presented, than when the light and smooth or heavy and rough bottle design was presented.
- The *Castle Lite* brand scored higher on the brand value *fun* when its bottle was light and rough or heavy and smooth, instead of light and smooth or heavy and rough.

Gender

- Women scored the *Castle Lite* brand significant higher on the *aspirational, accessible* and *unique* brand value dimensions and perceived the beer bottle design as more attractive than men.
- Women reported a significant more positive brand attitude to *Castle Lite* when its bottle was smooth textured compared to rough textured.
- The texture of the bottle had less effect on the attitude valence score of men: the rough bottle generated only a slightly more positive brand attitude among men than the smooth bottle.

Age

- *Castle Lite* beer scored higher on the taste descriptor *bitter* in the younger age group when the smooth bottle was presented, compared to the rough bottle.
- In contrast, in the older age group a more *bitter* taste was expected for the beer in rough bottle, compared to the smooth bottle.
- *Castle Lite* beer scored higher on the taste descriptor *mild* in the younger age group when the rough bottle was presented and lower on *mild* taste when the smooth bottle was presented.
- The older age group showed an opposite pattern: the beer scored higher on the taste descriptor *mild* when the smooth beer bottle was presented compared to the rough bottle.

4.4. Results for the *Švyturys* beer bottle design

4.4.1. Data analysis

The analysis for the Švyturys data proceeded in the same order. First, the scores for each scale were computed and thereafter the multivariate analyses and ANOVAs were conducted. The brand value dimension scores, attitude valence score, purchase intention score, price expectation score and aesthetic emotional score were calculated in a similar way as for Castle Lite in section 4.3.1.1. The analyses were also conducted in the same way as in the previous section 4.3.1.2. The GLM multivariate analyses and ANOVAs were run in the same sequence.

4.4.2. Results for weight

4.4.2.1. Brand value dimensions

A main effect was found of weight on the brand value dimension *aspirational* (F (1, 82) = 6.04, p < .05). This is a weak effect (eta^2 = .07). The brand *Švyturys* scored higher on the *aspirational* brand value dimension when the bottle design was heavy (M = 3.55, SD = .92, N = 43) compared to light (M = 3.07, SD = .89, N = 43).

There were no significant effects found of weight on the other brand value dimension scores. The perception of the brand on these brand value dimensions remained the same independent of the weight of the beer bottle design.

4.4.2.2. Taste descriptors

The analysis revealed no effects of weight on the taste descriptors which means that the scores of *Švyturys* beer on the taste descriptors remained the same independent of the weight of the bottle design.

4.4.2.3. Brand and product evaluation

There were no effects found of weight on the scores on perceived quality, attitude valence, purchase intention, price expectation and the aesthetic emotional attractiveness of the beer bottle design. The brand and product evaluation remained the same independent of the weight of the beer bottle design.

4.4.3. Results for texture

4.4.3.1. Brand value dimensions

The analysis did not result in a significant main effect of texture on the brand value dimensions. The score of the *Švyturys* brand on the brand value dimensions remained the same independent of the texture on the beer bottle.

However, analysis of the individual brand values revealed a main effect of texture on the brand value *original* (F (1,82) = 4.52, $p < .05$, $eta^2 = .05$) which belongs to the brand value dimension *unique*. The brand *Švyturys* scored higher on the brand value *original* when a rough textured bottle was presented (M = 4.93, SD = 1.44, N = 44), instead of a smooth textured design (M = 4.26, SD = 1.47, N = 42).

4.4.3.2. Taste descriptors

A main effect was found of texture on the taste descriptor *bitter* (F (1,84) = 4.81, $p < .05$, eta^2 = .05). *Švyturys* beer scored higher on the taste descriptor *bitter* when the rough textured bottle design was presented (M = 5.29, SD =.97, N = 45), compared to the smooth textured design (M = 4.78, SD = 1.23, N = 43).

There were no effects found texture on the other taste descriptors which means that the scores on these taste descriptors remained the same independent of the texture on the presented beer bottle.

4.4.3.3. Brand and product evaluation

No effects were found of texture on the scores on perceived quality, attitude valence, purchase intention, price expectation and the aesthetic emotional attractiveness of the beer bottle design. The brand and product evaluation remained the same independent of the texture on the beer bottle.

4.4.4. Results for weight and texture

4.4.4.1. Brand value dimensions

The analysis did not found a significant interaction effect of weight and texture on the brand value dimensions. The score of the *Švyturys* brand on the brand value dimensions remained the same independent of the tactile stimuli of the beer bottle design.

However, analysis of the individual brand values resulted in a moderate significant interaction effect of weight and texture on the evaluation of the brand value *bold* (F (1,82) = 3.36, p = .07, eta^2 = .04) which belongs to the *confident* brand value dimension. *Švyturys* scored higher on the *bold* brand value when the heavy and rough textured (M = 5.86, SD = 1.24, N = 21) or light and

smooth bottle designs were presented (*M* = 5.80, *SD* = 1.24, *N* = 20), than when the heavy and smooth (*M* = 5.41, *SD* = 1.10, *N* = 22) or light and rough bottle designs were presented (*M* = 5.28, *SD* = 1.57, *N* = 23).

4.4.4.2. Taste descriptors

There were no interaction effects found of weight and texture on the taste descriptors which means that the scores on these taste descriptors remained the same independent of the tactile stimuli of the beer bottle design.

4.4.4.3. Brand and product evaluation

The analysis revealed an interaction effect of texture and weight on purchase intention (F (1,86) = 11.51, $p < .01$, $eta^2 = .12$). Figure 4.20 presents this interaction effect. The purchase intention score for *Švyturys* beer was higher when the smooth and heavy (*M* = 4.88, *SD* =.1.29, *N* = 23) or rough and light (*M* = 4.61, *SD* = 1.64, *N* = 23) bottle designs were presented, than when the smooth and light (*M* = 3.51, *SD* = 1.74, *N* = 21) or rough and heavy (*M* = 3.72, *SD* = 1.63, *N* = 23) bottle designs were presented.

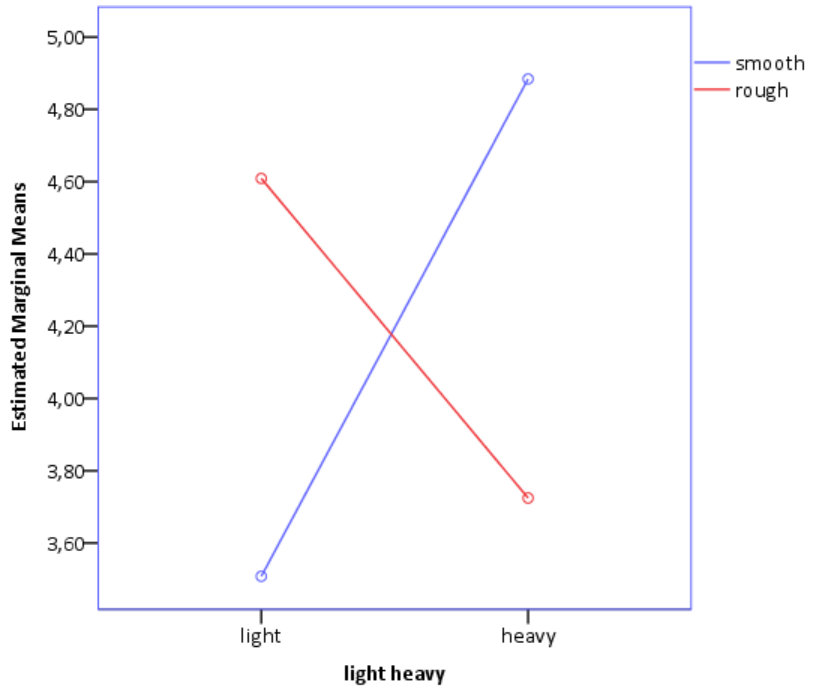


Figure 4.20. The interaction effect of texture and weight on the purchase intention score.

There were no other interaction effects found of weight and texture on the scores on perceived quality, attitude valence, price expectation, and the aesthetic emotional attractiveness of the beer bottle design. The brand and product evaluation on these scores remained the same independent of the tactile stimuli of the beer bottle design.

4.4.4.4. Summary

The results of the manipulation of weight and texture in beer bottle designs for *Švyturys* are summarized for the brand value dimensions in table 4.11, for the taste descriptors in table 4.12 and for product and brand evaluation in table 4.13.

Table 4.11. *The effects of weight and texture on the brand value dimensions*

	Weight (heavy vs. light)		Texture (rough vs. smooth)		Interaction (weight x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Aspirational	**6.04**	**< .05**	.33	= .57	.52	= .47
Premium	.10	= .75	.00	= .97	.00	= .98
Real	.10	= .76	.56	= .46	.06	= .81
Accessible	.17	= .68	.02	= .90	.29	= .59
Confident	1.55	= .22	.48	= .49	1.66	= .20
Unique	.05	= .83	3.53	= .06	1.86	= .18

Table 4.12. *The effects of weight and texture on the taste descriptors*

	Weight (heavy vs. light)		Texture (rough vs. smooth)		Interaction (weight x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Bitter	.08	= .78	**4.81**	**< .05**	.02	= .88
Full-bodied	.30	= .58	2.68	= .11	.38	= .54
Refreshing	.19	= .67	.35	= .56	1.69	= .20
Crispy	.00	= .96	.63	= .43	.01	= .92
Smooth	.23	= .63	1.19	= .28	3.00	= .09
Foamy	.39	= .53	.06	= .82	2.17	= .14
Easy to drink	2.57	= .11	.14	= .71	.36	= .55
Light	.14	= .71	.78	= .38	.53	= .47
Natural	.04	= .85	.84	= .36	.56	= .45
Mild	.54	= .47	1.91	= .17	.91	= .34
Thirst-quenching	.08	= .77	.03	= .87	.02	= .88
Sweet	1.84	= .18	.31	= .58	1.51	= .22
Sour	.62	= .43	.22	= .64	2.93	= .09
Sparkling	.05	= .82	1.11	= .30	.54	= .47
Watery	2.55	= .11	.00	= .99	.02	= .90
Sharp	.05	= .82	.43	= .51	.27	= .61

Table 4.13. *The effects of weight and texture on brand and product evaluation*

	Weight (heavy vs. light)		Texture (rough vs. smooth)		Interaction (weight x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Product quality	.14	= .71	.34	= .56	.03	= .87
Brand attitude	.68	= .41	.08	= .78	.03	= .86
Purchase intention	.54	= .46	.01	= .93	**11.51**	**= .00**
Price expectation	.84	= .36	.48	= .49	.01	= .92
Packaging attractiveness	.00	= .95	1.38	= .24	.57	= .45

4.4.5. Moderating effects

Moderating effects of gender and age were found on the investigated relationships.

4.4.5.1. Gender

The analysis revealed significant effect of gender on the brand value dimension *confident* (*F* (1,84) = 7.60, $p < .01$, $eta^2 = .08$). Women scored the brand *Švyturys* significant higher on the confident brand value dimension (*M* = 5.84, *SD* = .74, *N* = 27), than men did (*M* = 5.12, *SD* = 1.25, *N* = 59). The results of the effects of gender are summarized in table 4.14 for the brand value dimensions.

Table 4.14. *The effect of gender on the evaluation of Castle Lite on the brand value dimensions*

	Gender (men vs. women)		Interaction (gender x weight)		Interaction (gender x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Aspirational	.03	.86	.04	.84	.65	= .42
Premium	2.57	.11	.09	.76	.56	= .46
Real	3.65	.06	1.22	.27	.01	= .91
Accessible	1.03	.31	.19	.66	.70	= .41
Confident	**7.60**	**< .01**	.01	.93	.74	= .39
Unique	.04	= .85	1.70	.20	.06	= .81

A main effect of gender also was found on the taste descriptors *full-bodied* (*F* (1,86) = 4.05, $p < .05$, $eta^2 = .05$)and *watery* (*F* (1,86) = 4.05, $p < .05$, $eta^2 = .05$). Women expected a more full-bodied taste for *Švyturys* beer (*M* = 5.81, *SD* = 1.00, *N* = 27), than men did (*M* = 5.44, *SD* = 1.17, *N* = 61). In contrast, men expected a more watery taste for *Švyturys* beer (*M* = 2.59, *SD* = 1.24, *N* = 61), than women (*M* = 2.04, *SD* = 1.06, *N* = 27).

Moreover, a moderating effect of gender was found on the relation between texture and the taste descriptor *refreshing* (*F* (1,84) = 4,97, $p < .05$, $eta^2 = .06$). Figure 4.21 presents this moderating effect. Men (*M* = 3.30, *SD* = 1.07, *N* = 27) and women (*M* = 3.56, *SD* = 1.82, *N* = 16) assigned about the same score to *Švyturys* beer on the taste descriptor *refreshing* when the smooth bottle design was presented. However, when the rough bottle design was presented, women (M = 2.73, SD = .79, N = 11) assigned a substantially lower score to the beer on the taste

descriptor *refreshing*, than men (M = 3.82, SD = 1.31, N = 34). Table 4.15 summarizes the results of the effects of gender for the taste descriptors.

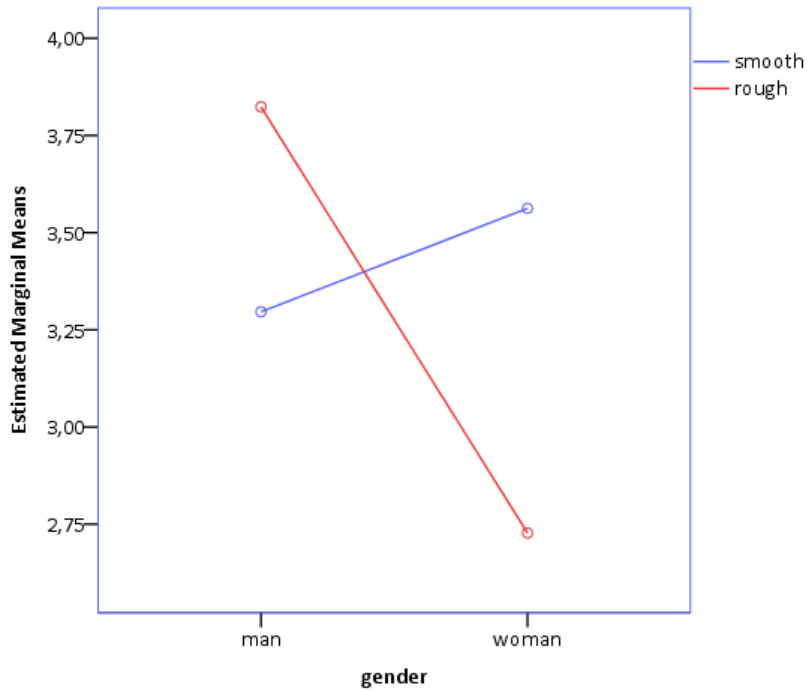


Figure 4.21 The moderating effect of gender on the relationship between texture and the taste descriptor *refreshing*.

Table 4.15. *The effects of gender on tactility and the taste descriptors*

	Gender (men vs. women)		Interaction (gender x weight)		Interaction (gender x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Bitter	.36	= .55	.99	= .32	.40	.53
Full-bodied	**4.05**	**< .05**	.76	= .39	.00	.95
Refreshing	1.44	= .23	.24	= .62	**4.97**	**< .05**
Crispy	2.02	= .16	1.77	= .19	1.32	.25
Smooth	.12	= .73	.00	= .99	.35	.56
Foamy	1.47	= .23	.00	= 1.00	2.23	.14
Easy to drink	.06	= .81	2.01	= .16	.01	.94
Light	.66	= .42	.48	= .49	.04	.85
Natural	.12	= .73	.24	= .63	.01	.94
Mild	.46	= .50	.31	= .58	.12	.73
Thirst-quenching	.09	= .77	.00	= .98	2.83	.10
Sweet	.01	= .93	.71	= .40	.00	.98
Sour	1.95	= .17	.29	= .60	.29	.59
Sparkling	.17	= .68	.25	= .62	.89	.35
Watery	**4.05**	**< .05**	1.52	= .22	.59	.45
Sharp	.33	= .57	1.97	= .16	1.27	.26

4.4.5.1. Age

The analysis showed a main effect of age on the scores on the taste descriptors *bitter* (F (1,86) = 6.88, p = .01, eta2 = .07), *refreshing* (F (1,86) = 6.09, p < .05, eta2 = .07), *easy to drink* (F (1,86) = 8.6.7, p = .00, eta2 = .09), *light* (F (1,86) = 4.47, p < .05, eta2 = .05), and *thirst quenching* (F (1,86) = 6.26, p = .01, eta2 = .07).

Švyturys beer scored higher on the taste descriptor *bitter* in the younger age group (*M* = 5.33, *SD* = 1.10, *N* = 46), than in the older age group (*M* = 4.71, *SD* = 1.09, *N* = 42), while in the older age group *Švyturys* beer scored higher on the taste descriptors *refreshing* (*M* = 3.83, *SD* = 1.29, *N* = 42), easy to drink (*M* = 4.24, *SD* = 1.25, *N* = 42), light (*M* = 3.12, *SD* = 1.19, *N* = 42) and *thirst quenching* (*M* = 4.33, *SD* = 1.49, *N* = 42), than in the younger age group (*M* = 3.15, *SD* = 1.30, *N* = 46; *M* = 3.46, *SD* = 1.24, *N* = 46; *M* = 2.57, *SD* = 1.26, *N* = 46; *M* = 3.61, *SD* = 1.22, *N* = 46).

In addition, significant moderating effects of age are found on the relationship between the texture and the taste desciptors *full-bodied* (F (1,84) = 4.52, p < .05, eta2 = .05), *smooth* (F (1,84) = 3.83, p = .05, eta2 = .04) and *easy to drink* (F (1,84) = 3.91, p = .05, eta2 = .05).

Figure 4.22 shows this moderating effect on the taste descriptor *full-bodied*. Although the rough bottle resulted in nearly the same score on *full-bodied* taste in the younger (M = 5.58, SD = .76, N = 26) and older age groups (M = 5.73, SD = .93, N = 19), the older age group assigned a substantial lower score for *full-bodied* taste to *Švyturys* beer when the smooth bottle was presented (M = 4.83, SD = 1.50, N = 24), compared to the younger age group (M = 5.70, SD = 1.22, N = 20).

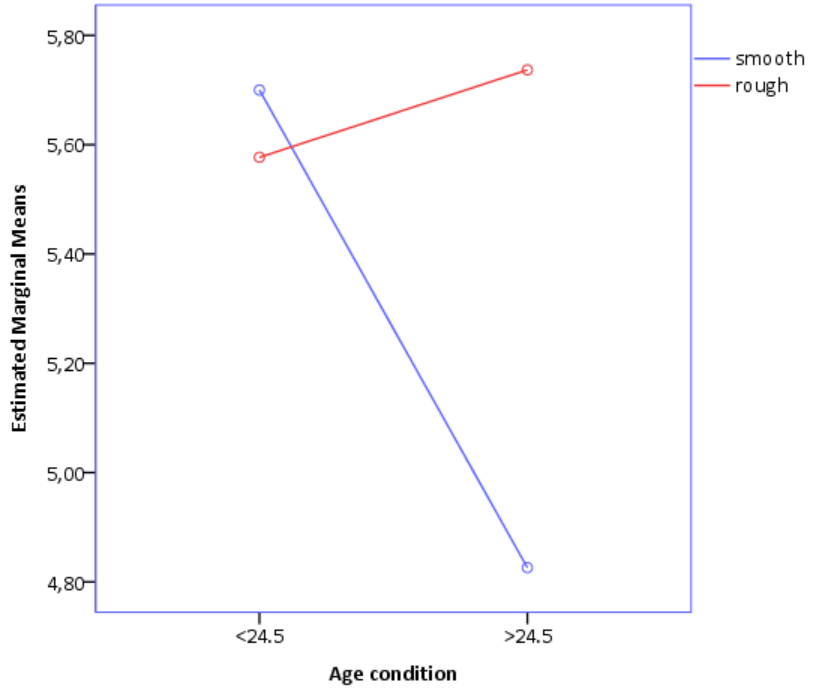


Figure 4.22. The moderating effect of age on the relationship between texture and the taste descriptor *full-bodied*.

Figure 4.23 presents the moderating effect of age on the *smooth* taste expectation. Although the older age group assigned about the same score for *smooth* taste to *Švyturys* beer independent of the rough (*M* = 3.73, *SD* = 1.19, *N* = 19) or the smooth bottle (*M* = 3.48, *SD* = 1.08, *N* = 23) was presented, in the younger age group *Švyturys* beer scored substantially lower on the taste descriptor *smooth* when the rough bottle (*M* = 3.04, *SD* = 1.22, *N* = 26) was presented, compared to the smooth bottle (*M* = 3.80, *SD* = 1.36, *N* = 20).

Figure 4.24 shows the moderating effect on *easy to drink*. When the smooth bottle was presented the *Švyturys* beer scored equally high on the taste descriptor *easy to drink* in the younger (*M* = 3.75, *SD* = 1.48, *N* = 20) and older age groups (*M* = 4.00, *SD* = 1.24, *N* = 23). However, in the younger age group *Švyturys* beer scored substantially lower on *easy to drink* when the rough bottle was presented (*M* = 3.23, *SD* = .99, *N* = 26), while the beer scored substantially higher on *easy to drink* in the older age group when the rough bottle was presented (*M* = 4.53, *SD* = 1.22, *N* = 19).

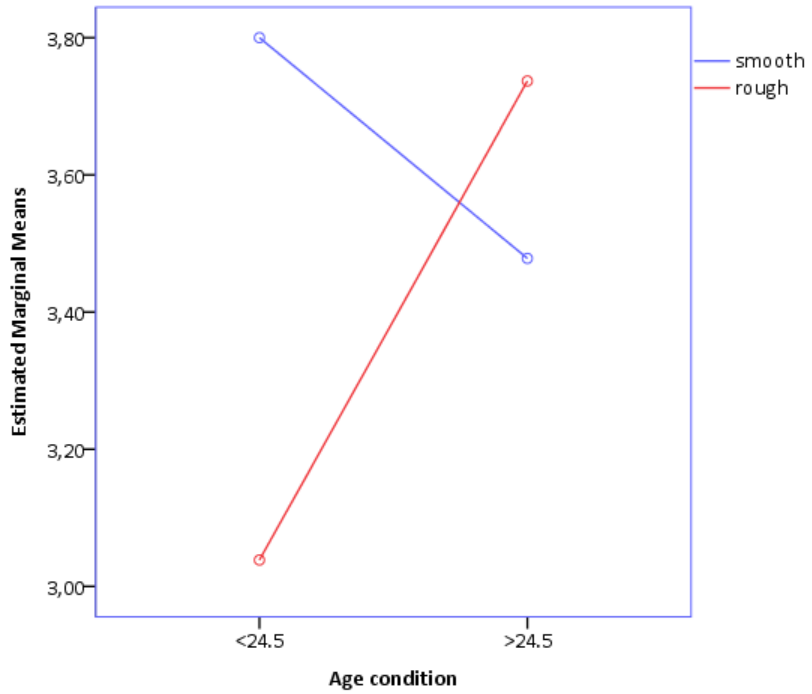


Figure 4.23. The moderating effect of age on the relationship between texture and the taste descriptor *smooth*.

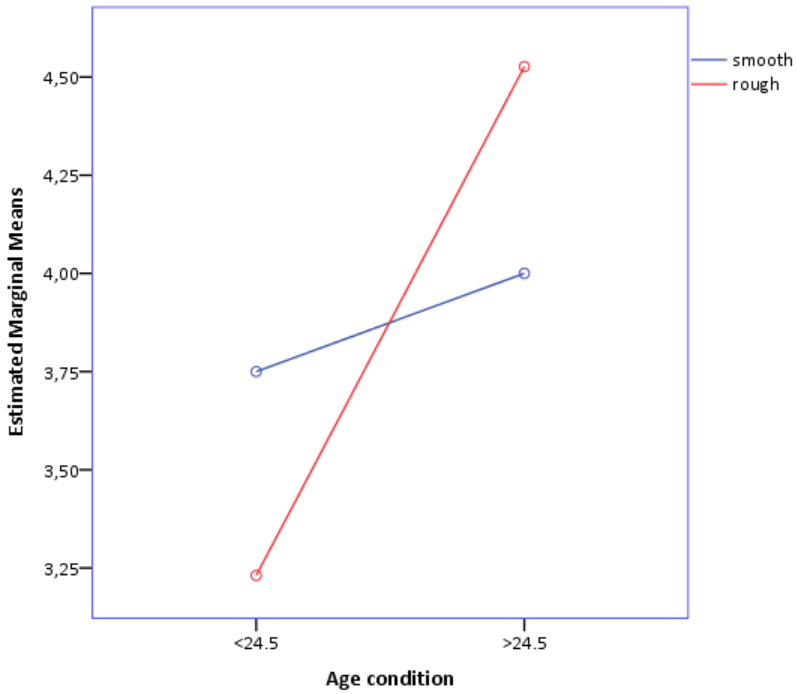


Figure 4.24. The moderating effect of age on the relationship between texture and the taste descriptor *easy to drink*.

Age also had a moderating effect of on the relationship between weight and score on the taste descriptor *sour* (F (1,84) = 6.08, p < .05, eta^2 = .07). Figure 4.25 presents this effect. In the older age group *Švyturys* beer scored higher on the taste descriptor *sour* when the heavy bottle was presented (M = 3.39, SD = 1.44, N = 45), compared to the light bottle (M = 2.47, SD = 1.39, N = 19). In contrast, in the younger age group *Švyturys* beer scored higher on *sour* taste when the light bottle was presented (M = 2.96, SD = 1.40, N = 24), compared to a heavy design (M = 2.50, SD = .91, N = 22). The results of the effects of age are summarized in table 4.15 for the taste descriptors.

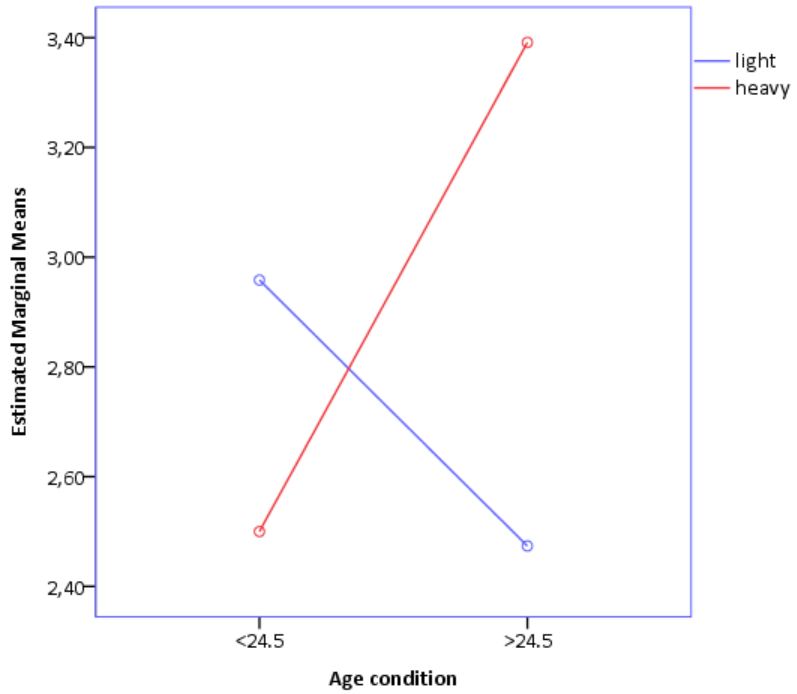


Figure 4.25. The moderating effect of age on the relationship between weight and the taste descriptor *sour*.

Table 4.16. *The effects of age on tactility and the taste descriptors*

	Age (Younger vs. older)		Interaction (age x weight)		Interaction (age x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Bitter	**6.88**	**= .01**	.05	= .83	2.17	= .14
Full-bodied	2.50	= .11	.05	= .82	**4.52**	**< .05**
Refreshing	**6.09**	**<. 05**	1.64	= .20	3,21	= .08
Crispy	1.01	= .32	1.00	= .32	.00	= .99
Smooth	.74	= .39	.01	= .93	3.83	**= .05**
Foamy	.06	= .81	.37	= .55	3.51	= .06
Easy to drink	**8.67**	**= .00**	.04	= .86	3.91	**= .05**
Light	**4.47**	**<. 05**	.38	= .54	3.61	= .06
Natural	.15	= .70	.33	= .57	.39	= .54
Mild	2.81	= .10	1.57	= .21	1.02	= .32
Thirst-quenching	**6.26**	**< .05**	.48	= .49	.05	= .83
Sweet	.06	= .81	1.02	= .32	.04	= .84
Sour	.69	= .41	**6.08**	**< .05**	.12	= .73
Sparkling	.01	= .94	.03	= .86	2.13	= .15
Watery	.00	= .95	.42	= .52	1.26	= .26
Sharp	,13	= .72	.66	= .42	.23	= .63

Finally, age moderated the relationship between the weight of the bottle design and the desirability of the bottle design (F (1,85) = 6.82, p = .01, eta2 = .07). Figure 4.26 shows this effect. Within the younger age group the heavy bottle design scored higher on desirability (measured by the aesthetic emotional scale) (M = 4.73, SD = 1.20, N = 22), compared to the light design (M =

4.00, SD = 1.56, N = 24). In contrast, the light bottle design scored higher on desirability within the older age group (M = 4.75, SD = 1.740, N = 20), compared to the heavy design(M = 3.70, SD = 1.84, N = 23). Table 4.17 summarizes the results for the items of the aesthetic emotional scale.

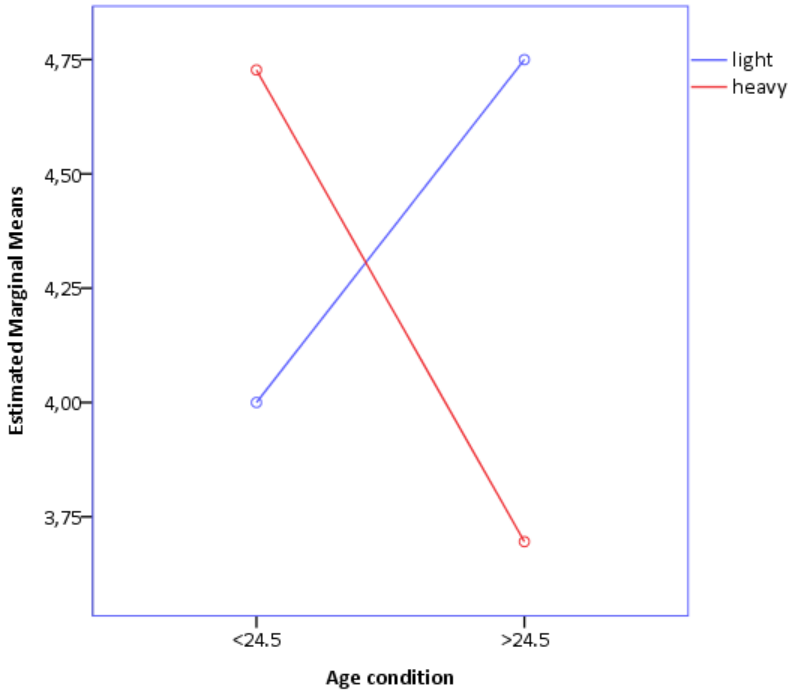


Figure 4.26. The moderating effect of age on the relationship between weight and desirability.

Table 4.17. *The effect of age on tactility and the items of the aesthetic emotional scale.*

	Age (younger vs. older)		Interaction (age x weight)		Interaction (age x texture)	
	F	*p*	*F*	*p*	*F*	*p*
Attractiveness	.49	= .49	.16	= .69	.35	= .55
Desirability	.21	= .65	**6.82**	**= .01**	.04	= .84
Arousability	.81	= .37	1.05	= .31	.32	= .58
Beautifulness	.20	= .66	1.40	= .24	.06	= .80
Likability	.29	= .59	2.72	= .10	.09	= .76

4.4.6. Summary of the results for the *Švyturys* beer bottle design

Weight

- The brand *Švyturys* scored higher on the *aspirational* brand value dimension when the bottle design was heavy compared to light.
- The light bottle design was perceived as firmer than de heavy design, while the heavy bottles design was perceived as flimsier than the light design.
- The heavy bottle design was perceived as rougher, than the light bottle design.

Texture

- The *Švyturys* brand scored higher on the brand value *original* when the rough textured bottle design was presented, compared to the smooth textured bottle design.
- *Švyturys* beer scored higher on the taste descriptor *bitter* when the rough textured bottle design was presented, compared to the smooth textured design.

Weight x Texture

- *Švyturys* scored higher on the *bold* brand value when the heavy and rough textured or light and smooth bottle designs were presented, than when the heavy and smooth or light and rough bottle designs were presented.
- The purchase intention score for *Švyturys* beer was higher when the smooth and heavy or rough and light bottle designs were presented, than when the smooth and light or rough and heavy bottle designs were presented.

Gender

- Women scored the brand *Švyturys* significant higher on the brand value dimension *confident*, than men did.
- Women scored *Švyturys* beer higher on the *full-bodied* taste descriptor than men, while men scored the beer higher on the *watery* taste descriptor than women.
- Men and women assigned about the same score to *Švyturys* beer on the taste descriptor *refreshing* when the smooth bottle design was presented. However, when the rough bottle design was presented, women assigned a substantially lower score to the beer on the taste descriptor *refreshing*, than men.

Age

- *Švyturys* beer scored higher on the taste descriptor *bitter* in the younger age group, than the older age group. *Švyturys* beer scored higher on the taste descriptors *refreshing, easy to drink, light* and *thirst quenching* in the older age group, than younger age group.
- Although the rough bottle resulted in nearly the same score on *full-bodied* taste in the younger and older age groups, the older age group assigned a substantial lower score for *full-bodied* taste to

Švyturys beer when the smooth bottle was presented, compared to the younger age group.

- The older age group assigned about the same score for *smooth* taste to *Švyturys* beer independent of the rough or the smooth bottle was presented. However, in the younger age group *Švyturys* beer scored substantially lower on the taste descriptor *smooth* when the rough bottle was presented, compared to the smooth bottle.
- The *Švyturys* beer received an equally high score on the taste descriptor *easy to drink* from the younger and older age groups when the smooth bottle was presented. However, in the younger age group *Švyturys* beer scored substantially lower on *easy to drink* when the rough bottle was presented, while the beer scored substantially higher on *easy to drink* in the older age group when the rough bottle was presented.
- In the older age group *Švyturys* beer scored higher on the taste descriptor *sour* when the heavy bottle was presented, compared to the light bottle. In contrast, in the younger age group *Švyturys* beer scored higher on *sour* taste when the light bottle was presented, compared to a heavy design.
- In the younger age group the heavy bottle design scored higher on *desirability* (measured by the aesthetic emotional scale), compared to the light design. In contrast, in the older age group the light bottle design scored higher on *desirability*, compared to the heavy design.

4.5. Discussion study 2

4.5.1. Research goal

This empirical research investigated how brand and product congruent tactile attributes of a beer bottle design affect brand and product perception and evaluation. Based on the results from study 1 and earlier academic research was expected that responses to a beer brand were more in line with its brand values, taste descriptions and more favorable when a beer bottle design included tactile stimuli that matched with the brand and product values, than when packaging design included mismatching or no matching stimuli.

4.5.2. Main results

- This study confirmed that tactile stimuli in the beer bottle design affect beer brand and product perception and evaluation.
- It is demonstrated that semantic congruence between the tactile stimuli in the beer bottle design and a brand value dimension or taste descriptor could influence brand or product perception in line with these values.
- However, this hypothesized effect of congruency was not found for all brand value dimensions and taste descriptors and in certain instances it was even found that semantic incongruent stimuli affected brand perception in line with the brand values and enhanced brand evaluation.
- This means that the causal relationships between tactile stimuli in beer bottle design and brand and product perception and evaluation in the hypothesized framework are confirmed, but that the facilitating role of semantic congruency is confirmed partially.
- The individual characteristics gender and age moderated the effect of weight and texture on product perception and brand and product evaluation and are therefore new factors to consider in the hypothesized framework.

The tables 4.18. and 4.19 provide an overview of the major effects found in this study for weight and texture of the beer bottle on brand and product perception and evaluation.

Table 4.18. *The dark blue boxes indicate the effects found of tactile stimuli for Castle Lite.*

The effects found of tactile stimuli on brand and product perception and evaluation

	Brand value dimensions	Taste descriptors	Evaluation
Weight	• *real* ($p < .01$)	• *easy to drink* ($p < .05$)	
Texture			
Weight x Texture	• *premium* ($p < .05$)		

Moderating effects gender on these relationships

	Brand value dimensions	Taste descriptors	Evaluation
Weight			
Texture			• *brand attitude* ($p < .05$)
Weight x Texture			

Moderating effects age on these relationships

	Brand value dimensions	Taste descriptors	Evaluation
Weight			
Texture		• *bitter* ($p < .05$) • *mild* ($p < .05$)	
Weight x Texture			

Table 4.19. The dark blue boxes indicate the effects found of tactile stimuli for *Švyturys*.

Effects found of tactile values on brand and product perception and evaluation

	Brand value dimensions	Taste descriptors	Evaluation
Weight	• *aspirational* ($p < .05$)		
Texture		• *bitter* ($p < .05$)	
Weight x Texture			• *purchase intention* ($p = .00$)

Moderating effects gender on these relationships

	Brand value dimensions	Taste descriptors	Evaluation
Weight			
Texture		• *refreshing* ($p < .05$)	
Weight x Texture			

Moderating effects age on these relationships

	Brand value dimensions	Taste descriptors	Evaluation
Weight		• *sour* ($p < .05$)	• *desirability* ($p = .01$)
Texture		• *full-bodied* ($p < .05$) • *smooth* ($p = .05$) • *easy to drink* ($p = .05$)	
Weight x Texture			

4.5.3. Weight of the beer bottle design

The figures 4.18 and 4.19 show that the weight of the beer bottles affected brand perception in for both brands. Moreover, weight affected product perception (taste expectations) for the *Castle Lite* beer bottle design. There were no effects found of weight on brand or product evaluation.

4.5.3.1. Weight and brand perception

It was expected that a heavy weighting beer bottle design would result in higher ratings of both beer brands on the *premium*, *real* and *confident* brand value dimensions and in lower ratings of

both beer brands on the *aspirational* and *accessible* brand value dimensions, while for the light weighting bottle design the opposite pattern was expected (hypotheses 1a).

For the brand *Castle Lite* a main effect was found on the brand value dimension *real* in the hypothesized direction. The *Castle Lite* brand was perceived as more in line with the *real* brand value dimension when the heavy bottle design was presented, compared to the light bottle design. This effect was expected because of the semantic congruent association between the heavy bottle design and the brand value dimension *real* that was identified in study 1. Thus, this finding suggests that a brand would be perceived as more in line with the *real* brand value dimension when a semantic congruent heavy bottle design is presented.

For remaining brand value dimensions were no effects found in the hypothesized direction. This means that hypothesis 1a was only confirmed for the brand value dimension *real*. However, interesting other effects of weight on the brand value dimensions were identified that were not hypothesized or even occur in the opposite direction of the hypothesis.

First, the *Švyturys* brand was perceived as more in line with the *aspirational* brand value dimension when the heavy beer bottle design was presented, compared to the light beer bottle design. This remarkable finding was contrary to the hypothesis, because according study 1 the *aspirational* brand value dimension would be semantic congruent with the light bottle design and semantically incongruent with the heavy bottle design. Heavier weight is often related to more 'saturated' characteristics like 'density' and 'fullness' (Piqueras-Fiszman et al., 2011; Piqueras-Fiszman & Spence, 2012b), that do not directly correspond semantically with the brand values young, modern, energizing , fun and fresh.

Likeability seems to be the only shared meaning between these brand values and weight. Young, modern, energizing , fun and fresh are likeable characteristics. In addition, consumers in general like heavier products more than lighter products (Piqueras-Fiszman & Spence, 2011). Therefore, the 'halo effect' may explain the findings (see Gleitman, Reisberg & Gross, 2007). This is the tendency to assume that objects that possess one good trait are likely to have others as well.

When a heavy bottle design is present, positive qualities like the *aspirational* brand values are expected to be present too. So heavy weight and the *aspirational* brand values may be semantic associated with good qualities which may explain why a brand is perceived as more in line with the *aspirational* brand value dimensions when a heavier beer bottle design is presented.

In contrast to the hypotheses, there were no effects found of weight on the brand value dimensions *premium, confident* and *aspirational*. Especially the absence of an effect of weight on the brand value dimension *premium* was remarkable. This brand value dimension is underlying the brand value qualitative and previous research demonstrated that a heavier weight result in higher quality perceptions of products (Piqueras-Fiszman & Spence, 2011; Piqueras-Fiszman et al. (2011); Piqueras-Fiszman & Spence, 2012b; 2012c).

The absence of effects of weight on the *confident* and *accessible* brand value dimensions may be due to the fact that these semantic relationships are less robust. Besides study 1, no other

previous research has identified yet semantic congruent relationships between weight and the qualities of the brand values that belong to the *confident* or *accessible* brand value dimensions. In addition, the relationship identified in study 1 between the brand value dimension *accessible* and weight was small. Therefore it is possible that this study could not find an effect for this brand value dimension.

Finally, an unexpected effect was found of weight on the individual brand value *craftsmanship* which belongs to the most claimed brand values among beer brands, but did not share an underlying dimension with the other brand values in study 1. The *Castle Lite* brand was perceived as reflecting more *craftsmanship* when a heavy bottle design was presented compared to a lighter design.

The effect of weight on *craftsmanship* is in the similar direction of the effect of weight on the brand value dimension *real*. Although study 1 could not identify a shared underlying dimension among *craftsmanship* and the brand values belonging to this brand value dimension (*national pride, traditional* and *authenticity*), research suggests that there may be a relation between these brand values, because national pride, tradition, and craftsmanship are all properties of authenticity (Beverland, 2006; Groves, 2001; Napoli, Dickinson, Beverland & Farrelly, 2014).

In addition, this previous research also identified 'quality' as a property of authenticity. Given that higher weighting products are perceived as more qualitative than lighter weighting variants (Piqueras-Fiszman & Spence, 2011; Piqueras-Fiszman et al. 2011; Piqueras-Fiszman & Spence, 2012b; 2012c), other properties that are semantic associated to authenticity may be linked to heavy weight in a similar.

4.5.3.2. Weight and taste expectation

For both brands was expected that a heavy weighting beer bottle design would result in more *bitter*, *full-bodied* and *sharper* taste expectations and less *refreshing*, *smooth*, *easy to drink*, *light*, *mild*, *sweet* and *watery* taste expectations, while for the light weighting beer bottle design the opposite pattern was expected (hypothesis 1b).

In line with this hypothesis *Castle Lite* beer was expected to be *easier to drink* when the light bottle design was presented, instead of the heavy bottle design. This effect is explained by the finding of study 1 that a light bottle design would be semantically congruent with a beer type that would be *easy to drink*, while a heavy bottle design would be incongruent with this taste descriptor.

However, there were no effects of weight found on the expectation of the other taste descriptors which means that the hypothesis is not confirmed for these taste descriptors. The expectation of *bitter, sharp, full-bodied, light, mild, sweet, watery, crispy* and *thirst-quenching* tastes remained the same independent of the weight of the beer bottle design.

The effects of tactile stimuli on product perception are not investigated as much as the effects of visual and auditive stimuli. Thus, the relationships identified in study 1 between weight and these

taste descriptors are not strongly validated yet. However, it was expected that the heavy weighting bottle design would raise the expectation for a full-bodied beer taste, because previous research found effects of weight on the perception of a full, satiating or dense taste (Piqueras-Fiszman et al., 2011; Piqueras-Fiszman & Spence, 2012b).

4.5.3.3. Weight and brand and product evaluation

It was expected that both brands and their products would be evaluated more positively in the semantic congruent condition (when the *confident* brand was paired with a heavy bottle and the *aspirational* brand was paired with a light bottle) than in the semantic incongruent condition (when the *confident* brand was paired with a light bottle and the *aspirational* brand was paired with a heavy bottle) on brand attitude, product quality, purchase intention, price expectation and packaging design attractiveness (hypothesis 1c).

Hypothesis 1c was not confirmed in this study. There were no solid effects of the weight of the bottle on the brand attitude valence, purchase intention for the brand and price expectation of the brand, the perceived quality of its products or the aesthetic emotional attractiveness of the packaging design. The brand and product evaluation remained the same independent of the weight of the packaging design. Because previous research showed that consumers evaluate heavier weighting products more positive than lighter ones in general (Piqueras-Fiszman & Spence, 2011), more positive brands evaluations were expected as response on a heavier packaging design.

Summary of the results for weight

- This study confirmed that the weight of the bottle design affects brand and product perception.
- Semantic congruence between weight and a brand value or weight and taste descriptor affected perception in line with the brand and product values.
- However, this did not happen for all investigated brand value dimensions and taste descriptors.
- In one instance, the brand was even perceived as more in line with the *aspirational* brand value dimension when a heavy semantic incongruent beer bottle design was presented instead of a light semantic congruent beer bottle design.
- The weight of the beer bottle design did not affect brand and product evaluation.

4.5.4. Texture of the beer bottle design

The tables 4.18. and 4.19 show that the texture of the beer bottle affected product perception (taste expectation). This effect was identified for the *Švyturys* beer bottle design, because the manipulation of texture was not adequate enough to induce clear effects for the *Castle Lite* beer

bottle design. There were no solid effects of texture found on brand perception or brand and product evaluation.

4.5.4.1. Texture and brand perception

It was expected that a rough textured beer bottle design would result in higher ratings of both beer brands on the *confident* brand value dimension and in lower ratings of the beer brands on the *aspirational* and *unique* brand value dimensions, while for the smooth textured beer bottle design the opposite pattern is expected (hypothesis 2a).

This hypothesis was not confirmed during this experiment. As well as for perception of the *Švyturys* brand as the *Castle Lite* brand were no effects found of the texture of the beer bottle design on these brand value dimensions. Based on the research of Krishna, Elder and Carrera (2010) were semantic congruent relationships expected between a rough beer bottle texture and the *confident* brand value dimension and a smooth beer bottle texture and the *aspirational* brand value dimension. However, the absence of these effects indicates that the role of texture in product perception identified in literature is not generalizable to brand perception. Consumers may not rely on texture to acquire brand-related information.

Analysis of the individual brand value dimensions does suggest the potential of the beer bottle's texture to affect brand perception. The texture of the beer bottle affected the perception of *Švyturys* on the brand value *original* which belongs to the brand value dimension *unique*. *Švyturys* was perceived as a more original brand when a rough textured bottle design was presented instead of a smooth textured design.

Although this effect is not in line with the expected direction based on study 1, it could be explained by academic literature on incongruency. A rough textured bottle design is in general less common among beer products than a smooth textured design. Therefore, a rough textured bottle may not be associated with beer in general which makes it semantically incongruent with beer products and brands. Because incongruent stimuli evoke surprise (Schifferstein & Spence, 2007), the rough textured bottle design is perhaps be perceived as more original than the smooth textured designs.

4.5.4.2. Texture and taste expectation

It was hypothesized for both brands that a rough textured beer bottle design would result in a *crispier* beer taste expectation and in less *refreshing*, *smooth*, *easy to drink, light* and *thirst quenching* beer taste expectations, while for the smooth textured beer bottle design the opposite pattern was expected (hypothesis 2b). This hypothesis was not confirmed for the taste expectations of both beer brands. The taste expectations remained the same independent of the texture of the beer bottle design.

It is no surprise that this experiment could not identify an effect of texture on expected crispiness, because this is a more common taste descriptor for food, than beverage products (Piqueras-

Fiszman & Spence, 2012). Given that the other taste descriptors are clearly applicable on beverages, it is remarkable that this research could barely find and effect of texture (or weight) on taste expectation.

An unexpected effect was found of the texture of the beer bottle on the expectation for bitterness. A more bitter taste was expected for *Švyturys* beer when it was presented in a rough textured bottle, than a in a smooth textured bottle. Bitterness is associated with angular forms (Deroy & Valentin, 2011, Ngo et al., 2011 & Spence, 2012) and angular forms are also associated with crunchiness (Spence, 2012; Spence & Gallace, 2011). Because Piqueras-Fiszman and Spence (2012) found an effect of a rough textured packaging on crunchy products, there also may exist cross-modal associations among bitterness, roughness and angular forms.

4.5.4.3. Texture and brand and product evaluation

Both brands and their products were expected to be evaluated more positive in the brand congruent condition when the *confident* brand was paired with a rough bottle and the *aspirational* brand with a smooth bottle, than in the brand incongruent condition (when the *confident* brand was paired with a smooth bottle and the *aspirational* brand with a rough bottle) on brand attitude, product quality, purchase intention, price expectation and packaging design attractiveness (hypotheses 2c).

However, hypothesis 2c was not confirmed by this research. There were no solid effects found of the texture of the bottle on the brand attitude valence, the purchase intention for and price expectation of the brand, the perceived quality of its products and the aesthetic emotional attractiveness of its packaging design. The brand and product evaluation remained in general the same independent of the texture of the beer bottle design.

Based on the research of Krishna, Elder and Carrera (2010) effects of a semantic congruent texture were expected for the *confident* brand value dimension that underlies the brand value masculinity. However, the absence of an effect of texture on brand evaluation suggests again that consumers may not rely on tactile information related to texture to evaluate brands.

Summary of the results for texture

- This study showed that the texture of the beer bottle design affects taste expectations for beer.
- The relationship found between texture and the taste descriptor bitter was not yet identified in study 1.
- There were no effects of the texture of the bottle on brand perception and brand or product evaluation, which suggest that consumers may not rely on texture to acquire information about brands or to evaluate brands.
- The existence of semantic congruent relationships between texture and brand values and product characteristics remains unclear, because there were no effects found of texture in the hypothesized directions.

4.5.4. Weight and texture of the beer bottle design

The tables 4.18 and 4.19 show that the weight and texture of the beer bottle resulted in combined effects on brand perception and brand and product evaluation. There were no combined effects of weight and texture found on product perception.

4.5.4.1. Texture and brand perception

It was expected that a heavy, rough textured beer bottle design would result in higher ratings of both beer brands on the *confident* brand value dimension and in lower ratings of both beer brands on the *aspirational* brand value dimension, while for the light, smooth textured beer bottle design the opposite pattern was expected (hypothesis 3a). However this hypothesis was not confirmed in for both brands. The perception of these brand value dimensions remained the same independent of the tactile stimuli in the beer bottle design.

Consideration of the individual brand values of these dimensions resulted in an interaction effect of texture and weight on the *aspirational* brand value *fun* and the *confident* brand value *bold*. However, this was not entirely in the hypothesized direction. The *Castle Lite* brand was perceived as funnier when its bottle was light and rough or heavy and smooth, instead of light and smooth or heavy and rough.

This finding could also be attributed to the effect of incongruency (Schifferstein & Spence, 2007). For example, humorous stimuli are a combination of unexpected, surprising, incongruent stimuli (Strick, Holland, van Baaren & van Knippenberg, 2009). In the same way, funny brands or products may also be linked to a combination of incongruent tactile stimuli.

In addition, although the effect was moderately significant, the effect found for the brand value *bold* was partly in line with the hypothesis of the *confident* brand value dimension. *Švyturys* was evaluated as a more *bold* brand when the bottle was heavy and rough textured, but also when the design was light and smooth, instead of heavy and smooth or light and rough.

Although the first direction of the interaction effect was expected, the second direction was not supported by study 1 or previous research. A brand may be perceived as *bolder* when tactile stimuli are congruent which each other, independent of the semantic congruency with the brand value. Little & Orth (2013) also showed an effect of mutual congruent stimuli on brand evaluation independent of the congruency with the brand itself.

Finally, a combined effect of texture and weight was found on the perception of *Castle Lite* on the *premium* brand value dimension. Participants evaluated the *Castle Lite* brand as most *premium* when a light and rough bottle design was presented and as least *premium* when a light and smooth bottle design was presented. However, the brand was perceived as more *premium* when a heavy and smooth bottle design was presented, than a heavy and rough bottle.

This suggest that a brand is perceived as more *premium* when there is slight incongruency among tactile stimuli in the beer bottle design. Based on this insight it is recommended to combine a

more with a less intense tactile stimulus (for example rough and light or heavy and smooth), instead of combining multiple intense (rough and heavy) or multiple less intense stimuli (smooth and light) in beer bottle design to affect brand perception. Thus, adding tactility to beer bottle design may make a brand perceived as more premium, but do not overdo it.

4.5.5.2. Weight and texture and taste expectation

A combined effect of weight and texture was expected on taste expectation. For both brands it was hypothesized that a light, smooth textured beer bottle design would result in more *refreshing*, *smooth*, *easy to drink*, and *light* beer taste expectations, than a heavy, rough textured bottle design (hypothesis 3b).

This hypothesis was not confirmed in this research, because there was no effect of the combination of both stimuli in bottle design found on the taste expectations for beer of both brands. This is not totally surprising, because study 1 could not find any shared associations between heavy weight and rough texture with the taste descriptors. However, smooth texture and light weight showed similarities in the pattern of semantic associations found in study 1. Therefore, some combined effects were expected to occur.

4.5.5.3. Weight and texture and brand and product evaluation

The brands and their products were expected to be evaluated more positively in the brand congruent condition (when the *confident* brand was paired with a heavy and rough bottle design and the *aspirational* brand was paired with a light and smooth bottle), than in the brand incongruent condition (when the *confident* brand was paired with a light and smooth bottle and the *aspirational* brand was paired with a heavy and rough bottle) on brand attitude valence, product quality, purchase intention, price expectation and aesthetic emotional attractiveness of the packaging design (hypotheses 3c).

An interaction effect of the texture and weight of the bottle was found on the purchase intention for *Švyturys*. Participants reported a higher purchase intention for *Švyturys* beer when the smooth and heavy or rough and light bottle designs were presented, than when the smooth and light or rough and heavy bottle designs were presented.

Based on the semantic associations found in study 1 the heavy and rough design was expected to be congruent with the *Švyturys* brand and therefore to enhance purchase intention. Although the texture and weight of the bottle influenced purchase intention together, this effect did not occurred in the hypothesized direction. Like for the effect of weight and texture on the *premium* brand value dimension, consumers may evaluate brands more positively when one more and one less intense tactile dimension are combined (like heavy weight and smooth texture or light weight and smooth texture) compared to multiple more intense tactile dimensions (roughness and heavy weight) or multiple less intense tactile dimensions (smoothness and light weight).

There were no other combined effects found of weight and texture on the brand attitude valence, price expectation of the brand, the perceived quality of its products and the aesthetic emotional

attractiveness of its packaging design. Therefore hypothesis 3c was not confirmed by this research.

Summary of the results for weight and texture:

- This study demonstrated that the weight and texture of the beer bottle design had a combined effect on brand perception and evaluation.
- Slightly incongruency between the tactile stimuli in the beer bottle design made a brand perceived as more in line with the premium brand value dimension and enhanced the purchase intention for the brand.
- There were no combined effects found of weight and texture of the bottle on the expected beer taste.

4.5.6. Moderators

As visualized in the tables 4.18 and 4.19, the effects of tactile stimuli in beer the bottle design on product perception and brand and product evaluation were moderated by the age and the gender of the participants.

4.5.6.1. Gender

Gender turned out to moderate the effect of the texture of the beer bottle design on brand attitude.
Women reported a significant more positive brand attitude valence to *Castle Lite* when a smooth textured bottle design was presented, compared to a rough textured design. Although texture had less effect for men, men reported a slightly more positive brand attitude to *Castle Lite* when a rough bottle design was presented compared to the smooth bottle design.

This finding is in line with the research of Krishna, Elder and Caldara (2010) that showed that femininity is associated with smooth haptic qualities and masculinity with rough haptic qualities. The finding also supports partially hypothesis 3c.

The moderating role of gender on the effect of texture on brand attitude could be explained by the suggestion that not the congruence between the brand values and the tactile stimuli in packaging design have resulted in a higher brand attitude, but the congruence between individual characteristics of the participants – gender in this situation – and the texture of the packaging design. Gender congruent sensory stimuli in packaging design may have dominated instead of the effect of brand congruent sensory stimuli.

Further, the effect of texture on brand attitude turned out to be stronger for women than for men. Women reported a much more positive brand attitude to *Castle Lite* when a 'gender-congruent' textured bottle design was presented and a much more negative brand attitude when

a ‘gender-incongruent’ design was presented, than men did. Thus, the congruency between the tactile stimuli in beer bottle design and own gender had much more impact on women, than men.

This may be explained by the fact that women have a higher need for tactile input compared to men in making product evaluations (Citrin et al., 2003). This effect can also be true for brand evaluation. Women may rely more on tactile input for brand evaluation than men do. This also suggests that women perhaps may be even more vulnerable for the affective ventriloquism effect of Spence and Gallace (2011) than men. Positive haptic information about a brand may dominate the overall multisensory brand evaluation of women.

Another noticeable finding was that women perceived the *Castle Lite* and the *Švyturys* brands more in line with their brand value dimensions than men did – independent of the tactile stimuli in bottle design. This is in line with previous findings that women would be more brand sensitive and conscious than men (Workman & Lee, 2013). This insight raises a second explanation in addition to congruence with own gender, for the finding that the brand attitude for *Castle Lite* raised among women when a smooth textured bottle design was presented: sensitivity for the brand.

Because of their higher sensitivity and consciousness for brands in combination with a higher need for tactile input, women might have noticed the congruency between the *aspirational* brand and the smooth texture, while men did not. Thus, women may have based their brand attitude on coherence between the tactile stimuli in packaging design and the brand values (in line with hypothesis 3c), while men based their brand attitude on gender congruent tactile stimuli in packaging design.

Another moderating effect of gender was found on the effect of the texture of the bottle design on taste expectation. Although men and women expected relatively the same amount of refreshment from *Švyturys* beer when a smooth bottle was presented, men expected a more refreshing taste from the rough textured bottle, while women expected a much less refreshing taste from the beer when this design was presented.

This effect may also be the result a higher need for tactile input among women for product evaluation. Study 1 showed a congruent relationship between smooth texture and a refreshing taste, which was also in line with hypothesis 2b. Because women may be more sensitive for tactile input, an incongruent packaging texture might change their taste expectation dramatically.

However, it is remarkable that men expected from beer of a rough textured bottle design a more refreshing taste, because this is contrary to the semantic associations found in study 1. Perhaps the halo effect may also explain this finding. Because the beer was packed in a rough textured bottle which is perceived as positive a positive characteristic among men, men expected more positive characteristics from the beer, like a refreshing taste.

Finally, it is worth to note that gender only moderated the effects of the texture of the bottle design on brand evaluation and product perception. There are no moderating effects of gender found for the effect of the weight of the bottle design on these outcomes. This is perhaps related

to the semantic association between gender and texture identified by Krishna, Elder and Caldara (2010).

Summary of the results for gender:

- Gender moderated the effect of texture on product perception and brand evaluation.
- Women reported a more positive brand attitude valence to the *aspirational* brand when a smooth textured bottle design was presented, compared to a rough textured design, while the brand attitude of men raised slightly when a rough textured bottle design was presented.
- Women expected a less refreshing taste from the beer when a rough textured beer bottle was presented, while men expected a more refreshing taste in this situation.
- Two possible explanations for these moderating effects are:
  - Congruence between own gender and tactile stimuli of the beer bottle design result in a more positive brand evaluation and taste expectation for the beer
  - A higher brand sensitivity and need for tactile input among women than men result in stronger effects of semantic congruency between tactile stimuli in packaging design and product and brand values on women, than on men.

4.5.6.2. Age

In addition to gender, age showed interesting moderating effects on the relationship between tactile stimuli in bottle design and taste expectations and product evaluation. Age moderated the effect of the bottle design's texture on the expectation for *bitter* and *mild* tastes. The younger age group expected a more *bitter* taste for *Castle Lite* beer when the smooth bottle design was presented compared to the rough bottle design, while older age group expected a more *bitter* taste for the beer in rough textured bottle design, instead of the smooth variant.

The younger age group also expected a milder taste for *Castle Lite* beer when it was presented in a rough textured bottle and a less *mild* taste when it was presented in a smooth bottle. However, the older age group expected a *milder* taste for the beer in the smooth bottle, compared to the rough variant.

Age also moderated the effect of texture on the taste expectations *full-bodied*, *smooth* and *easy to drink* for *Švyturys* beer. Although the rough bottle elicited relatively similar *full-bodied* taste expectations among the younger and older age group, the smooth bottle resulted in a substantial drop in the *full-bodied* taste expectation in the older age group, compared to the younger age group. Furthermore, the older age group expected an equally *smooth* taste of the beer from the rough bottle as of the smooth bottle, while younger age group expected a substantially less *smooth* taste for the beer in rough bottle, compared to the smooth bottle.

Moreover, the younger and the older age groups expected the smooth bottle to be relatively as equally *easy to drink*. However, when a rough bottle was presented, the younger age group

expected the beer form this bottle to be less *easy to drink*, while the older age group expected the beer from this bottle to be *easier to drink* compared to the beer from the smooth bottle.
It is interesting that study 1 could not identify semantic congruent associations between the texture of the beer bottle and the taste descriptors *bitter, mild*, and *full-bodied*. The younger age group turned out to associate the rough textured beer bottle design with the taste descriptors *mild* and the smooth textured design with the taste descriptors *bitter* and *full-bodied*. In contrast, the older age group associated the rough textured beer bottle design with the taste descriptors *bitter* and *full-bodied* and the smooth design with the taste descriptor *mild*.

It is surprising that a *mild* taste is associated with a rough texture among the young age group, because milder, creamy products are often associated with round shapes (Spence, 2012; Spence & Gallace, 2011) which would suggest an association between plainness and smoothness in the texture with mildness. However, this association is only found for the older age group. In addition, this study showed a relationship between texture and the expectation of *full-bodied* taste. This is interesting, because previous research related this taste descriptor especially to weight (Piqueras-Fiszman et al., 2011; Piqueras-Fiszman & Spence, 2012).

The controversial effects found on *bitterness* corresponds with findings from literature. *Bitterness* is generally general associated with low-pitching sounds and words like *bouba* and *maluma* (Crisinel et al. 2012; Crisinel & Spence 2010; Holt-Hansen, 1968; 1976; Metz et al., 2011; Rudmin & Capelli, 1983). These sounds in turn, are often associated with round and organic shapes (Spence & Gallace, 2011; Ngo et al., 2011). Therefore it might be expected that *bitterness* also is associated with these 'smooth' forms which may explain why the young age group expects a *bitter* taste for a smooth textured bottle design.

However, research of Deroy & Valentin (2011), Ngo et al. (2011) & Spence (2012) shows that *bitterness* is associated with angular shapes. These less 'smooth' shapes may explain why the older age group associated *bitterness* with a rough textured beer bottle design. The shape and sound symbolism do not seem to match in the conventional way case for *bitterness*. Age may play a role in the controversial semantic associations related to bitterness.

Finally, the younger age group associated the smooth textured beer bottle with the taste descriptors *easy to drink* and *smooth*. This corresponds with the semantic associations that were expected based on the findings from study 1. However, the average age of the sample of study 1 was somewhat higher than the average age of the participants of study 2. This may explain why the younger age groups responds in line with hypothesis 2b.

Furthermore there is also a moderating effect of age found on the relationship between the weight of the bottle and the expectation for a *sour* taste of *Švyturys* beer. Younger participants expect a *sourer* taste for the beer in the light bottle, while the older participants expect a substantial *sourer* taste for the beer in the heavy bottle. Although matching relationships were found between *sourness* and the green colour (Lavin & Lawless, 1998), angular shapes (Ngo et al., 2013; Spence, 2012; Spence & Gallace, 2011) and high and sharp sounds (Crisinel & Spence, 2010; Ngo et. al, 2013; Metz et al., 2011; Spence & Gallace, 2011), *sourness* was not associated earlier with weight.

It is clear from these results that the tactile stimuli in the beer bottle design have a different outcomes for the taste expectations depending on the age of consumers. This may be a consequence of general differences in taste expectations between the age groups. The younger age group expected a more *bitter* taste of *Švyturys* beer in general*,* than the older age group. In contrast the older age group expected a more *refreshing, thirst quenching* and *lighter* taste from the beer and expected the beer to be *easier to drink*.

Although these differences in taste expectations for age groups were not found for the *Castle Lite* beer*,* academic literature supports differences in taste expectations between different age groups by suggesting that the perception or preferences for certain tastes may change with age. For example, people learn to like foods that they used to dislike over time after repeating exposure with the food. This phenomenon is called hedonic reversal, because the negative valence of innate negative sensory properties (like cold temperatures, bitterness, irritant foods as peppers) changes with age to a more positive valence (see Rozin & Hormes, 2010).

In addition to taste perceptions and preferences, are also semantic congruent associations developed over time based on real-life experience (Krishna , Elder & Caldara, 2010). The older age group may have developed certain associations to a stronger degree than the younger participants, because they are more repeating exposed to pairs of congruent stimuli over time. In addition, cohort differences could account for different views on congruent and incongruent associations, because the packaging of product's is redesigned over time. Thus, older participants may have different associations between stimuli in packaging design and brand or product characteristics, than younger participants.

Finally, age turned out to moderate the effect of weight and the desirability of the *Švyturys* beer bottle design. The younger participants evaluated the heavy bottle design as more desirable, compared to the light design, while the older participants evaluated the light bottle design as more desirable than the heavy bottle. Although heavy product designs are in generally preferred among consumers (Piqueras-Fiszman & Spence, 2011), this was not found for the older age group.

Summary of the results for age:

- This study demonstrated that age moderated the effects of tactile stimuli in the beer bottle design on taste expectations and product evaluation.
- Especially texture affected the taste expectations of the beer in a different way for different age groups.
- There are two explanations for these effects:
  - The changes in taste perception and preferences that occur over age.
  - Different cohorts may develop different semantic associations
- The general preference for heavy products found by earlier research may be stronger for younger consumers, than older consumers.

4.5.7. Tactile manipulation

Not only effects were found of tactile stimuli on brand and product perception and evaluation. The manipulation of the weight of the beer bottle design also influenced the perception of other tactile stimuli. A moderate significant effect was found of weight on temperature which suggested that the light *Castle Lite* bottles might have been perceived as colder, than the heavy bottles. Study 1 found a congruent relationship between a light bottle and freshness. Although freshness and cold temperature are not the same they are semantically associated with coolness and this may be semantically congruent associated with light weight.

In addition, participants perceived the light *Švyturys* bottles as firmer, than the heavy *Švyturys* bottles. This could be a result of illusions induced by contrast effects, like the size-weight illusion which is the tendency to expect a heavier weight for a larger object and a lighter weight for a smaller object (see Raghubir, 2010). However, when tactile inspection shows that the large object is lighter than expected or vice versa, people tend to exaggerate this weight perception as result of this contrast. In the same way a certain weight may be expected from the firm *Švyturys* beer bottle. However, when this bottle turned out to be lighter than expected, it may have felt firmer as a consequence of this contrast.

The heavy *Švyturys* bottle was also perceived as rougher, than the light *Švyturys* bottle. This could be explained by the sensory congruence between roughness and heavy weight and smoothness and lightness which is suggested by study 1 and findings from (Krishna, Elder & Carrera, 2010).

Summary of the results for the tactile manipulation:

- The weight of a beer bottle design affected the perception of other tactile stimuli of the beer bottle: its temperature, firmness and texture.

4.5.8. Implications for the hypothesized framework of beer bottle design

This study confirmed the causal relationships of the hypothesized framework in figure 5.1 between tactile stimuli in beer bottle design and brand and product perception (relationship 2) and evaluation (relationship 3). However, the facilitating role of sensory congruence between brand and product values and tactile stimuli is only partially confirmed (relationship 1). In some instances sensory congruence facilitated brand and product perception in the intended directions.

However, sensory congruence between tactile stimuli and brand and product values had not on all brand value dimensions and taste expectations the hypothesized effect. Moreover, especially when the tactile stimuli texture and weight resulted in combined effects, slightly incongruence between these stimuli facilitated product perception and brand and product evaluation. In addition, gender and age turned out to moderate the outcomes of tactile stimuli in beer bottle design. Therefore, a fourth relationship is added to the hypothesized framework. Figure 4.27 shows the hypothesized framework for beer bottle design adapted to the insights from study 2.

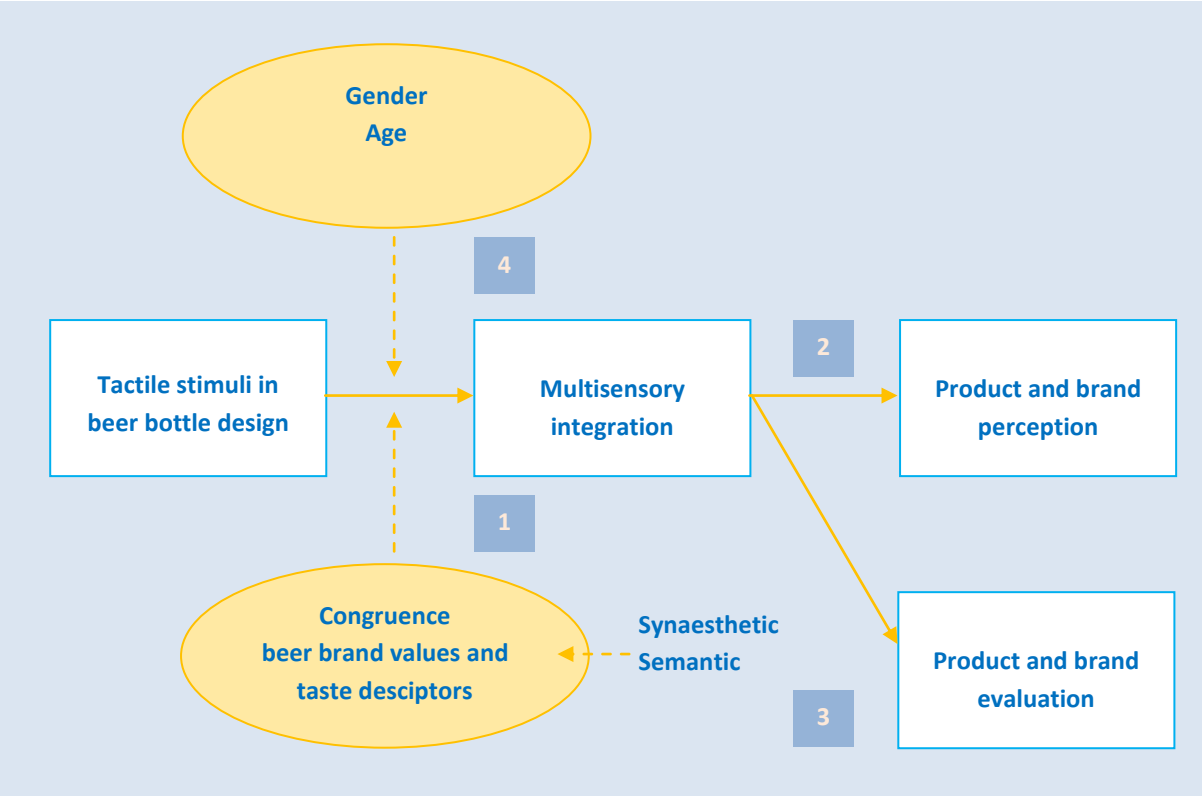


Figure 4.27. The hypothesized framework of multisensory beer bottle design

4.5.9. Conclusion study 2

| Conclusion study 2

- **Research goal:**

  Study 2 investigated how brand and product congruent tactile attributes of a beer bottle design affect brand and product perception and evaluation.

- **Main findings:**

  The study demonstrated that tactile stimuli in the beer bottle design affect beer brand and product perception and evaluation.

  → This means that the causal relationships between these secondary product attributes and brand and product perception and evaluation in the hypothesized framework of multisensory beer bottle design are confirmed.

  The facilitating role of semantic congruency within this framework is only confirmed partially:

  - The study found evidence for the hypothesis that semantic congruence between the tactile stimuli in the beer bottle design and a brand value dimension or taste descriptor could influence brand or product perception in line with these values.
  - However, this effect of semantic congruence was not found for all brand value dimensions and taste descriptors and in some instances semantic incongruent stimuli even affected brand perception evaluation in a favorable direction.

  Gender and age moderated the effect of weight and texture on product perception and brand and product evaluation.

  → Therefore these new factors are added to the hypothesized framework.

5

General discussion

Study 1 and 2 investigated the hypothesized framework of multisensory packaging in the context of beer bottle design. This section discusses how the outcomes of both studies contribute to the framework and to an effective strategy for multisensory packaging within the beer category. In addition are implications of the studies provided for the academic theory and the professional packaging field.

5.1 Main results

5.1.1. Research goal

This collaborative graduation project between the University of Twente and CARTILS had the goal to provide insight in the way multisensory marketing can be applied in packaging design. Based on these insights a hypothesized framework of multisensory packaging was developed. The validity of the multisensory packaging strategy suggested by this is framework is investigated for beer bottle design which resulted in the following main research question:

> *How do brand and product congruent sensory attributes of a beer bottle design affect brand and product evaluation?*

A literature review, a correlational study and an experimental study were conducted to answer this research question and to validate the hypothesized framework.

5.1.2. Main results

Study 1 and 2 resulted in the following main findings:

| Overview of the main findings of this thesis project:

1) The semantic associative networks of beer consumers

- There exist semantic congruent associations between sensory stimuli and brand values of beer brands and taste characteristics of beer products.

→ This means that consumers perceive certain brand values and taste descriptors as matching or mismatching with specific sensory stimuli.

2) Tactile stimuli serve as secondary product attributes

- The weight and the texture of the beer bottle design affect beer brand and product perception and evaluation.

→ This means that tactile stimuli in beer bottle design can serve as secondary product attributes in multisensory packaging.

3) The controversial role of sensory congruency

- The facilitating role of semantic congruency within brand and product values is only partially confirmed for tactile stimuli in beer bottle design.

→ This means that sensory stimuli in packaging design that match with brand and product values facilitate brand and product perception and evaluation in certain instances, while in other situations these effects do not occur or even occur for semantic incongruent stimuli.

4) The role of individual characteristics

- Gender and age moderated the effect of tactile stimuli on product perception and brand and product evaluation.

→ This means that the effect of multisensory packaging design depends on individual characteristics of the target segment.

5.1.3. The hypothesized framework of multisensory packaging design

Study 1 and 2 validated and expanded the hypothesized framework of multisensory packaging design. The resulting framework of multisensory packaging design is presented in figure 5.1.

5.1.3.1. Brand and product congruent stimuli

Previous academic research on multisensory experience suggested the existence of synaesthetic and semantic congruent associations between sensory stimuli and beer brand values and product characteristics. Study 1 confirmed this assumption (relationship 1) within the beer category by revealing the beer consumer's semantic associative network of brand and product congruent stimuli. The study showed that consumers perceive certain sensory stimuli as matching and other sensory stimuli as mismatching with the brand values and taste descriptors that are most common among beer brands.

5.1.3.2. Brand and product perception and evaluation

The academic literature also suggested that pairing of brands and products with these matching stimuli by inclusion of these stimuli in packaging design, might affect brand and product perception and evaluation. The associations found in study 1 implied that tactile and auditive stimuli could be appropriate sensory stimuli to serve as secondary product attributes in packaging design to support the primary product attributes of beer.

Study 2 was conducted to test this potential for tactile stimuli in beer bottle design. The study showed that the texture and weight of a beer bottle design influences brand and product perception and evaluation which confirmed relationship 2 and 3 of the framework. However, the facilitating role of semantic congruence in these relationships remains unclear.

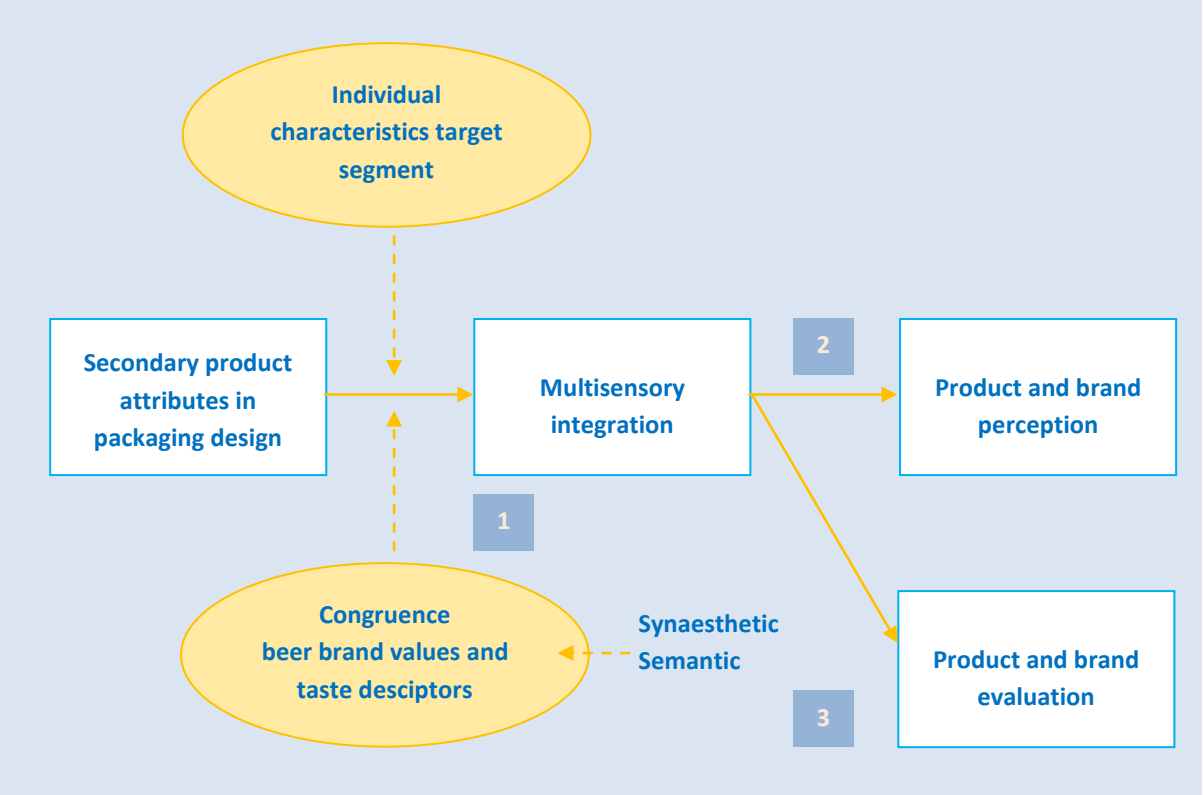


Figure 5.1. The framework of multisensory packaging design

5.1.3.3. Revising the role of sensory congruence

Based on theory on sensory congruence it was expected that the inclusion of brand or product congruent tactile stimuli in beer bottle design would make brands or products perceived as more in line with their values and as more favorable, than inclusion of brand or product incongruent or no congruent stimuli.

This hypothesis was only confirmed partially for brand values of the brand value dimension *real* and for the taste descriptor *easy to drink*. The perception and evaluation of brands and products remained in some instances the same, despite of the inclusion of brand and product congruent tactile stimuli in beer bottle designs. In other instances tactile stimuli that were identified as incongruent with certain brand value dimensions even affected the brand perception and evaluation in a favorable direction.

The controversial results related to sensory congruence leaves the role of relationship 1 in the framework unclear. Therefore, the influence of sensory congruence is not removed from the framework, but suggested. In some instances sensory congruence seem to work as strategy for multisensory packaging, while in other instances the intended effects remain absent or appear for incongruent tactile stimuli.

This means that currently the success of a multisensory packaging strategy may be more dependent of the simply identification of combinations of stimuli that affect brand and product perception and evaluation in a favorable direction, than the sensory congruence among these stimuli and brand values or product characteristics.

As discussed in the previous chapter sensory congruence may explain a part of the findings. Therefore, the semantic associative network identified in study 1 is a valuable starting point for the development of a multisensory packaging strategy. However, study 2 demonstrated that when a particular beer bottle design is developed based on the semantic network of study 1, it is important to test the effects of these designs before taking this design into production.

The controversial effects of semantic congruency may be explained by the difference in research settings. In study 1 participants consciously considered the depicted beer bottles and the degree to which they thought the presented brand values and sensory stimuli would match these designs. This way of consideration of the presented beer bottles comes close to the thoughtful central way of information processing discussed in chapter 1 (Petty & Cacioppo, 1986). Thus, the semantic associative network identified in study may be based on 'thinking': the properties the participants consciously perceived as matching.

However, multi-sensory stimuli affect perception and evaluation in an unconscious way (Krishna, 2012). Although the participants in study 2 still consciously indicated how they thought about the presented bottle, these perceptions and evaluations resulted from direct experience with sensory stimuli that are processed by the peripheral route that operates at a subconscious level (Petty & Cacioppo, 1986). So the effects of tactile stimuli found in study 2 may be based on 'experience': the subconscious experience resulting from interaction with the multisensory beer bottle designs.

Thinking is different from experience. Brand and product experience are a multi-faceted phenomena which involve more facets than cognition alone. These experiences involves internal subjective responses (sensations, feelings and cognitions) and external responses (behavioural and expressive reactions) evoked by brand or product related stimuli (Brakus, Schmitt, & Zarantonello, 2009; Desmet & Hekkert, 2007). Because of the subconscious, multifaceted nature of experiences, more influences than cognition may affect the actual experience resulting from interaction with the multisensory beer bottle design.

Therefore, the conscious reported brand or product congruent associations may not always have resulted in the hypothesized effect on perception and evaluation. As Dijkersthuis et al. (2005) showed, consumers cannot explain all their actions and decisions, because peripheral stimuli in the environment influence their behaviour in a subconscious way.

5.1.3.4. The role of individual characteristics

Study 2 added a fourth relationship to the framework of multisensory packaging. Gender and age turned out to moderate the effects between tactile stimuli on product perception and brand and product evaluation. These moderating effects emphasize the importance of individual characteristics for the effects of multisensory packaging on product or brand experience.

Experience is not only shaped by the characteristics of the products, like its texture or weight, but it is also affected by the individual characteristics of the consumer like gender or age (Desmet & Hekkert, 2007). Therefore, prior investigation of the characteristics of the target segment of a beer brand and testing of the effects of multisensory beer bottle design within this target segment is crucial for the development a successful multisensory packaging strategy.

5.1.3.5. Generalization

The framework of multisensory packaging design that is developed in this thesis project is based on two studies that investigates mainly the effects of tactile stimuli in beer bottle design. Now the question is to which degree this framework is generalizable to other products and brands within the beverage context.

The initial hypothesized framework was based on findings by previous research conducted within a wide variety of food and beverage product categories, cultures and geographical populations. Study 1 and 2 validated the relationships of this framework for tactile stimuli within the beer category. Validation of the broad framework within this specific category suggests that the main relationships within this framework will also be generalizable to other brands, products and sensory stimuli within the beverage category. This means that the framework provides evidence that sensory stimuli in the packaging of beverage products may affect perception and evaluation of these products and brands.

However, the more specific outcomes that are found – like the effects of texture or weight on certain brand value dimensions and taste descriptors – may be more difficult to generalize. Other beverage brands and products possess other specific brand values and taste descriptors. In addition, other sensory stimuli induce other outcomes.

Thus, this thesis project showed that brand and product perception and evaluation of beverage products are influenced by the weight and texture of its packaging design. However, how these tactile stimuli specifically will affect the perception and evaluation of other beverage products and brands depends on their specific characters.

However, the evidence that stimuli of other modalities than the dominating visual modality, affect brand and product perception, suggests also this potential for other non-visual sensory stimuli like auditive stimuli. However, the specific effects of auditive stimuli on brand and product perception and evaluation still need to be investigated.

Study 1 and 2 investigated relationships between the most common brand values and taste descriptors among beer brands and products. Therefore, the findings of these studies may be easier the generalize to brands and products that share brand values and taste descriptors with beer.
For example, the brand values from the *real* and *premium* brand value dimensions are also used among brands within the wine branch (Beverland, 2006). Thus, a heavier weighting wine bottle may support the perception of wine brands in line with the brand values belonging to the *real* dimension.

In addition, wine brands may also benefit more from the inclusion of one more intense tactile stimulus (heavy weight or rough texture) in their bottle designs, than multiple (heavy weight and rough texture). Wine brands build on brand values belonging to the *premium* dimension are recommended to use this slight incongruence in their bottle designs. It may even enhance the purchase intention among consumers for these wine brands.

Beverage products that possess a (slightly) bitter taste. For example sweet-bitter drinks like *Bitter Lemon, Aperol Spritz* or *Crodino San-Bite* may emphasize their bitterness more or less compared to their sweetness by using a rough or smooth texture in the design of their bottles.

Further, women may be more sensitive for the effects of tactile stimuli in beer bottle design on brand or product perception. Brands that target women are therefore recommended take the effects of the tactile stimuli in beer bottle design in account. In addition, brands may be evaluated as more positive among women when they use smooth bottle designs, while men may evaluate brands as more positive when the bottle possess rough textured stimuli.

Finally brands focusing on specific age groups are recommended to investigate how the tactile stimuli of their bottle designs influence taste expectations or perceptions. Preferences for certain tastes and effects of tactile stimuli on taste expectation may differ substantially among different age groups.

| Summary of the framework of multisensory packaging design

- Study 1 and 2 validated the relationships within the framework of multisensory packaging design.
- Secondary product attributes (tactile stimuli) affect brand and product perception and evaluation.
- Although study 1 identified a network of semantic associations among beer consumers between sensory stimuli and brand and product values, study 2 could only partially confirm the facilitating role of semantic congruence in the framework.
- This controversial findings are explained by the different nature of both studies: The results of study 1 are based on thinking, while the results of study 2 are based on experience. Cognition is only one facet of experience.
- The effects of multisensory packaging depend on the stimuli in packaging design and the individual characteristics of the consumer.
- The main relationships in the framework of multisensory packaging design are generalizable to other sensory stimuli, brands and products within the beverage category
- The specific outcomes for the texture and weight of the packaging design on beer brand and product perception and evaluation are limited generalizable to brands and products that share brand values or taste descriptors with the beer category

5.2. Theoretical implications

5.2.1. Theoretical contribution

The goal of this thesis project from academic perspective was to provide insight in the way sensory marketing in packaging design can affect the perception and evaluation of brands and products in a more favorable direction. In addition, this research project had the aim to enhance the cohesiveness within the innovative and rising field of multisensory marketing.

This research provided a clear overview of previous multisensory research relevant for multisensory packaging in the beverage category and extended these findings to the category of beer products and brands and the context of packaging design.

The most important contribution of this thesis research is the demonstration that tactile stimuli in packaging design affect brand perception and evaluation. Although previous research on tactile stimuli suggested the potential for these stimuli to affect brand perception (e.g. Krisnha , Elder & Caldara, 2010; Little & Orth, 2010; Spence & Gallace, 2011), research that actually demonstrated this is scarce.

Although previous research on semantic congruence suggested the presence of semantic congruent and incongruent relationships between sensory stimuli and brand values (e.g. Krisnha , Elder & Caldara, 2010) their actual existence has not been demonstrated previously. Therefore the identification of a associative semantic network of relationships between beer brand values and sensory stimuli this research makes an important contribution to the academic literature.

| Theoretical implications:

- This research demonstrated that tactile stimuli of packaging design affect brand and product perception and evaluation. Especially for brands, these effects are hardly proved by previous research.
- This thesis expanded of the insights on multisensory experience to the category of beer brands and products and the context of packaging.
- Finally, this project contributed to the creating of cohesion and clarity in the academic multisensory literature by providing a clear overview of multisensory research relevant for packing design within the beverage category.

5.2.2. Limitations

5.2.2.1. Limitations study 1

The semantic associative network identified in study 1 served as a valuable base for the development and test of a multisensory packaging design in study 2. However, as already discussed above, the associative network identified in study 1 is based on thinking, while the

effects of tactile stimuli in the beer bottle designs in study 2 are a result of experience. This may explain why the facilitating role of semantic congruence in the framework of multisensory packaging design is only confirmed partially.

Although the outcomes of study 1 still may be a valuable basis for future studies to investigate effects of semantic congruency in packaging design, their 'thoughtful' basis makes it is important to consider the identified matching and mismatching relationships with some caution. A part of the identified congruent and incongruent relationships found by study 1 is supported by previous research findings. However, some relationships are only identified by study 1 and the identified relationships are based on thinking and imagination and not on actual exposure to sensory stimuli.

Therefore, more research is needed to validate the associations between sensory stimuli and brand values and taste descriptors found in study 1. Replication of this study with real samples of tactile, auditive, scent and taste stimuli may shift the base of the study more from thinking to experience. Validation of the semantic associative network of study 1 may provide studies like study 2 a strong theoretical base in the future.

5.2.2.2. Limitations study 2

Study resulted in valuable insights in the role of tactile stimuli in multisensory beer bottle design. However, there are also some limitations in the research design of the study to take in account.

First, the brand value dimension scales developed in study 1 were not always reliable for all brand value dimensions for both brands. The *confident* brand value dimension scale for *Castle Lite* (α = .59) and the *accessible* (α = .63) and *unique* (α = .68) brand value dimension scales for *Švyturys* were not judged as adequate internally consistent. This makes the results for these brand value dimensions less reliable.

The fluctuating reliability of the scale may be explained by the design of this study from the perspective of the marketer. Even after translation of the questionnaire in Dutch, participants still indicated that they found it hard to understand the meaning of the brand values, tactile values and taste descriptors. They also found it hard to apply these terms on a beer bottle. For example the definition of the brand values *masculine* and *premium* was often unknown and some participants did not understood how to apply flimsy, firm and crispy on the beer bottle designs.

Adaptation of the brand value dimension scales and the taste descriptor scales to the perspective of the consumer may make studies like these more understandable for the participant. For example by visualizing the brand values or by providing real taste samples. This may result in more reliable and informative results.

Second, the manipulation of texture did not worked out as intended for the *Castle Lite* bottles. The manipulation check showed that the rough *Švyturys* bottle was perceived as significant more rough, than the smooth bottle, while this effect was not confirmed for the *Castle Lite* bottles. However, there were interaction effects of texture and weight found for *Castle Lite* as well as

moderating effects of gender and age on the outcomes of the texture of the bottle. Thus, subtle effects of texture have occurred subconsciously.
The investigation of beer bottle designs of two brands in this study was advantageous, because the adequate manipulation of texture in the *Švyturys* bottle design confirmed the potential of texture to affect brand and product perception and evaluation. The large, rough embossing on the *Švyturys* bottle may have been a more appropriate manipulation in this research than the small, rough embossing on the *Castle Lite* bottle. Furture research can provide more clarity in the necessary amount of weight and rough texture in a bottle design that is needed to influence brand and product perception in the intended direction.

Third, input from visual stimuli may have influenced the effects of tactile stimuli. The smooth *Švyturys* bottles contained a label on the body that communicated visual information (although in a small font) about the beer. The rough *Švyturys* bottles did not contained a body label, because the rough embossing covered a large amount of the body surface of these bottles. Thus, participants could for example infer the alcohol percentage from the smooth bottles, but not from the rough designs which may have affected their responses especially on taste expectation.

In addition, participants noticed the difference between the labeled *Švyturys* bottles and the unlabeled designs after the research. A part of the participants preferred the labeled bottle because this bottle was perceived as more informative about the brand and product content, while others believed the embossed *Švyturys* bottle was aesthetic more attractive and original.

These visual perceived informative and aesthetic differences between the smooth and rough *Švyturys* bottles could have account for the different responses on the bottles, instead of the difference in texture stimuli. The potential for the embossing in bottle design to provide visual and tactile input, makes it harder to separate the effects of tactile stimuli. Vision provides faster information and a larger amount of information, than the other modalities. This information quantity strong attention, which result in less available attention for the information provided by other modalities. That is why people pay more intention to sensory input from other modalities when their visual attention is blocked, (see Schifferstein & Spence, 2007).

Therefore, in similar future research settings it is recommended to use a beer bottle design wherein the visual and tactile input of an embossing is more balanced to investigate effects of tactility. The embossing on the *Castle Lite* bottle was not as visual dominant as the embossing on the *Švyturys*. However, the tactile manipulation of the bottle was not salient enough. A more balanced bottle design between these extremes may result in more reliable results.

Fourth, the dominating role of vision may also explain the small effect sizes that were found for tactile stimuli in this study. This means that tactile stimuli affect product and brand perception and evaluation, but that the relative contribution of these stimuli to the multisensory experience is small compared to the contributions of other incoming stimuli. The small effect sizes may explain why there were less effects found of tactile stimuli on the outcomes related to brand evaluation than hypothesized.

Because the manipulated stimuli produce mainly small effects, more effects may have been identified when a larger sample size was used in this study. Future research is therefore recommended to use larger samples when investigating the subtle effects of tactile stimuli on brand and product perception and evaluation.

Fifth, although the stimulus material consist of beer bottles that had been market in real-life, the bottles were manipulated for this experiment which made them less realistic and more artificial. These prototype bottles were made non-transparent with paint, because the weight manipulation was not possible otherwise. There were no transparent materials found to fill the bottle in order to achieve the desired weights. In addition, the production of transparent prototype bottles, mock-ups with the desired weights, was quite expensive.

However, non-transparency is not common among glass beer bottles. Participants generally indicated after the research that they did not liked the non-transparent bottles or that they believed these bottles were uncommon. Consumers in general prefer transparent packaging designs because these allow them to appraise the product before consumption (Mortensen, Bertelsen, Mortensen, & Stapelfeldt, 2004). This may have affected the evaluations of the beer bottle designs.

Moreover the bottles were manipulated on weight by filling them totally with a substance with a certain weight. Therefore the bottles felt like they were filled with a non-liquid substance. Although they were never empty, participants were doubting if the bottles were filled and especially if they were filled with beer.

The absence of the possibility to appraise product content by visual and tactile inspection may have made the research setting less credible for the participants which may have affected their responses. This point needs to be taken in account during generalization of the results to the professional beer market. Replication of this study for more realistic beer bottles would make the generalization of this results more reliable.

5.2.3. Future research

5.2.3.1. Sensory congruent packaging

Although the evidence for the potential of brand and product congruent stimuli in packaging design to affect perception and evaluation was controversial in this study, it provides a first exploration of the topic of semantic congruency in packaging design. Given the effects found of sensory congruence within study 1 and 2 and in previous research in other contexts (e.g. Krishna, Elder & Caldara, 2010; Krishna & Morrin, 2008; Spence, Shankar, & Blumenthal, 2011; Piqueras-Fiszman et al., 2011) this research prompts future research to clarify the role of brand or product congruence within the context of packaging design. For example by investigating the situations in which brand and product congruent packaging design may produced the desired outcomes and how individual characteristics of the target segment change these outcomes.

5.2.3.2. Promising potential of auditive stimili

Study 1 showed promising relationships of brand values and product characteristics with auditive stimuli like the volume and pitch of the opening sound and the pitch of the brand or product name. The outcomes of study 1 and findings from previous research (e.g. Crisinel et al., 2012; Crisinel & Spence, 2010b; Dacremont, 1995; Holt-Hansen, 1968; 1976, Ngo et al., 2013; Rudmin & Cappelli, 1983; Spence & Zampini, 2006; Spence 2011; Spence et al., 2011; Yorkston & Menon, 2004; Zampini & Spence, 2004; 2005) suggest that besides tactile stimuli, also auditive stimuli may affect brand and product perception and evaluation. The potential of auditive stimuli to serve as secondary product attributes in multisensory packaging design provides grounds to be explored by future research.

5.2.3.3. Individual, social and cultural influences

Study 2 showed that more research is needed to investigate the impact of individual characteristics of a target group on multisensory experience and perception. Individual characteristics like gender and age may affect which combinations of sensory stimuli, brand values and product characteristics are perceived as congruent in a specific target group. The higher need for touch among women may explain why women responded more in line with the hypothesized effect on the tactile stimuli, than men (e.g., Citrin et al., 2003; Peck & Childers, 2003a).

In addition, Spence & Gallace (2011) suggest that age-related changes in sensitivity are also likely to give rise to individual differences in the need for touch. Besides the visual, auditive, olfactory and auditive abilities, the tactile ability also declines with aging. For example the 'tactile acuity', ability to discriminate as separate two stimuli presented close together, declines linearly with increasing age(Stevens, 1992). This decline may affect the perception of the packaging's texture.

Moreover are semantic congruent associations developed based on experience (Krisnha , Elder & Caldara, 2010). This may result in different semantic congruent associations among consumers of different genders, ages or social and cultural background. The sample of study 2 consisted of participants from Dutch, German and Belgian backgrounds. Although, the German and Belgian participants in this research did not show significant different responses to the variables compared to the Dutch participants, there are cultural differences that may result in different interpretations of the brand values. For example, the Dutch culture scores low on the masculinity dimension of Hofstede's model, while the Belgian and German cultures score much higher on this dimension (The Hofstede Centre, n.d.).

Therefore, caution is needed when the generalizability of study 1 and 2 is considered to other cultures, countries or specific social groups. Because sematic associations are based on experience they may be more affected by such individual differences, than synaesthetic congruent associations (Ngo et al., 2013). Thus, for example synaesthetic congruent associations between taste descriptors and auditive or tactile stimuli may be easier to generalize to other populations, than semantic congruent associations identified between brand values and sensory

stimuli. Future research is recommended to conduct similar studies in multiple cultural and social groups to investigate to which degree the findings are generalizable to other populations.

5.2.3.4. Short term versus long term effects

The effects of brand and product congruent stimuli in packaging design on evaluation was assessed by measuring brand attitude, perceived product quality, purchase intention, price expectation and the aesthetical emotional attractiveness of the packaging design. Effects of tactile stimuli in packaging design were found on purchase intention, brand attitude and the desirability of the packaging.

The expectation of a more positive evaluation of brands and products when a sensory congruent packaging was presented, was based on the processing fluency and expectation account. Because 'fluid' routines are developed over time (Dijksterhuis et al., 2005), the effects of multisensory coherent packaging may also enhance over time. In addition, participants found it harder to evaluate the beer bottles, because they were unfamiliar with the brand and product and had no expectations of the product. The presence of more and strong expectations may enhance the reinforcing effects of a packaging which meet this expectations.

The research setting in study 2 involved a first encounter between the participants and the beer brands *Castle Lite* and *Švyturys*. The participants perceived *Castle Lite* as more in line with the brand values of the premium dimension and reported a higher purchase intention for *Švyturys* when a slightly incongruent beer bottle design was presented. Slightly incongruent, surprising characteristics of products or brands may enhance attention for new brands and products (see Knowles & Riner, 2007) and may make these evaluated as more exciting (Littel & Orth, 2013). Therefore, slightly incongruence in the packaging may have benefit the perception and evaluation of the brands in the context of a first encounter. It is interesting how slightly incongruence will work for a brand on the long run.

Thus, in study 2 participants who were unfamiliar with the beer brand and its product, evaluated these based on one encounter. A subsequent longitudinal and field research in a real-life consumption setting may result even in more positive affect as a consequence of multisensory coherent packaging on the long term. In addition it is interesting how the evaluation of slightly incongruence develops after the first encounter with the brand.

| Suggestions for future research:

- Research to clarify the role of sensory congruence in multisensory packaging design
- Research to the promising potential of auditive stimuli in packaging design.
- Investigation of the impact of individual characteristics on multisensory experience and perception.
- Longitudinal and field research in a real-life consumption setting may reveal the effects of multisensory coherent packaging on the long term.

5.3. Practical implications

5.3.1. Multisensory packaging strategy

From a managerial perspective this thesis project had the goal develop a clear multisensory packaging strategy for the professional field to influence brand and product perception and evaluation within the beverage category. Based on the framework of multisensory packaging design a multisensory packaging strategy is developed for brands and products in the beverage category. This strategy is discussed step by step below.

5.3.2.1. Step 1: The division of sensory stimuli in primary and secondary product attributes.

This strategy starts with the division of sensory stimuli in primary and secondary product attributes of beverages. Because taste (more specifically flavour), is the primary reason for buying in the beverage category, taste and olfactive stimuli are perceived as the primary product attributes of beverages products. Taste perception is heavily influenced by stimuli of other modalities besides the olfactive modality. Therefore visual, auditive and tactile stimuli could serve as secondary product attributes in the packaging design of a beverage to affect the perception of the product and its distinctiveness.

A similar type of division is maintained for brands. However, the brand values of the involved beverage brand, replace the primary product attributes. Because taste and olfactive stimuli are already primary attributes of the product, only the visual, auditive and tactile stimuli are perceived as appropriate secondary product attributes in packaging design to help the brand to distinguish from competitive offerings.

5.3.2.2. Step 2: Selection of semantic congruent stimuli for multisensory packaging

After the division of sensory stimuli in primary and secondary product attributes and the identification of the brand values of the involved beverage brand, the relationships between these aspects are considered. The semantic associative networks depicted in table 5.2, 5.3 and 5.4 present a clear and structural method for designers to select the appropriate sensory stimuli for their multisensory packaging designs. Although these associative networks are primary developed for application in the beer product category, the networks may also be applicable on beverages brands and product that share primary product attributes (taste descriptors) and brand values with the beer category.

Designers can infer from this overview which brand values or primary product characteristics match with certain secondary product attributes and which are not. Table 5.1 provides designers an overview to check to which brand value dimension a specific brand value belongs. Subsequently, the designer can infer from the semantic associative network of brands in table 5.2 which secondary product attributes (presented in the first column) match and mismatch with the brand value dimension that covers the brand values endorsed by the brand involved (presented in the first row). In a similar way designers can infer from the semantic associative networks of taste

descriptors for auditive stimuli (table 5.3) and tactile stimuli (table 5.4) which primary product attributes match with specific auditive and tactile secondary product attributes.

The green checkmarks represent a positive association and therefore a congruent relationship between brand value dimensions and specific sensory stimuli. The red crosses show which secondary product attributes are negatively related to the brand value dimensions and therefore incongruent with brand values belonging to this dimension. The relationships between the brand value dimensions and the primary product attributes (olfactive stimuli and taste descriptors) are also presented which allows brand managers to check if the involved brand match or do not match with the product it endorses.
The semantic associative networks enable the designer to select auditive and / or tactile stimuli that match with relevant brand values and taste descriptors. Subsequently the designer can include these sensory stimuli in the packaging design for the involved beverage brand and product.

5.3.2.3. Step 3: Trial…and error within the target segment

The inclusion of matching sensory stimuli in the packaging design is a starting point of this multisensory packaging strategy. It is based on initial insights provided by an explorative research on multisensory congruent packaging. Study 2 showed that brand and product congruent relationships may affect brand and product perception, but not in all instances. Other influences, including individual characteristics of the target segment like gender and age, affect the success of the outcomes of the multisensory packaging design.

Therefore, it is recommended to test the packaging design first within the target segment before taking the packaging design in production. This trial of the multisensory packaging design can be conducted according to the similar methodology as used in study 2. Members of the target segment can evaluate prototypes of the multisensory packaging design on brand and product perception and evaluation. When the multisensory packaging design turn out to affect the brand or product perception or evaluation in the desired direction, the packaging design is ready for production. After launching of the new multisensory packaging design on the market a brand may choose to monitor the outcomes of the packaging by measuring its effects on brand and product image and purchases over time.

5.3.2.4. Final point of consideration

The multisensory packaging strategy developed in this thesis provides designers and brand managers a starting point: an initial structured strategy to develop a multisensory packaging design. However, more insights are needed to support this strategy. This multisensory packaging strategy is based on effects of tactile stimuli in beer bottle design. Brand owners are recommended to invest in additional research to validate the networks of semantic associations found in this study and to extent this network and strategy to other beverage and food products.

The method suggested by this thesis project do not relate individual brand values, but brand value dimensions that underlie groups of individual brand values to sensory stimuli. This brand

dimension structure is chosen to prevent complexity as a consequence of a large amount of individual relationships. The resulting concise framework provides a clear, structured and practical overview of matching and mismatching stimuli which is understandable and easy to apply by designers. The brand value dimensions consist of brand values that conceptual fit and therefore often co-occur in brands.

The structure of the brand value dimension framework makes it more practical applicable, but involves also a point of consideration. Although the patterns of the brand values in general should be the same (because they share an underlying dimension), the individual brand values may show a slightly different patterns of correlations.

| The recommended multisensory packaging strategy:

- A multisensory packaging strategy is developed for brands and products in the beverage category based on the framework of multisensory packaging design.
- This strategy consists of the following steps:

  Step 1 : Division of primary product attributes secondary product attributes and selection of relevant brand values.

  Step 2: Selection of semantic congruent stimuli for multisensory packaging from the semantic associative networks that are developed for designers to serve as a initial starting point for multisensory packaging.

  Step 3: Trial and error: Prior testing of the effects multisensory packaging design on perception and evaluation within the target segment is recommended before taking the packaging design into production.
- This multisensory packaging strategy is developed with the aim to provide designers and brand managers a starting point within this innovative field. This is an important point of consideration during the application of this strategy: additional insights by empirical investigation and trial and error in practice are needed to validate this multisensory packaging strategy.

Table 5.2 *Semantic associative network of brand values*

		Brand value dimensions					
		Aspirational	**Premium**	**Real**	**Accessible**	**Confident**	**Unique**
Secondary product attributes							
Touch	**Temperature**						
	Cold	✓	✓				
	Warm	✗	✗				
	Hardness					.	
	Firm material		✓✓	✓✓		✓✓	
	Flimsy material		✗✗	✗✗		✗✗	
	Texture						
	Soft	✓		✗		✗	
	Hard	✗		✓		✓	
	Smooth						✓
	Rough						✗
	Weight						
	Light	✓✓	✗	✗✗	✓	✗✗	
	Heavy	✗✗	✓	✓✓	✗	✓✓	
Sound	**Opening sound**						
	Quiet	✓	✗	✗		✗	
	Loud	✗	✓	✓		✓	
	Weak carbonating		✗			✗	✗
	Strong carbonating		✓			✓	✓
	Sound name						
	Frosh	✗✗		✓✓	✗		
	Frish	✓✓		✗✗	✓		
	Maluma			✓			
	Takete			✗			
Primary product attributes							
Smell	Fruity	✓✓			✓		
	Floral	✓			✓		
	Spicy	✗		✓		✓	
	Sweet	✓			✓		
	Bitter	✗	✓✓	✓✓		✓✓	
	Intense		✓✓✓	✓✓✓	✓	✓✓✓	✓✓
	Subtle	✓✓			✓		
Taste	Bitter	✗	✓✓	✓✓		✓✓	✓
	Refreshing	✓✓✓	✓✓		✓✓	✓✓	✓✓
	Full-bodied		✓✓✓	✓✓✓	✓	✓✓✓	✓✓
	Smooth	✓✓			✓✓		✓✓
	Crispy					✓	
	Foamy		✓			✓	✓
	Easy to drink	✓✓✓		✗	✓✓		✓
	Light	✓✓	✗	✗✗	✓	✗	
	Natural		✓✓	✓	✓✓		✓
	Mild	✓✓		✗	✓		
	Thirst-quenching	✓✓	✓		✓✓	✓	✓
	Sweet	✓✓		✗✗	✓		

✓ represents a small congruent relationship
✓ ✓ represents a medium congruent relationship
✓✓✓ represents a large congruent relationship
✗ represents a small incongruent relationship
✗✗ represents a medium incongruent relationship
✗✗✗ represents a large incongruent relationship

Table 5.1. *The division of brand values among brand value dimensions*

Brand value dimensions					
1. Aspirational	2. Premium	3. Real	4. Accessible	5. Confident	6. Unique
Energizing	Quality	National pride	Hospitable	Self-conscious	Original
Young	Passionate	Authentic	Friendly	Bold	Distinctive
Fun	Prestige	Traditional	Relaxed	Masculine	
Fresh	Reliable				
Modern	Premium				
	Successful				

Table 5.3. *Semantic associative network for tactile secondary product attributes*

Primary product attributes	Secondary product attributes									
	Temperature		Hardness		Texture				Weight	
	Warm	Cold	Flimsy	Firm	Smooth	Rough	Soft	Hard	Light	Heavy
Bitter			✗	✓			✗	✓	✗	✓
Refreshing	✗✗	✓✓			✓	✗			✓	✗
Full-bodied			✗✗	✓✓			✗	✓	✗✗	✓✓
Crispy					✗	✓				
Smooth					✓	✗			✓	✗
Easy to drink	✗✗	✓✓			✓	✗	✓	✗	✓✓	✗✗
Light	✗	✓			✓	✗	✓	✗	✓✓	✗✗
Natural	✗	✓	✗	✓						
Mild							✓	✗	✓	✗
Thirst-quenching	✗✗	✓✓			✓	✗				
Sweet									✓	✗
Tingly			✗	✓			✗	✓		
Watery			✓	✗					✓✓	✗✗
Sharp			✗✗	✓✓			✗✗	✓✓	✗✗	✓✓

✓ represents a small congruent relationship ✗ represents a small incongruent relationship

✓ ✓ represents a medium congruent relationship ✗✗ represents a medium incongruent relationship

Table 5.4. *Semantic associative network of auditive secondary product attributes*

Primary product attributes	Secondary product attributes							
	Opening sound						Sound name	
	Quiet	Loud	Weak carbonating	Strong carbonating	Low pitch	High pitch	Frosh	Frish
Bitter	✗	✓						
Refreshing			✗	✓			✗	✓
Full-bodied	✗✗	✓✓	✗	✓			✓	✗
Smooth							✗✗	✓✓
Foamy			✗	✓				
Easy to drink							✗✗	✓✓
Light							✗✗	✓✓
Mild							✗	✓
Thirst-quenching							✗	✓
Sweet							✗	✓
Tingly	✗	✓	✗✗	✓✓	✗	✓		
Watery	✓							✓✓
Sharp	✗	✓	✗	✓			✓	✗

✓ represents a small congruent relationship ✗ represents a small incongruent relationship

✓ ✓ represents a medium congruent relationship ✗✗ represents a medium incongruent relationship

5.3.2. Tactile stimuli in multisensory packaging

More specifically, this study provides practical implications to the professional field of packaging design by demonstrating that designers can influence brand and product perception and evaluation by the tactility of their beer bottle designs. Brand managers can select particular beer bottle designs that contain tactile stimuli with the potential to induce a desired brand image or product experience within the target groups of a beer brand. These outcomes can be achieved by the manipulation of the weight or texture – or both – in the beer bottle design.

The addition of weight to the beer bottle may enhance the perception of a brand as *traditional* and *authentic* or as reflecting *national pride* and *craftsmanship*. The *Grolsch Premium Pilsner* 450 ml bottle depicted in figure 5.2 is a good example of this multisensory packaging strategy (Grolsch, n.d.). In addition, designers can choose for a lighter beer bottle design if they want to raise the expectation that a particular beer type is easy drinkable. The light aluminum *Bavaria Radler 0.0%* 330 ml bottle presented in figure 5.3 may be an appropriate example for this strategy (Drankenhandel Hooisma, n.d.). Moreover, a beer type that needs to be consumed especially cold, like the *Castle Lite* beer depicted in figure 5.4 fits a lighter beer bottle design, because this may induce the perception of a colder temperature of the beer bottle (SAB, 2014).

Figure 5.2. The heavy Grolsch Premium Pilsner bottle bottle

Figure 5.3. The light Bavaria Radler 330 ml

Designers can select a particular texture for a bottle design to affect the product perception. For example a rough textured beer bottle design may be appropriate, when the taste of bitterness needs to be emphasized for a particular beer type, while a smooth beer bottle design is a better option when the expectation of a bitter taste needs to be reduced. This makes for example the smooth bottle design beer depicted in figure 5.3 appropriate for the sweet *Radler* beer type.

Designers can even combine certain aspects of weight and texture in their designs to make a brand perceived as more *qualitative*, *passionate*, *prestigious*, *reliable*, *premium* or *successful*. This by designing beer bottles that possess slightly incongruent combinations of tactile stimuli, like

rough and light or smooth and heavy beer bottle designs. Slightly incongruent in combinations of tactile stimuli in beer bottle designs may also enhance purchase intention.

Less intense combinations of tactile stimuli in beer bottle design (light weight and smooth texture) or just more intense combinations (heavy weight and rought) texture are not recommended when the aim of the brand is to enhance the *premium* perception. The study showed that these combinations of tactile stimuli can reduce the *premium* brand perception and purchase intention.

Figure 5.4. The *Castle Lite* 340 ml bottle

The *Švyturys Extra Draught* 500 ml bottle presented left in figure 5.5 risks these negative outcomes. This bottle is heavy and rough textured which may exceed the appropriate level of tactile stimulation. The latest *Švyturys* 500 ml bottle presented right may result in more positive outcomes for the brand, because its design combines a heavy weight with a smooth texture (Švyturys, 2010).

Figure 5.5. The *Švyturys Extra Draught* 500 ml bottle (left) and the *Švyturys* 500 ml bottle (right)

These examples show that brand managers and designers also have to beware for unintended effects of certain tactile stimuli in packaging design. For example, when a brand that endorses brand values of the *real* dimension considers to minimize the glass use in its beer bottles, this decision could affect brand perception in an unfavorable direction.

The role of semantic congruency between brand and product values and tactile stimuli in packaging design remains unclear. The multisensory strategy based on sensory congruence between tactile stimuli and brand and product values worked in some cases, but it did not worked or worked for incongruent combinations of stimuli in other instances. Therefore, more insights

are needed for beer brand managers in the way they can apply tactile stimuli in their packaging designs.

Moreover, the idiosyncratic characteristics of the target group like gender and age are important to consider when brand managers select a particular beer bottle design. Women may be more sensitive for the congruence between brand and product values and the tactile stimuli in beer bottle designs, than men. Moreover, men may be more sensitive for effects of gender congruent tactile stimuli, like a rough texture. In addition, different ages have different preferences and expectations related to taste.

A final important implication form study 2 is that brand managers are recommended to test the effects of tactile stimuli in beer bottle designs, before taking the selected design into production. Sensory congruence does not work in the same way in all situations and among all target segments.

Practical implications for managers:

- This study demonstrated how designers can use tactile stimuli in their beer bottle designs to influence the brand and product perception and evaluation of consumers.
- Brand managers are recommended to test these effects of tactile stimuli in beer bottle designs on its outcomes, before taking the selected design into production.

5.3.3. Commercial value of multisensory packaging

Although brands and companies are paying increasingly attention to sensory marketing it lacked insight in the way marketing managers successfully could apply multisensory marketing strategies and to which extent these efforts could contribute to commercial goals.

This thesis project developed a multisensory packaging strategy for the beverage category and provided the professional field more specifically practical implications to benefit from tactile stimuli in beer bottle design. Finally, the commercial value of this innovative strategy is discussed below to remove the last bit of ambiguity related to sensory marketing.

5.3.3.1. The valuable potential of multisensory packaging

This research confirmed the commercial value of multisensory packaging by demonstrating that brand managers can deploy multisensory packaging design to affect brand and product perception and evaluation. Multisensory packaging provides brand managers an answer on the rising consumer need for an enhanced consumption experience. It makes brands literally more tangible and increases the brand and product experience. Moreover, the experiential dimension added by multisensory packaging affects cognitions, feelings and behaviours unconsciously which provides brand managers a mean to target the inconspicuous consumer who is accessible for subconscious sensory triggers.

Moreover, packaging is an excellent mean for brands to develop their own sensory signature. Because semantic associations are learned, brands may introduce their own effective 'sensory signatures' based on the research findings. For example, a premium beer brand can add a rough textured element to its light bottles, to reinforce its premium image and to make its brand more distinctive. Packaging design is a great mean for repetitive pairing of the brand with the rough textured element. Consumers will learn about the semantic link between the rough texture and the brand which will result in the birth of a new, effective sensory signature.

5.3.3.2. The points of consideration related to multisensory packaging

Notwithstanding the promising potential of multisensory packaging, there are some points of consideration for the professional field. First, because multisensory experience is a multi-faceted phenomenon, multisensory packaging strategies are complex. Besides the features of the packaging, the outcomes of a multisensory packaging strategy are heavily affected by individual characteristics. For example, gender and age change the effects of multisensory packaging. Moreover, the semantic associative networks of consumers and the outcomes of multisensory strategies are difficult to generalize across different social or cultural backgrounds. Particularly, because the individual network of semantic associations heavily depends on learning from experience.

Second, the effects of multisensory packaging on product and brand perception and evaluation found in this project were small. Therefore, it is important for brand managers to consider if the effects of the multisensory packaging strategy are worth the additional costs that the multisensory packaging involves. This is important to consider when large investments are needed to switch from the current packaging to a redesigned multisensory variant. For example, when a new production machine is required to produce a rough texture bottle.

Third, the most important learning from this research is that multisensory packaging is a valuable mean for brand mangers to affect brand and product perception and evaluation in a favorable direction. However, multisensory marketing is still in a beginning stage. This prioneering thesis project provides a starting point for the development of multisensory packaging. In the end is multisensory packaging not about congruent relationships, but about the identification of combinations of sensory stimuli that generate the most favorable outcomes for products and brands among its target segments. Insights provided by future academic research and trial and error in the marketing practice will develop this promising insights in multisensory packaging to a commercial valuable mean.

5.3.3.3. Sensory marketing makes sense!

Let's close this thesis report with an example of a leading beverage brand that convincingly demonstrates the commercial potential of multisensory packaging. Although brands increasingly focus on ways to engage our senses in products and services, Coca-Cola started using this potential already 90 years ago by making it possible to touch the brand by packaging design (see figure 5.6).

Bottlers worried that a straight-sided bottle wasn't distinctive enough and that Coca-Cola was becoming easily confused with 'copycat' brands. Glass manufacturers were approached to come up with a unique bottle design for Coca-Cola. The Root Glass Company of Terre Haute, Indiana, designed with the famous contour shape, which won enthusiastic approval from Coca-Cola in 1915 and was introduced in 1916…The Contour Bottle design was inspired by the curves and grooves of a cocoa bean. Today, it's one of the most recognized icons in the world - even in the dark.

(Coca-Cola, 2010)

The classic Coca-Cola Contour bottle design demonstrates that a sophisticated multisensory packaging strategy definitely pays off. Globally and on the long term.

Figure 5.6. *The history of the iconic Coca-Cola Controur bottle (Coca-Cola, 2010).*

| Commercial value of multisensory packaging

- This thesis project demonstrated the commercial value of multisensory packaging for the commercial field:
    1. Brand managers can deploy multisensory packaging design to affect brand and product perception and evaluation.
    2. Multisensory packaging adds an experience dimension to brands and products in a subconscious way which provides brand mangers a mean to respond to the rising need for an enhanced brand and product experience and to inconspicuous consumption.
    3. Multisensory packaging provides brands a excellent mean to develop their own unique sensory signatures.
- The thesis project also provides some points of consideration related to the extent to which multisensory packaging may benefit a brand and its products:
    1. The outcomes of a multisensory packaging strategy are heavily affected by characteristics of the target segment.
    2. It is important to consider if the small effects of the multisensory packaging strategy are worth the costs the novel packaging design involves.
    3. In the end multisensory packaging is not about congruent or incongruent relationships, but about the identification of combinations of sensory stimuli by future academic research and trial and error in the marketing practice that result in the most favorable outcomes for products and brands among its target segments.

5.4. General conclusion

| General conclusion

- **Research goal:**

  This collaborative graduation project between the University of Twente and CARTILS had the goal to provide insight in the way multisensory marketing can be applied in packaging design.

- **Main findings:**

  Based on a literature review, a correlational study (study 1) and an experimental study (study 2) a framework of multisensory packaging design is developed which provides the following insights:

  1. The weight and the texture of a beer bottle design affected brand and product perception and evaluation which means that sensory stimuli can serve as secondary product attributes in the packaging to affect the perception and evaluation of brands and their products.

  2. Consumers hold semantic associative networks that makes them perceive certain brand values and taste descriptors as matching or mismatching with specific sensory stimuli.

  3. Inclusion of matching sensory stimuli in packaging design facilitates brand and product perception and evaluation in certain instances, while in other situations these effects do not occur or even occur for semantic incongruent stimuli.

  4. The effect of sensory stimuli in packaging design on product perception and brand and product evaluation depends on individual characteristics like gender and age.

  → The suggestion that the semantic associative network derived from study 1 was based on thinking, while the outcomes of tactile stimuli in beer bottle design of study 2 were based on experience, may explain why the facilitating role of sensory congruence remained controversial. Multisensory experience is a complex multifaceted phenomenon which is affected by many factors including cognition and individual characteristics.

  → The main relationships of the framework are generalizable to the packaging design of products within the beverage category. However, the specific semantic associative network developed in study 1 and outcomes of tactile multisensory packaging in study 2 are limited generalizable to beverage brands and products that share brand values and taste descriptors with the beer category.

- **Theoretical implications:**
  - This research demonstrated that tactile stimuli in packaging design affect brand and product perception and evaluation which hardly has been demonstrated for brands by previous research.
  - This project also improved the cohesion and clarity in the academic multisensory literature by providing a clear overview of multisensory research relevant for beverage packing design and expansion of these insights to the category of beer brands and products and to the context of packaging.
- **Implications for future research:**
  - Clarify and validate the semantic associative networks found in study 1 and extent the semantic associative networks to other product categories.
  - Investigate the impact of individual characteristics of a target group on multisensory experience and perception.
  - Investigate the effects of multisensory coherent packaging in the retail context on the long term.
- **Practical implications:**

  This thesis project demonstrated the value of multisensory packaging for the commercial field:

  1. Managers can deploy multisensory packaging design to affect brand and product perception and evaluation.
  2. Multisensory packaging provides brand mangers a mean to respond to the rising need for an enhanced brand and product experience and to inconspicuous consumption.
  3. Multisensory packaging provides brands an excellent mean to develop their own unique sensory signatures.

  Some points of consideration were identified related to the extent to which multisensory packaging may benefit a brand and its products:

  1. The outcomes of a multisensory packaging strategy depend heavily on the individual characteristics of the target segment.
  2. It is important to consider if the potential small effects of the multisensory packaging are worth the costs.
  3. Future academic research and trial and error in the marketing practice are needed to indentify the combinations of sensory stimuli that result in the most favorable outcomes for products and brands.

- **Multisensory packaging strategy**

  Based on the framework of multisensory packaging design a multisensory packaging strategy is formulated for brands and products the beverage category:

  - Step 1 : Division of primary product attributes secondary product attributes and selection of relevant brand values.
  - Step 2: Selection of semantic congruent stimuli for multisensory packaging from the semantic associative networks that are developed for designers to serve as a initial starting point for multisensory packaging.
  - Step 3: Trial and error: Prior testing of the effects multisensory packaging design on perception and evaluation within the target segment is recommended before taking the packaging design into production.

  When this multisensory packaging strategy is applied in practice it is important to consider that it is developed with the aim to provide designers and brand managers a starting point within this innovative field. In the end multisensory packaging is not about congruent or incongruent relationships, but about finding the most effective combinations of sensory stimuli which is only possible by empirical investigation and trial and error in practice.

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Appendix

1. An overview of the most claimed brand values

Table I. *Overview of the most claimed brand values among 31 brands across the world*

	Brand value (personality)	Number of claiming beer brands	Brand that claimed the value and country of origin
1.	**Quality**	**9**	Alivaria (Belarus) Halida (Vietnam) Golden Pilsener (Zimbabwe) Gyumri Gold (Armenia) Bohemia (Brasil) König Pilsner (Germany) Brovar (Belarus) Feldschlösschen (Switzerland) Obolon (Ukraine)
2.	**Modern (Innovative, Progressive, Up-to-date)**	**9**	Haldia (Vietnam) Gold Mine Beer (Russia) Gyumri Gold (Armenia) Hansa Pilsener (South Africa) Bohemia (Brasil) Baltika 7 (Russia) Skol (Romania) Alivaria (Belarus) Castle Lite (South Africa)
3.	**Social (Socializing and Friendship)**	**9**	Irbis (Kazakhstan) Chișinău (Moldova) Balboa (Panama) Pilsen Callao (Peru) Brovar (Belarus) Derbes (Kazakhstan) Skol (Romania) Feldschlösschen (Switzerland) Derbes (Kazakhstan)
4.	**Origin (Nation, Tradition, Heritage & Historical Roots)**	**7**	Chișinău (Moldova) Feldschlösschen (Switzerland) Obolon (Ukraine) Pilsner Urquell (Czech Republic)

			Gyumri Gold (Armenia) Bohemia (Brasil)
5.	**Fun (Joy)**	**6**	Kozel (Czech Republic) Balboa (Panama) König Pilsner (Germany) Castle Lite (South Africa) Tuborg (Denmark) Skol (Romania)
6.	**Energizing (Revitalizing, Exciting, Active)**	**6**	Bohlinger's (Zimbabwe) Backus ICE (Peru) Pilsner Urquell (Czech Republic) Miller (USA) Baltika 7 (Russia)
7.	**Young**	**5**	Bohlinger's (Zimbabwe) Gold Mine Beer (Russia) Pilsen Callao (Peru) Brovar (Belarus) Tuborg (Denmark)
8.	**Reliable (Trustworthy)**	**4**	Alivaria (Belarus) Pilsen Callao (Peru) Derbes (Kazakhstan) Skol (Romania)
9.	**Fresh (Refreshing)**	**4**	Chișinău (Moldova) Backus ICE (Peru) Hansa Pilsener (South Africa) Castle Lite (South Africa)
10.	**Authentic**	**3**	Halida (Vietnam) Hansa Pilsener (South Africa) Peroni (Italy)
11.	**National Pride**	**3**	Alivaria (Belarus) Zambezi (Zimbabwe) Ožujsko (Croatia)
12.	**Premium**	**3**	Hansa Pilsener (South Africa) Bohemia (Brasil) Castle Lite (South Africa)
13.	**Relaxed**	**3**	Irbis (Kazakhstan) Zambezi (Zimbabwe) Skol (Romania)

14.	**Bold**	**3**	Ciuc (Romania) Grolsch (The Netherlands) Peroni (Italy)
15.	**Self-concious**	**3**	Ciuc (Romania) Grolsch (The Netherlands) Hansa Pilsener (South Africa)
16.	**Natural**	**3**	Chișinău (Moldova) Gyumri Gold (Armenia) Obolon (Ukraine)
17.	**Craftsmanship**	**3**	Bohemia (Brasil) Feldschlösschen (Switzerland) Castle Lite (South Africa)
18.	**Honest (Sincere)**	**3**	Baltika 3 (Russia) König Pilsner (Germany) Feldschlösschen (Switzerland)
19.	**Friendly**	**3**	Halida (Vietnam) Kozel (Czech Republic) Derbes (Kazakhstan)
20.	**Distinctive (Different)**	**2**	Bohlinger's (Zimbabwe) Miller (USA)
21.	**Hospitable (Open-hearted)**	**2**	Kozel (Czech Republic) Baltika 3 (Russia)
22.	**Masculine**	**2**	Pilsen Callao (Peru) Skol (Romania)
23.	**Unpretentious**	**2**	Pilsen Callao (Peru) Skol (Romania)
24.	**Passionate**	**2**	Ožujsko (Croatia) Miller (USA)
25.	**Prestige (Status)**	**2**	Golden Pilsener (Zimbabwe) Gold Mine Beer (Russia)
26.	**Traditional**	**2**	Feldschlösschen (Switzerland) Alivaria (Belarus)
27.	**Successful**	**2**	Golden Pilsener (Zimbabwe) Baltika 7 (Russia)
28.	**Characterful**	**1**	Grolsch (The Netherlands)

29.	**Independent and free**	**1**	Grolsch (The Netherlands)
30.	**Proactive**	**1**	Balboa (Panama)
31.	**Ingenious**	**1**	Balboa (Panama)
32.	**Curious**	**1**	Balboa (Panama)
33.	**Generous**	**1**	Baltika 3 (Russia)
34.	**Reward**	**1**	König Pilsner (Germany)
35.	**Practical**	**1**	Skol (Romania)
36.	**Stability**	**1**	Obolon (Ukraine)
37.	**Family values**	**1**	Obolon (Ukraine)
38.	**Experiencing Real Moments**	**1**	Ožujsko (Croatia)
39.	**Cosmopolitan**	**1**	Miller (USA)
40.	**Spirited flair**	**1**	Peroni (Italy)
41.	**Effortlessly Stylish**	**1**	Peroni (Italy)
42.	**Intriguing**	**1**	Pilsner Urquell (Czech Republic)
43.	**Sensual**	**1**	Pilsner Urquell (Czech Republic)
44.	**Enchanting**	**1**	Pilsner Urquell (Czech Republic)
45.	**Leadership**	**1**	Alivaria (Belarus)
46.	**Extrovert**	**1**	Halida (Vietnam)
47.	**Simple**	**1**	Irbis (Kazakhstan)

2. An overview of the most claimed taste descriptors

Table II. *Overview of the most claimed taste descriptors of pilsners among 32 brands across the world*

	Taste descriptor	Number of claiming beer brands	Brand that claimed the taste descriptor (country of origin)
1.	**Slightly Bitter**	**11**	Golden Pilsner (Zimbabwe) Zambezi (Zimbabwe) Chișinău (Moldova) Kozel Světlý (Czech Republic) Balboa (Panama) Pilsen Callao (Peru) König Pilsener (Germany) Ožujsko (Croatia) Tuborg (Denmark) Feldschlössen (Switzerland) Brovar (Belarus)
2.	**Refreshing**	**9**	Bohlinger's (Zimbabwe) Hansa Pilsener (South Africa) Feldschlössen (Switzerland) Ožujsko (Croatia) Miller (USA) Peroni (Italy) Tuborg (Denmark) Halida (Vietnam) Skol (Romania)
3.	**Full-bodied (Rich)**	**9**	Alivaria Zolotoe (Belarus) Halida (Vietnam) Irbis (Kazakhstan) Zambezi (Zimbabwe) Balboa (Panama) Baltika 7 (Russia) Feldschösschen (Switzerland) Tuborg (Denmark) Grolsch Premium Pilsner (The Netherlands)
4.	**Crispy (Bite)**	**6**	Golden Pilsner (Zimbabwe) Bohlinger's (Zimbabwe) Balboa (Panama) Hansa Pilsener (South Africa) Skol (Romania) Peroni (Italy)
5.	**Smooth**	**4**	Bohlinger's (Zimbabwe) Balboa (Panama) König Pilsener (Germany) Miller (USA)
6.	**Foamy (Effervescence, Bubbly)**	**3**	Zambezi (Zimbabwe) Bohlinger's (Zimbabwe) Baltika 3 (Russia)

7.	**Easy to drink**	**3**	Chișinău (Moldova) Balboa (Panama) Feldschlössen (Switzerland)
8.	**Light**	**2**	Gold Mine (Russia) Halida (Vietnam)
9.	**Natural**	**2**	Irbis (Kazakhstan) Derbes (Kazakhstan)
10.	**Mild**	**2**	Bohlinger's (Zimbabwe) Tuborg (Denmark)
11.	**Thirst quenching**	**2**	Chișinău (Moldova) Brovar (Belarus)
12.	**Caramel**	**1**	Bohlinger's (Zimbabwe)
13.	**Delicate**	**1**	Golden Pilsner (Zimbabwe)
14.	**Sweet**	**1**	Balboa (Panama)
15.	**Spicy**	**1**	Hansa Pilsener (South Africa)
16.	**Fruity**	**1**	Brovar (Belarus)
17.	**Pure, original, untouched**	**1**	Pilsner Urquell (Czech Republic)
18.	**Flowers**	**1**	Tuborg (Denmark)
19.	**Grain**	**1**	Tuborg (Denmark)
20.	**Firm**	**1**	Grolsch Premium Pilsner (The Netherlands)

3. Questionnaire used in study 1

Questionnaire

Thank you for participating. This study is part of a Master thesis project of Twente University. In this questionnaire are five foreign beer products shown. You are asked to evaluate these beer types on several properties. The questionnaire will take about 15 minutes. Of course, your answers will be treated anonymously.

Personal data

1. What is you gender?
   Male/female

2. What is your age?
   Open question

3. What is your highest level of education? (does not have to be completed yet):
   VMBO, MAVO, HAVO, VWO, MBO, HBO, WO

4. How frequent do you consume beer products?

   - Weekly
   - Monthly
   - A few times a year
   - Never

Below is a foreign type of beer presented. Inspect this beer product well, because you are asked to evaluate this product.

Please, specify as specific as possible, the extent to which you agree with these statements.

5. This pilsner seems familiar to me.
    1 Yes
    2 No
    3 Maybe
6. I have consumed this pilsner before.
    1 Yes
    2 No
    3 Maybe

1 = strongly disagree
2 = disagree
3 = slightly disagree
4 = neutral
5 = slightly agree
6 = agree
7 = strongly agree

Brand values

What are your associations with the depicted beer product? Please, specify as well as possible, the extent to which you agree that the properties below are associated with this beer product.

Brand values

7. Quality
8. Modern
9. Social
10. Original
11. Fun
12. Energizing
13. Young
14. Reliable
15. Fresh
16. Authentic
17. National Pride
18. Premium
19. Relaxed
20. Bold (Powerful)
21. Self-confident
22. Natural
23. Craftsmanship
24. Honest
25. Friendly
26. Distinctive
27. Hospitable
28. Masculine
29. Unpretentious (not dominant)
30. Passionate
31. Prestige
32. Traditional
33. Successful

Touch

How do you expect the bottle to feel?

34.	Warm (Temperature)	O	O	O	O	O	O	O	Cold
35.	Flimsy (fragile) (Hardness)	O	O	O	O	O	O	O	Firm
36.	Smooth (Texture)	O	O	O	O	O	O	O	Rough
37.	Soft (Texture)	O	O	O	O	O	O	O	Hard
38.	Light (Weight)	O	O	O	O	O	O	O	Heavy

How will the bottle sound when opened?

39.	Quiet	O	O	O	O	O	O	O	Loud
40.	Low-pitched (low tone)	O	O	O	O	O	O	O	High-pitched (High tone)
41.	Weak carbonating (bubbling)	O	O	O	O	O	O	O	Strong carbonating (bubbling)

Which alternative name do you consider to be more appropriate for this beer product?

42.	Frosh beer	O	O	O	O	O	O	O	Frish beer
43.	Maluma beer beer	O	O	O	O	O	O	O	Takete

Olfaction

How will this beer smell?

44. Fruity
45. Floral (flowery)
46. Spicy
47. Sweet

48. Bitter
49. Intense
50. Subtle

Taste characteristics

How will the beer taste?

51. Bitter
52. Refreshing
53. Full-bodied (Rich)
54. Crispy
55. Smooth
56. Foamy (bubbly)
57. Easy to drink
58. Light
59. Natural
60. Mild
61. Thirst quenching

Sensory properties

Taste

62. Sweet
63. Sour
64. Tingly (Prickly)
65. Watery
66. Sharp

This is the end of the questionnaire. Thank you for participating.

4. The questionnaire used in study 1

Beer bottle experiment

INSTRUCTIONS

Thank you for participating in the *beer bottle experiment*. This study is part of my Master Thesis project that focuses on the design of product packaging and brand evaluation. This project is part of a collaboration between the University of Twente and CARTILS branding and packaging design.

The questionnaire consist of two sections in which you are asked to evaluate a beer bottle of a foreign brand. The brands of beer that are shown in this survey are currently not sold in the Netherlands, but they may become available in the Netherlands in the future. The goal of this research is to gain insight in the way consumers evaluate beer brands.

You are asked to answer the questions carefully and to hand in a completed questionnaire. It will take about 15 minutes to complete this questionnaire. This questionnaire is filled in anonymously and the answers are only used for this particular research. If you wish to be informed about the outcomes of this research, you can select this option in the questionnaire.

Thank you very much for participating and good luck!

Sanne Heiltjes, Msc.

Master student University of Twente
Intern Brand Strategy – CARTILS

PERSONAL DATA

Below some questions are asked about your personal data.

You can answer the questions by checking the correct boxes or by writing short answers in the boxes.

67. What is you gender?

    - Male
    - Female

68. What is your age?

    ☐ years

69. What is you nationality?

    - Dutch
    - Other, namely:

      ☐

70. What is your highest level of education? (You do not have to have completed this education):

    - VMBO
    - MAVO
    - HAVO
    - VWO
    - MBO
    - HBO
    - WO

71. How often do you drink beer?

    - Weekly
    - Monthly
    - A couple of times a year
    - Never

CASTLE LITE

You have just received from the researcher a beer bottle of the foreign beer brand *Castle Lite*. *Castle Lite* is considering to launch this beer on the Dutch market. Therefore, bottle you received is still in a state of development. You are asked to evaluate this beer bottle.

The following statements are about the *Castle Lite* beer bottle. Indicate as precisely as possible, the extent to what extent you agree with these statements.

72. This beer looks familiar to me.

- Yes
- No
- Maybe

73. I have drunk this bier before.

- Yes
- No
- Maybe

Please, examine the *Castle Lite* bottle carefully: focus on the design and the feel of the bottle, and the expectations the bottle raises. Point out as precisely as possible, the extent to what extent you agree with the following statements.

What does the *Castle Lite* bottle feel like? Please, describe it as precisely as possible by checking the correct boxes.

74. Warm	○	○	○	○	○	○	○	Cold
75. Flimsy	○	○	○	○	○	○	○	Firm
76. Smooth	○	○	○	○	○	○	○	Rough
77. Soft	○	○	○	○	○	○	○	Hard
78. Light	○	○	○	○	○	○	○	Heavy

To what extent do you think that the following characteristics fit (or don't fit) the beer brand *Castle Lite*? Please point out as precisely as possible by checking the right boxes.

	Strongly disagree						**Strongly agree**
79. Qualitative	○	○	○	○	○	○	○
80. Modern	○	○	○	○	○	○	○
81. Social	○	○	○	○	○	○	○
82. Original	○	○	○	○	○	○	○
83. Fun	○	○	○	○	○	○	○
84. Energizing	○	○	○	○	○	○	○
85. Young	○	○	○	○	○	○	○
86. Reliable	○	○	○	○	○	○	○
87. Fresh	○	○	○	○	○	○	○
88. Authentic	○	○	○	○	○	○	○
89. National Pride	○	○	○	○	○	○	○
90. Premium	○	○	○	○	○	○	○
91. Relaxed	○	○	○	○	○	○	○
92. Bold	○	○	○	○	○	○	○
93. Self-conscious	○	○	○	○	○	○	○
94. Natural	○	○	○	○	○	○	○
95. Craftsmanship	○	○	○	○	○	○	○
96. Honest	○	○	○	○	○	○	○
97. Friendly	○	○	○	○	○	○	○
98. Distinctive	○	○	○	○	○	○	○
99. Hospitable	○	○	○	○	○	○	○
100. Masculine	○	○	○	○	○	○	○

(Continuation previous page)

	Strongly disagree						Strongly agree
101. Unpretentious (not dominant)	○	○	○	○	○	○	○
102. Passionate	○	○	○	○	○	○	○
103. Prestigious	○	○	○	○	○	○	○
104. Traditional	○	○	○	○	○	○	○
105. Successful	○	○	○	○	○	○	○

What are your expectations for the taste of *Castle Lite* beer? Please specify as well as possible to what extent you expect (or do not expext) the following taste characteristics to be present in *Castle Lite* beer.

		Strongly disagree						Strongly agree
106.	Bitter	○	○	○	○	○	○	○
107.	Full-bodied (Rich)	○	○	○	○	○	○	○
108.	Refreshing	○	○	○	○	○	○	○
109.	Crispy	○	○	○	○	○	○	○
110.	Smooth	○	○	○	○	○	○	○
111.	Foamy (bubbly)	○	○	○	○	○	○	○
112.	Easy to drink	○	○	○	○	○	○	○
113.	Light	○	○	○	○	○	○	○
114.	Natural	○	○	○	○	○	○	○
115.	Mild	○	○	○	○	○	○	○
116.	Thirst quenching	○	○	○	○	○	○	○
117.	Sweet	○	○	○	○	○	○	○
118.	Sour	○	○	○	○	○	○	○
119.	Sparkling (tingly)	○	○	○	○	○	○	○
120.	Watery	○	○	○	○	○	○	○
121.	Sharp	○	○	○	○	○	○	○

Please specify as precisely as possible what quality you would expect from *Castle Lite* beer?

122.	Low quality	○	○	○	○	○	○	○	High quality

How do you perceive *Castle Lite* beer ? I perceive the brand *Castle Lite* as…

123.	Bad	○	○	○	○	○	○	○	○	○	○	Good
124.	Negative	○	○	○	○	○	○	○	○	○	○	Positive
125.	As a brand you dislike	○	○	○	○	○	○	○	○	○	○	As a brand you like

Imagine that this *Castle Lite* beer becomes available on the Dutch market. To what extent would you agree with these statements in that situation?

		Strongly disagree						**Strongly agree**
126.	It is very likely that I will buy this brand in the future.	○	○	○	○	○	○	○
127.	The next time I visit a bar I will order this brand of beer.	○	○	○	○	○	○	○
128.	I will definitely try this beer brand.	○	○	○	○	○	○	○
129.	Compared to other beer brands, I expect a high price for the beer of this brand.	○	○	○	○	○	○	○
130.	Compared to other beer brands, I expect a low price for the beer of this brand.	○	○	○	○	○	○	○

What do you think of the design of the *Castle Lite* bottle. Please indicate this as precisely as possible by checking the correct boxes. I think that the bottle of *Castle Lite* is…

131. Not attractive	○	○	○	○	○	○	○	Attractive
132. Not desirable	○	○	○	○	○	○	○	Desirable
133. Not arousing	○	○	○	○	○	○	○	Arousing
134. Not beautiful	○	○	○	○	○	○	○	Beautiful
135. Making the product less likeable	○	○	○	○	○	○	○	Making the product more likeable

You just completed this part of the experiment.