CHEWING GUM PACKAGING

Feel how intense it tastes!

The influence of tactile packaging features and typeface color of product claim on consumer responses

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Abstract

The number of products offered in supermarkets is continually increasing. Consequently, product packaging is becoming more and more crucial for manufacturers when it comes to gain the attention of consumers. This study focuses on chewing gums which are commonly sold at the checkout zone, one of the most profitable sales areas in stores. As the chewing gum market is recently facing declining sales figures it is essential for gum manufacturers to implement effective product packages. Most of chewing gum manufacturers only rely on the visual appearance of their product packages. This study is focused not only on the visual aspect of chewing gum packaging (typeface color of product claim), but also on tactile features (rough versus smooth surface) and how these packaging attributes influence package design evaluation, purchase intention and product taste intensity of different consumer groups (such as males/females and smokers/nonsmokers). The study uses a 2 (tactile packaging feature: rough versus smooth) x 2 (typeface color of product claim: black versus pink) experimental design, resulting in four conditions. The rough packaging variant consisted of 3D printed dispensers. A total of 160 respondents participated in this study (50% females & 50% males). The study results revealed that a rough packaging surface leads to a more intense product taste perception by respondents compared to the smooth packaging. Moreover, it was found that product claims in black typeface lead to a more intense taste perception in comparison to pink typefaces (only for males, not for females). Finally, congruency between packaging elements, as well as between gender and packaging resulted in positively influencing consumer responses.

Keywords: Product Packaging - Tactile Features - Product Claim Color - Congruency

TABLE OF CONTENTS

1 INTRODUCTION

As the number of products offered in supermarkets is continually increasing, product packaging is becoming more and more crucial for manufacturers when it comes to gain the attention of consumers. Manufacturers manipulate their product packages in terms of color, size and shape in order to stimulate consumers' senses. With this in mind, Krishna (2012, p. 333) defines sensory marketing as "marketing that engages the consumers' senses and affects their perception, judgement and behavior." Most brands have placed their focus on the visual appearance of their product packages and are thus only attending to one of the five senses of consumers. In order to differentiate from other brands on the shelf, manufacturers should consider creating package designs aiming at stimulating any other of consumers' senses.

This current study will focus on chewing gums which in most cases are bought impulsively by consumers. Chewing gums and other confectionery products are strategically placed in stores. To be more specific, they are point-of-purchase items that are placed at the checkout zone (i.e. by the cash register). According to a study of the EHI Retail Institute, the checkout zone is one of the most profitable areas for sales in stores (Wrigley & Mars, 2011). The study discovered that the checkout zone generates an average sales return of €32,000 per square meter and year - six times higher compared to other store areas. It was additionally found that chewing gum is the best sold product in the confectionery segment, accounting for 43% of checkout zone sales. Nevertheless, recently the chewing gum market is facing declining sales figures. For instance, in the Netherlands it was forecasted that volume and value sales in this segment would continually decrease during the year 2016 (Euromonitor, 2016). Reasons for this negative development are deficient new product developments and changes in consumer lifestyle (i.e. consumer switching to more appealing substitutes like mints). Taking recent developments into account, it is more than ever essential for chewing gum manufacturers to implement effective product packages that attract consumers' attention and differentiate them from their competitors.

Chewing gum is available in different packaging varying in material, color, size and shape. Manufacturers' focus lies clearly on the visual appearance of their packages rather than attending to any other of consumers' senses. In this regard, Rebollar et al. (2012) studied the effect of gum packaging format and color on consumer expectation and willingness to buy. The focus of this current study will not only lie on tactile features of the packaging (rough

versus smooth surface), but also on the visual aspect of chewing gum packaging (typeface color of product claim) and how these packaging attributes influence consumers' taste intensity, purchase intention and package design evaluation. Accordingly, the central research question is formulated as follows:

What are the effects of tactile packaging features and typeface color of product claim on consumers' package design evaluation, product taste intensity and purchase intention?

Since there is scarce research on the effect of chewing gum packaging elements (i.e., typeface design and tactile features) on consumer responses, this research will add value to the existing theoretical knowledge. Moreover, the results may provide valuable insights to chewing gum manufacturers on how packaging elements can influence consumers' perception of the actual product.

2 THEORETICAL FRAMEWORK

2.1 PRODUCT PACKAGING

2.1.1 Tactile packaging features and taste

Touch may be regarded as the human's most important sense. It is the first sense to develop in the womb (Atkinson & Braddick, 1982). In addition, Aristotle's aesthesis or sensation theory posits that the human's five senses are ordered hierarchically, with touch on top of all senses. A closely related term is haptics, which from the marketing point of view, includes the active searching and perception of product information by making use of the hands (Krishna, 2011). Existing research in haptics has focused primarily on touch versus non-touch settings. For instance, Martin (2012) studied interpersonal touch, while Peck and Childers (2003) focused on individual differences in the need for touch. Yet, little research has been made with regard to haptic features and their influence on consumer behavior. In this respect, Spence and Gallace (2011) acknowledged that there is plenty of scope for the improvement of tactile innovation in product and package design. This study will therefore particularly focus on the effects of tactile features of chewing gum packages on consumers' responses (package design evaluation, product taste intensity and purchase intention).

Several studies focusing on food packaging have proven that packaging can influence consumers' taste perception. Thus, consumers are able to create a certain expectation regarding a product's taste by simply touching or looking at its packaging. In this regard, Balzarotti, Maviglia, Biassoni and Ciceri (2015) found in their study that consumers liked foods packaged in glass containers more than when packaged in plastic containers. The researchers explained that glass containers were associated with a higher quality (compared to plastic) and that the perceived higher quality of the packaging was transferred to the actual product, leading to higher pleasantness judgements. In another study, Ngo, Misra and Spence (2011) investigated that the bitterness of products is strongly associated with angular shapes, while sweetness with round shapes. The underlying reason why sensory characteristics of a product's packaging can communicate clues about the product's actual taste can be explained by the term cross-modal correspondence. The concept of cross-modal correspondences encompasses the fact that people often perceive certain product characteristics by multiple sensory modalities. For example, there is a correspondence between color (vision) and temperature (touch). On the one hand, blue, green and purple are

perceived as cool colors which mostly transmit a sense of restfulness and quietness. On the other hand, there are warm colors such as red, yellow and orange which are considered to be stimulating and arousing (Kaya & Epps, 2004). Moreover, Schifferstein and Spence (2008) asserted a strong correspondence between vision and touch and the information that both senses can provide. Thus, consumers can both see and feel the shape of a product package, its size, and its texture (e.g., rough or smooth).

Boring (1942) discovered that sensations arising from different modalities have three components in common. He identified the dimensions of duration, spatial location, and intensity. The latter (i.e., intensity), claims that an intense sensation in one modality also leads to an intense sensation in another modality (Becker, van Rompay, Schifferstein & Galetzka, 2011).

Applying the information presented above to the current study, it can be assumed that consumers will perceive a rough surface of a chewing gum packaging as strong or intense, and consequently will judge the taste experience as being also strong or intense. In contrast to this, it is expected that a packaging with a smooth surface will be perceived as less intense and in consequence consumers will also evaluate the taste experience as less intense. Accordingly, the following hypotheses are formulated:

H1a: Chewing gum packages with a rough surface will lead to a more intense taste perception.
H1b: Chewing gum packages with a smooth surface will lead to a less intense taste perception.

2.1.2 **Product claims and typeface color design**

Product claims communicate product characteristics with the goal of encouraging purchase. In general, a distinction can be made between claims that are presented in advertisements and those that are displayed on product packages. In a recent study, Fajardo and Townsend (2015) ascertained that consumers are more likely to purchase a product when the claim is presented directly on the packaging rather than in an advertisement. The reason for this is the claim-to-product proximity, which suggests that proximity between a claim and a product functions as an indicator of the manufacturer's credibility. Hence, a claim presented on the packaging reinforces claim credibility and purchase probability.

Most of the claims on food packaging are nutrition and health-related, or simple emphasize the taste experience. For instance, manufacturers might claim that their food products are “100 % natural”, “low fat and sugar free”, or “crunchy” and “creamy”. When presenting a product claim not only the message itself is essential, but also the food package design. Besides of packaging color, shape and texture, typography is of great importance. Doyle and Bottomley (2011) contended that people are capable of reading messages in a typeface. In addition, Ngo, Piqueras-Fiszman, and Spence (2012) claimed that different typefaces on a product’s package can convey diverse emotional meanings. In this respect, Lee and Pai (2011) studied the relation of affective feelings to typefaces. The authors claimed that studies focusing on this field only investigated typefaces in black color and therefore implemented various font colors in their study. According to their study results, pink is the most efficient color to induce a “soft” or feminine feeling, while black is best suited for transmitting a “hard” or masculine feeling.

Applying this knowledge to the current study, it can be assumed that a chewing gum packaging displaying a product claim written in black typeface will induce a “hard” and masculine feeling by consumers, leading to an intensified taste perception. In contrast to this, it is expected that a packaging displaying a product claim written in pink typeface will induce a “soft” and feminine feeling, leading to a less intense taste perception. Hence, the following hypotheses are proposed:

H2a: Chewing gum packages displaying a product claim written in black typeface color will lead to a more intense taste perception.
H2b: Chewing gum packages displaying a product claim written in pink typeface color will lead to a less intense taste perception.

2.1.3 **Congruency effects**

According to van Rompay and Pruyn (2011), people have the need for congruence. For this reason it is important that there is congruence between a product and its package. To be more specific, congruence is crucial when displaying textual cues (e.g., product claims) on product packages, since it positively affects consumer responses (van Rompay, Pruyn & Tieke, 2009).

In this current study two types of congruency will be investigated. In the first place, the congruency between chewing gum packaging attributes will be examined. In this respect, it

is assumed that chewing gum packages with a rough surface (perceived as strong) should be matched with a product claim written in black typeface color in order to be perceived as congruent and positively influence consumer responses. Consequently, chewing gum packages with a smooth surface (perceived as soft) should be matched with a product claim written in pink to be perceived as congruent by consumers. A more detailed elaboration on the importance of congruency between packaging attributes will be given in section 2.2.
In the second place, congruency between packaging attributes and gender will be investigated in this study. Males and females might differentiate in the preference of packaging attributes. It is therefore hypothesized that chewing gum packages with a rough surface and black typeface color of product claim will be perceived as masculine and correspondingly be preferred by men, while women will prefer the more feminine packaging with a smooth surface and pink typeface color. The topic of congruency between packaging and gender will be further discussed in section 2.3.

2.2 CONSUMER RESPONSES

2.2.1 Package design evaluation and product taste intensity

When consumers evaluate a product, for instance in terms of its packaging and taste, processing fluency plays an essential role (van Rompay et al., 2009). The term processing fluency explains how fast and accurate product characteristics can be processed by consumers (Reber, Wurtz & Zimmermann, 2004). In this regard, van Rompay and Pruyn (2011) discovered that congruence between product characteristics may foster processing. According to their study, consumers perceive congruent packaging attributes as more attractive compared to incongruent attributes, resulting in higher price expectations. Moreover, high processing fluency leads to a more positive product evaluation (Reber, Schwarz & Winkielman, 2004). Taking the above information into account, it can be hypothesized that congruent product characteristics (e.g., a chewing package with rough surface and with a black typeface color of product claim) will lead to a more positive evaluation of package design and product taste. Formally stated:

H3: Chewing gum packages congruent in tactile features (i.e. surface) and typeface color of product claim will positively influence consumers' package design evaluation.
H4: Chewing gum packages congruent in tactile features (i.e. surface) and typeface color of product claim will positively influence consumers' product taste intensity.

2.2.2 Purchase intention

Purchase intention is to some extent a decision-making that explains why consumers decide to buy a specific brand or product (Shah et al., 2012). Kotler and Armstrong (2010) identified six stages that consumers experience before deciding to buy a product: awareness, knowledge, liking, preference, conviction, and finally purchase. Marketers try to influence consumers at these different stages. Especially the first two stages (i.e., awareness and knowledge) are of great importance, since competition is fierce on the market. Manufacturers consequently seek to gain the attention of consumers by implementing effective packaging. As mentioned earlier, it is expected that congruent product elements will positively influence consumers' evaluation of package design and product taste. In addition, it can be concluded that congruent packaging characteristics will lead to a higher purchase intention by consumers. Thus, the following hypothesis is postulated:

H5: Chewing gum packages congruent in tactile features (i.e. surface) and typeface color of product claim will positively influence consumers' purchase intention.

2.3 CONSUMER CHARACTERISTICS

2.3.1 Smokers and nonsmokers

The first moderating variable of this study is the differentiation between smokers and nonsmokers. There are several studies that investigated chewing gum consumption among smokers and nonsmokers. One study demonstrated that chewing gum can serve smokers as an alternative to cigarette smoking in situations where smoking is prohibited (Cohen, Collins, & Britt, 1997). In this respect, it was found that chewing gum reduces craving and nicotine withdrawal in situations where smokers are not allowed to smoke (Cohen, 1998; Cohen et al., 1997). Consequently, it can be assumed that smokers and nonsmokers have different motives to consume chewing gum. In this study it is expected that smokers are more likely to have a higher motivation to process information concerning chewing gum packaging than nonsmokers, leading to distinctive consumer responses. Hence, the following hypothesis is postulated:

H6: The main effects of tactile features and typeface color of product claim on package design evaluation, product taste intensity and purchase intention will be higher for smokers than nonsmokers.

2.3.2 **Gender**

The second moderating variable of this study is gender. In general, males and females differ in personality traits and gender is therefore a common segmentation criteria used in marketing (Tifferet & Herstein, 2012). For this reason, it is expected in this study that gender will moderate the effect of product packaging attributes on package design evaluation, purchase intention and product taste intensity. Chewing gum is often bought impulsively by consumers. In this regard, it is known that women tend to make more impulsive purchases than men (Coley & Burgess, 2003; Dittmar et al., 1995; Rook and Hoch, 1985). Moreover, several studies have shown that men and women perceive sensory stimuli differently. Citrin, Stem, Spangenberg and Clark (2003) developed a scale to measure the need for tactile input in product evaluations (NTI). In their study they discovered that women have a higher need for tactile input than men.

Furthermore, as mentioned earlier, it is to consider that males and females might differentiate in the preference of packaging attributes. This assumption can be explained by the term symbolic meaning. According to Mc Cracken (1986) consumer goods communicate symbolic meanings. Creusen and Schoormans (2005) stated that the appearance of a product has several functions, including symbolic meaning. Machiels and Karnal (2016) further explained that the package design of a product (such as its size, shape and color) can convey symbolic meaning to consumers and thereby influence their product evaluation and hedonic expectancy. Most studies focusing on the importance of symbolic meaning in the area of product packaging, have placed their emphasis on how visual packaging elements may convey symbolic meaning. In this respect, Hoegg and Alba (2007) investigated the impact of packaging color, Becker et al. (2011) that of packaging shape and Karnal et al. (2016) examined the impact of typeface designs. This current study will not only focus on the visual aspect of product packaging (typeface color of product claim), but also the sense of touch will be incorporated.

Moreover, Fugate and Philipps (2010) claimed in their study about product gender congruence that in accordance with self-congruency theory (Grubb & Grathwohl, 1967), people use products that to some extent reflect their own image or identity. Consumers do not only like products because of their functional attributes. Instead, consumers develop a preference for a particular product due to the symbolic meaning it conveys and because it reflects their own identity. Thus, it can be assumed that a product packaging conveying masculine attributes will be preferred by males, as this group can easily identify itself with the

masculinity of the packaging. Consequently, it is more likely that females will be attracted by packages that convey a sense of femininity.
Applying this knowledge to the current study, it can be expected that a packaging with a rough surface and black typeface of product claim (i.e., gender congruent) will be associated with masculine attributes and therefore will be preferred by male consumers. On the other hand, it is expected that females will have a preference for the more feminine packaging.

Thus, the last hypothesis of this study can be stated:

H7: Males will prefer chewing gum packages representing masculine attributes (rough surface & black product claim), while females will prefer packages representing feminine attributes (smooth surface & pink product claim).

2.4 RESEARCH MODEL

In order to investigate the formulated hypotheses a research model was created (see figure 1). Tactile packaging feature and typeface color of product claim are the independent variables of this study. The dependent variables are package design evaluation, product taste intensity and purchase intention. Moreover, it is expected that gender and smokers/ nonsmokers will act as moderating variables.

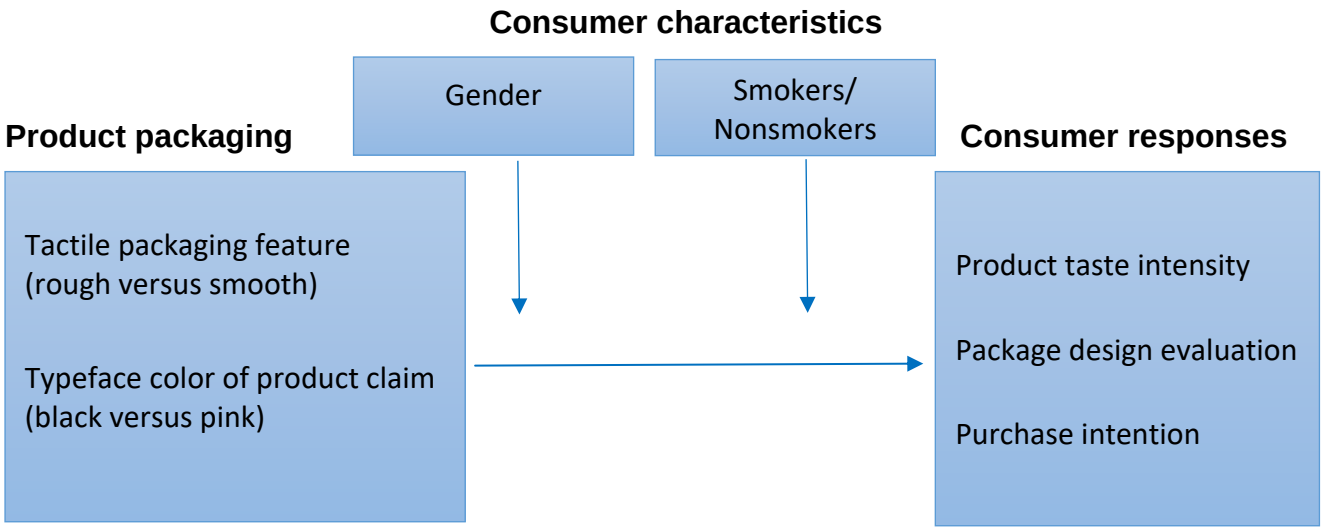


Figure 1: Research model with independent, moderating, and dependent variable

3 RESEARCH METHODOLOGY

3.1 EXPERIMENTAL DESIGN

This study made use of a 2 (tactile packaging feature: rough versus smooth) x 2 (typeface color of product claim: black versus pink) experimental design, including 4 different conditions (see table 1).

Condition	Tactile packaging feature	Typeface color of product claim	Tactile packaging feature & Typeface color of product claim
1	Rough	Black	Congruent
2	Smooth	Pink	Congruent
3	Smooth	Black	Incongruent
4	Rough	Pink	Incongruent

Table 1: Research conditions

3.2 PARTICIPANTS

The sample consisted of females and males, whereby an equally distribution of both genders was desired and obtained. In order to achieve a valid sample, 20 people per research condition and gender were required. As this study contains four conditions, 160 respondents were necessary to guarantee a valid sample.

Table 2 shows the distribution in ages, as well as the percentage of smokers, per research condition.

Condition	**N**	**Age of respondent**		**Smoker?**	
		M	SD	Yes	No
1	40	23.53	3.58	43%	58%
2	40	24.58	5.98	38%	63%
3	40	23.48	3.10	43%	58%
4	40	23.42	3.82	25%	75%

Table 2: Demographics of participants

The total number of respondents who participated in this study was 160. All four conditions consisted of 20 female and 20 male respondents. The great majority were Dutch (112 people), followed by Germans (23 people). Moreover, the participants varied between the ages of 18 and 46 years old (M = 23.75, SD = 4.25).

3.3 STIMULUS MATERIAL

The product that has been utilized for this study was a mint chewing gum of a particular brand. All four containers were provided with the same chewing gum (dragees). This should guarantee that the taste perception of the product could be solely attributed to the product packaging characteristics.

Before starting with the actual study the stimulus material was created. The stimulus material consisted of four chewing gum dispensers. All four dispensers had the same shape and were designed in white color. Nevertheless, they differed in terms of texture and typeface color of product claim. To be more specific, two dispensers were provided with a rough surface intending to stimulate a strong taste perception by participants. The other two packages were provided with a more neutral or smooth surface intending to stimulate a smoother taste perception.

Figure 3: Comparison of dispenser surfaces - rough plastic (left) versus smooth plastic (right)

Besides the different package texture, the dispensers were displaying the product claim “Very Strong Mint Taste” either in black (intending to stimulate a strong taste perception) or in pink color (intending to stimulate a smoother taste perception).

For the smooth variant, a dispenser of an existing brand was used. For this purpose, all glued labels had been removed and the dispensers were then provided with new labels. Besides the “Very Strong Mint Taste” label, one label with nutrition facts was affixed in order to make appear the dispensers more realistic.

The existing smooth dispenser served as template for the rough variant. With the help of a 3D printing company, a model design with the same dispenser shape, measurements and color was created. Several prototypes varying in respect of printing materials were manufactured to find the most suitable one. The dispenser that finally has been used for this study was created with the selective laser sintering (SLS) 3D printing technology. The printing material that was used is called polyaryletherketone (PAEK) plastic. More specified manufacturing information on the dispensers can be found in appendix 1.

Figure 2: Chewing gum dispensers - rough surface & black typeface (top) and smooth & pink typeface (below)

3.4 RESEARCH PROCEDURE

The study was carried out at the library building of the University of Twente. Participants that agreed to participate in this study, were randomly assigned to one of the four conditions. Before starting the experiment, participants were given a short paper with instructions (see appendix 2) and informed that they would taste and evaluate a new chewing gum which is supposed to be launched on the market. First, participants were given one chewing gum packaging and the researcher waited a short moment before inviting them to take one gum out of the dispenser. This short delay was crucial to ensure that participants would feel the texture of the chewing gum dispenser and also read the displayed product claim. Thereafter, while participants were chewing and tasting the gum, they received a short questionnaire. The questionnaire included a few demographic questions (e.g. gender, age, etc.), as well as questions aimed at measuring the dependent variables (i.e. package design evaluation, product taste intensity and purchase intention).

3.5 RESEARCH MEASUREMENTS

A questionnaire (see appendix 3) was made in order to measure the effects of the independent and moderating variables on the dependent variables. The first part of the survey contained several questions to determine the respondent's profile (age, gender, nationality, chewing gum consumption, smoker or nonsmoker). Subsequently, questions regarding the dependent variables were asked. After finalizing with the data collection, the Cronbach's alpha for each of the variables was calculated. Cronbach's alpha is an indicator of internal consistency and indicates whether a construct is reliable or not. In general, values above 0.7 are considered to be acceptable (range is from 0 to 1).

In the following, the dependent measurements will be presented, including an analysis of reliability for each of the scales.

3.5.1 **Package design evaluation**

The dependent variable package design evaluation was measured with a five-point semantic differential scale consisting of three items: not expensive – very expensive, not appealing – very appealing, not exciting – very exciting. The reliability analysis showed that the construct is reliable (Coefficient Alpha = 0.82).

3.5.2 **Product taste intensity**

Product taste intensity was measured with a scale based on Rebollar et al. (2012). The scale was modified to match the taste description of a mint chewing gum. It consisted initially of six taste descriptions (fresh, intense, menthol, acidic, sweet and spicy), whereby the product taste intensity was indicated on a Likert Scale ranging from 1 (not at all) to 5 (extremely). However, it appeared that the scale was not reliable. In order to increase reliability to a satisfactory level, three items were removed. The final scale consisted of three items: fresh, intense, and menthol. These three items together give a logical description of the product taste intensity of a mint chewing gum (Cronbach's Alpha = 0.73).

3.5.3 **Purchase intention**

Purchase intention was measured with a scale based on Baker and Churchil (1977). This scale consisted of four items on a Likert Scale ranging from 1 (strongly disagree) to 5 (strongly agree). The construct included the items: "I would buy this product if I happened to see it in a store", "I would actively seek out this product in a store", "I would consider buying this product", and "I would recommend this product to others". The reliability analysis proved that the construct is reliable (Cronbach's Alpha = 0.85).

4 RESULTS

In this section all relevant study results will be presented. In order to examine the relationships between the research variables, a multivariate analysis of variance (MANOVA) has been conducted. To be more specific, a factorial between groups analysis of variance was performed to investigate the effects of the two independent variables (tactile packaging feature and typeface color of product claim) on the three dependent variables (package design evaluation, product taste intensity and purchase intention). Moreover, pairwise comparisons with Bonferroni adjustments were calculated in order to analyze the differences between the means.

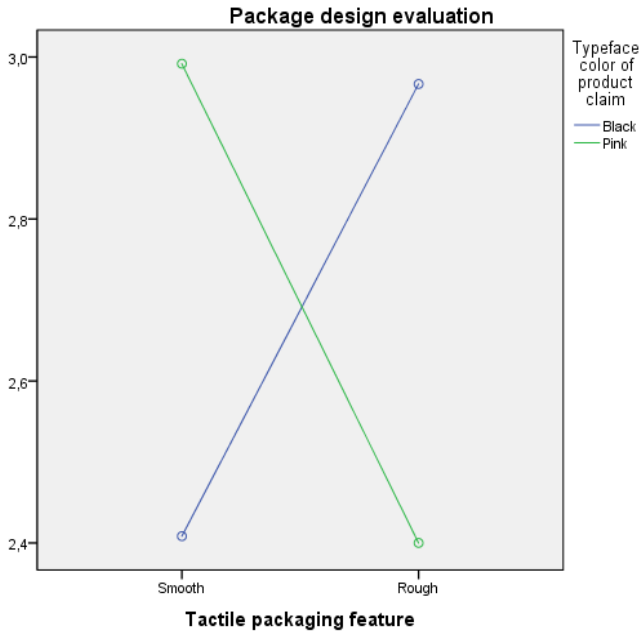
In a first step, the moderating variable gender was included into the analysis. In a second step, a separate MANOVA has been conducted including the second moderating variable of this study (smokers and nonsmokers). For all calculations, an alpha level of 0.05 was determined.

In the following, the detected main effects and interaction effects will be presented separately for each dependent variable. All significant main and interaction effects of this study are displayed in table 3, at the end of this results section (page 24).

4.1 EFFECTS ON PACKAGE DESIGN EVALUATION

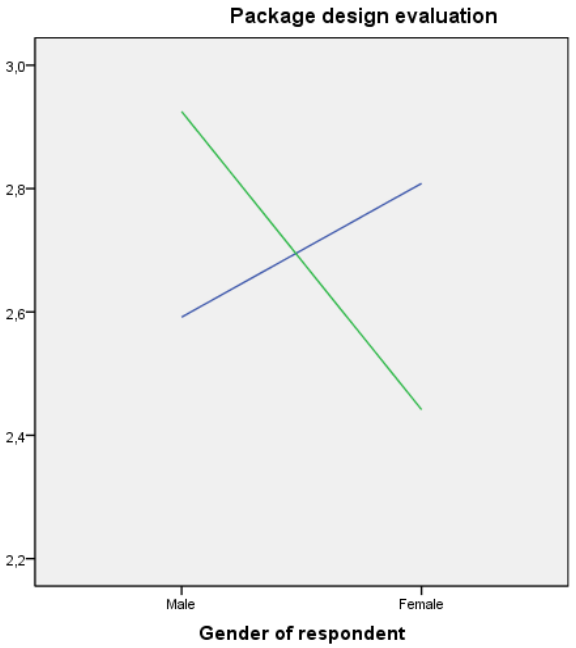
The MANOVA results show that there was no main effect for tactile packaging feature, as well as for typeface color.

Nevertheless, an interaction effect was found for tactile feature and typeface color on package design evaluation ($F(1, 152) = 16.49$; $p < 0.001$). This interaction effect (see graph 1) demonstrates that congruent packaging elements lead to a more favorable package design evaluation (confirmation of hypothesis 3). Thus, a smooth packaging and pink typeface color of product claim ($M = 2.99$; $SD = 0.96$), as well as a rough packaging and black typeface color of product claim ($M = 2.97$; $SD = 1.17$), lead to higher package design evaluations compared to incongruent packaging elements ($M = 2.41$; $SD = 0.64$ for smooth packaging/black typeface color and $M = 2.40$; $SD = 0.71$ for rough packaging/pink typeface color).

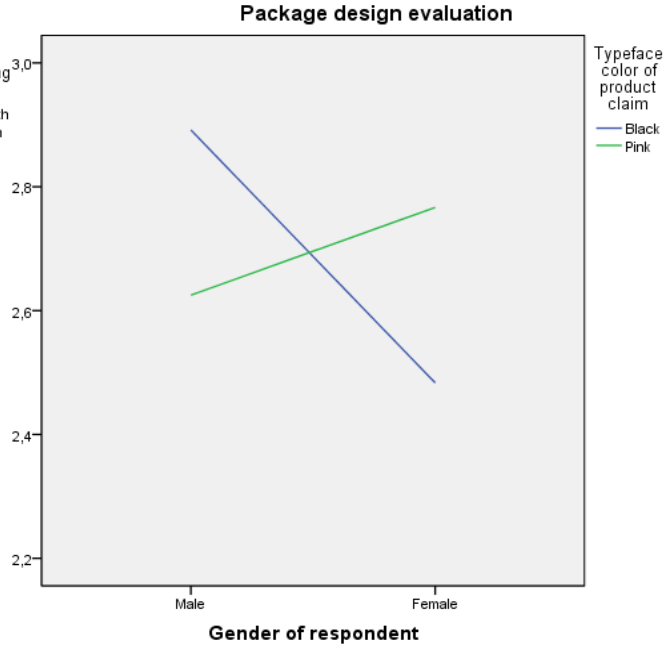


Graph 1: Interaction effect tactile feature and typeface color on package design evaluation

With regard to the first moderating variable gender it is to mention that an interaction effect was found between gender and tactile packaging feature on package evaluation (F (1, 152) = 6.44; p = 0.012). In this respect, graph 2 clearly demonstrates that females evaluated the smooth packaging (M = 2.81; SD = 1.04) higher than the rough variant (M = 2.44; SD = 0.85), while males preferred the rough packaging (M = 2.93; SD = 1.09) as opposed to the smooth one (M = 2.59; SD = 0.64).



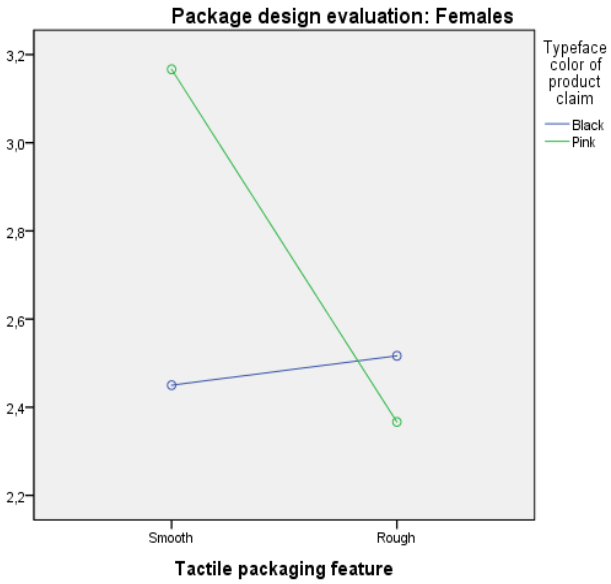
Graph 2: Interaction effect tactile feature and gender on package design evaluation

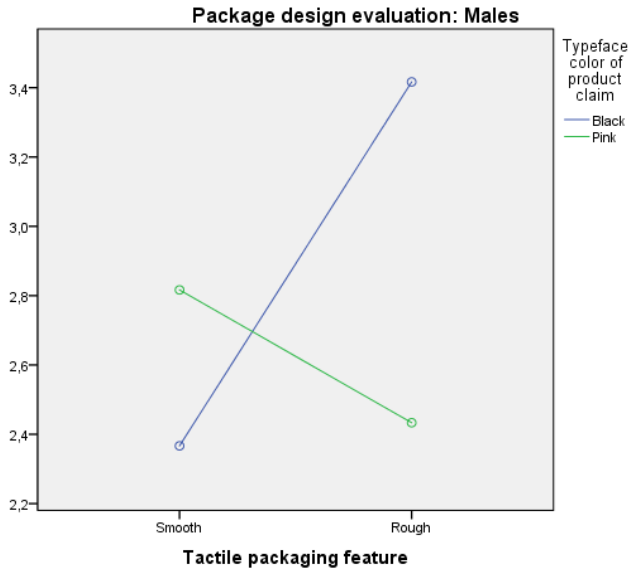


Graph 3: Interaction effect typeface color and gender on package design evaluation

Besides, an interaction effect could be found between typeface color and gender on package design evaluation (F (1, 152) = 3.98; p = 0.048). Graph 3 visualizes that females evaluated packages displaying the product claim in pink typeface color higher (M = 2.77; SD = 1.08) than packages with black typeface color (M = 2.48; SD = 0.81). In contrast to this, males evaluated packages with a black typeface higher (M = 2.89; SD = 1.01) compared to those with a pink typeface (M = 2.63; SD = 0.65).

Hypothesis 7 of this study postulated that males would prefer chewing gum packages representing masculine attributes, while females packages representing feminine attributes. As we can see in the graphs displayed below, this hypothesis can be confirmed. Graph 4 shows that females evaluated the packaging with a smooth surface and pink typeface highest (M = 3.17; SD = 1.21). In contrast to this, graph 5 demonstrates that males had a preference for packages with a rough surface and black typeface color (M = 3.42; SD = 1.23).





Graph 4: Package design evaluation females

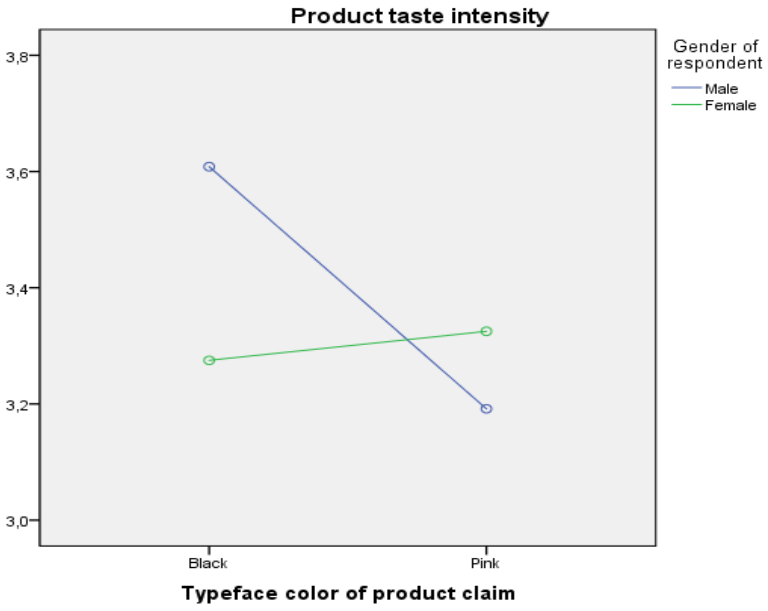
Graph 5: Package design evaluation males

4.2 EFFECTS ON PRODUCT TASTE INTENSITY

The MANOVA results show that there was a main effect of tactile packaging feature on product taste intensity (F (1, 152) = 19.58; p < 0.001). Pairwise comparisons analysis with Bonferroni corrections indicate that a rough packaging leads to a higher product taste

intensity (M = 3.57; SD = 0.61) compared to a smooth packaging (M = 3.12; SD = 0.69). This result confirms hypotheses 1a and 1b.
With regard to the second independent variable it is to mention that no main effect was found for typeface color of product claim on product taste intensity. In other words, it could not be proved that packages with black typeface color lead to a more intense taste perception (hypothesis 2a) and that packages with pink typeface color lead to a less intense taste perception (hypothesis 2b).
Furthermore, no interaction effect was found between the two independent variables on product taste intensity. Hence, no evidence could be provided that congruent packaging elements lead to a higher product taste intensity (hypothesis 4).

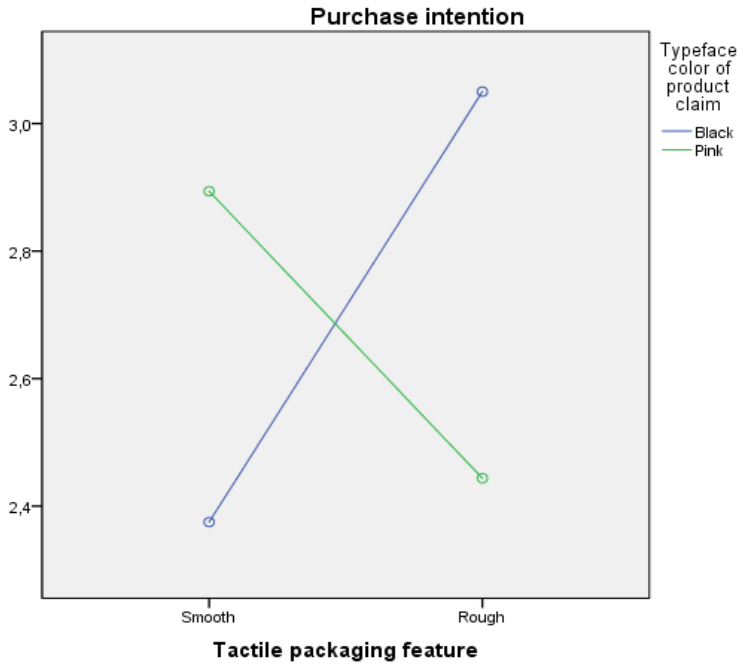
When analyzing the effects of gender, an interaction effect could be found between this variable and typeface color on product taste intensity (F (1,152) = 5.26; p = 0.023). Graph 6 demonstrates that males evaluated the product taste as more intense when the packaging was displaying a product claim in black typeface (M = 3.61; SD = 0.66) as opposed to a pink typeface (M = 3.19; SD = 0.80). In the case of females this difference is not significant. A pink typeface color led to a slightly higher taste intensity evaluation (M = 3.32; SD = 0.61) compared to a black typeface (M = 3.28; SD = 0.63).
This finding has great significance for the aforementioned hypotheses 2a and 2b. Both hypotheses can be confirmed in the case of males, as the black typeface led to a significantly higher taste intensity evaluation than the pink typeface. Nevertheless, this cannot be confirmed for the group of females.



Graph 6: Interaction effect gender and typeface color on product taste intensity

4.3 EFFECTS ON PURCHASE INTENTION

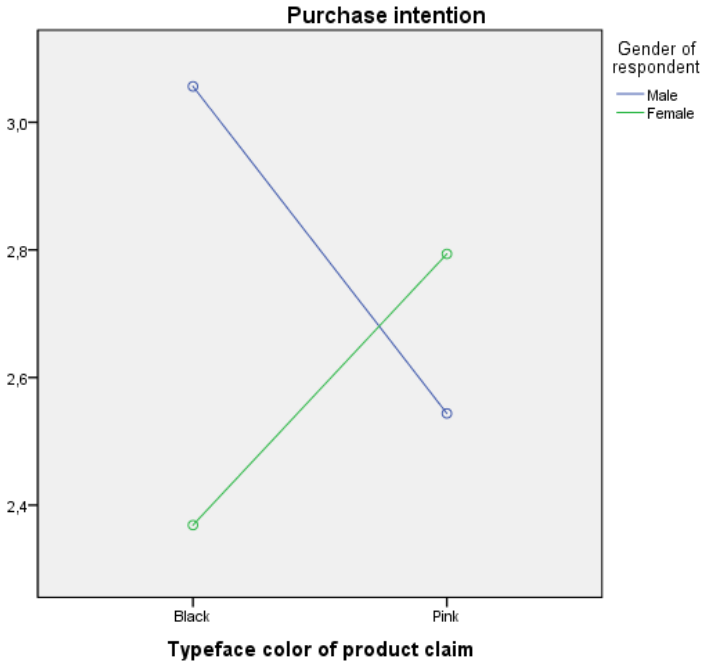
The MANOVA results show that there was no main effect for tactile packaging feature, as well as for typeface color on purchase intention.
As expected, an interaction effect of the two independent variables on purchase intention was found ($F(1, 152) = 20.14$; $p < 0.001$).



Graph 7: Interaction effect tactile feature and typeface color on purchase intention

This result proves that congruent packaging elements lead to a higher purchase intention (confirmation of hypothesis 5). Hence, a smooth packaging and pink typeface color of product claim ($M = 2.89$; $SD = 0.93$), as well as a rough packaging and black typeface color ($M = 3.05$; $SD = 0.99$), lead to a higher purchase intention in comparison to incongruent packaging elements ($M = 2.37$; $SD = 0.54$ for smooth packaging/black typeface color and $M = 2.44$; $SD = 0.80$ for rough packaging/pink typeface color).

When analyzing the effects of gender, an interaction effect was found between this variable and typeface color on purchase intention ($F(1, 152) = 13.99$; $p < 0.001$). Pairwise comparisons revealed that males indicated a higher purchase intention for packages displaying a black typeface ($M = 3.06$; $SD = 0.89$) compared to packages with a pink typeface color ($M = 2.54$; $SD = 0.73$). In contrast to this, females signalized a higher purchase intention for packages displaying a pink typeface ($M = 2.79$; $SD = 0.70$) as opposed to packages with black typeface design ($M = 2.37$; $SD = 0.70$).



Graph 8: Interaction effect gender and typeface color on purchase intention

4.4 SMOKERS AND NONSMOKERS

As mentioned earlier, the effects of the second moderating variable smokers and nonsmokers were investigated by conducting a separate MANOVA.
The MANOVA results reveal that there was no main effect for smoking on taste intensity. However, main effects were found for smoking on package design evaluation ($F(1, 152) = 16.36$; $p < 0.001$) and purchase intention ($F(1, 152) = 10.12$; $p = 0.002$). Pairwise comparisons analysis with Bonferroni corrections show that smokers evaluated the package design higher ($M = 3.08$; $SD = 1.05$) compared to nonsmokers ($M = 2.46$; $SD = 0.78$). In addition, smokers indicated a higher purchase intention ($M = 3.00$; $SD = 0.99$) than nonsmokers ($M = 2.51$; $SD = 0.74$). It can therefore be concluded that hypothesis 7 is only partly confirmed. The main effects of tactile features and typeface color on package design evaluation and purchase intention are indeed higher for smokers than nonsmokers. Nevertheless, these effects are not significant in the case of product taste intensity.

Further analyses on smokers and nonsmokers showed three interaction effects. The first interaction effect occurred between smoking and typeface color on purchase intention ($F(1, 152) = 10.33$; $p = 0.002$). Pairwise comparisons indicated that a black typeface led to a considerably higher purchase intention by smokers ($M = 3.18$; $SD = 0.81$) than nonsmokers

(M = 2.37; SD = 0.75). In comparison to the black product claim, pink typefaces were less preferred by smokers (M = 2.76; SD = 1.18) but more preferred by nonsmokers (M = 2.63; 0.73). The second interaction effect could be found between smoking and tactile feature and typeface color, on package design evaluation (F (1, 152) = 16.62; p < 0.001). Smokers evaluated congruent packaging elements considerably higher than incongruent packages. Thus, packages with a smooth surface and pink typeface color (M = 3.67; SD = 1.04), as well as packages with a rough surface and black typeface (M = 3.61; SD = 0.99), were higher evaluated than packages with a smooth surface and black typeface (2.61; SD = 0.66) or with a rough surface and pink typeface (M = 2.13; SD = 0.63). In respect to nonsmokers it is noticeable that the difference in package evaluation was not as pronounced between congruent and incongruent packaging variants. Furthermore, a third interaction effect of smoking, typeface color and tactile feature on purchase intention (F (1, 152) = 13.78; p < 0.001) was found. In the group of smokers congruent packaging elements also lead to a significantly higher purchase intention compared to incongruent elements. Moreover, as in the case of package evaluation, the difference in purchase intention was not as pronounced between congruent and incongruent packaging variants in the group of nonsmokers. A detailed overview of all interaction effects of smoking with the other independent and dependent variables can be found in table 5 in appendix 4.

Finally, all significant main effects and interaction effects of this study are displayed in the table below.

Independent variable / moderating variable	Dependent variable	F	p
Tactile feature x Typeface color	Package design evaluation	17.38	0.000
Tactile feature x Gender		6.44	0.012
Typeface color x Gender		3.98	0.048
Smoking		16.36	0.000
Tactile feature x Typeface color x Smoking		16.62	0.000
Tactile feature	Product taste intensity	19.58	0.000
Typeface color x Gender		5.26	0.023
Tactile feature x Typeface color	Purchase intention	20.14	0.000
Typeface color x Gender		13.98	0.000
Smoking		10.12	0.002
Smoking x Typeface color		10.33	0.002
Tactile feature x Typeface color x Smoking		10.12	0.002

Table 3: Significant main and interaction effects of this study

5 DISCUSSION AND CONCLUSION

In this section, the central research question of this study will be answered. In the first place, an overview will be given, indicating whether the postulated hypotheses were supported by the results. In the second place, the results will be discussed, providing explanations for the main study findings. Subsequently, the limitations of this study are presented including future research suggestions. Finally, the theoretical and practical implications of this study will be presented and final conclusions will be drawn.

5.1 OVERVIEW OF HYPOTHESES

	Hypotheses	
	Packaging features and taste	
H1a	Chewing gum packages with a rough surface will lead to a more intense taste perception.	Confirmed
H1b	Chewing gum packages with a smooth surface will lead to a less intense taste perception.	Confirmed
H2a	Chewing gum packages displaying a product claim written in black typeface color will lead to a more intense taste perception.	Partly confirmed (only for males)
H2b	Chewing gum packages displaying a product claim written in pink typeface color will lead to a less intense taste perception.	Partly confirmed (only for males)
	Packaging congruency effects on consumer responses	
H3	Chewing gum packages congruent in tactile features (i.e. surface) and typeface color of product claim will positively influence consumers' package design evaluation.	Confirmed
H4	Chewing gum packages congruent in tactile features (i.e. surface) and typeface color of product claim will positively influence consumers' product taste intensity.	Not confirmed
H5	Chewing gum packages congruent in tactile features (i.e. surface) and typeface color of product claim will positively influence consumers' purchase intention.	Confirmed
	Moderating variables: Smokers/Nonsmokers and Gender	
H6	The main effects of tactile features and typeface color of product claim on package design evaluation, product taste intensity and purchase intention will be higher for smokers than nonsmokers.	Partly confirmed (not product taste intensity)
H7	Males will prefer chewing gum packages representing masculine attributes (rough surface & black product claim), while females will prefer packages representing feminine attributes (smooth surface & pink product claim).	Confirmed

Table 4: Overview of hypotheses

5.2 DISCUSSION OF RESULTS

The main goal of this study was to identify the effects of tactile packaging features and typeface color of product claim on consumer's package design evaluation, product taste intensity and purchase intention. The findings demonstrate that the tactile feature of a packaging is indeed capable of influencing the taste perception of consumers. Significant evidence has been found that a rough packaging surface leads to a more intense taste perception compared to a smooth surface. This finding is in line with the study of Becker et al. (2011) who claimed that an intense sensation in one modality (in this case touch) also leads to an intense sensation in another modality (in this case taste).

Moreover, it was assumed in this study that the typeface color of product claim displayed on the product packaging could possibly influence the taste perception of consumers. In this regard, it was expected that a black typeface color of product claim would transmit a "hard" and masculine feeling to consumers, leading to a more intense taste perception. On the contrary, a pink typeface color should induce a "soft" and feminine impression and lead to a less intense taste sensation. This assumption, which was based on the study of Lee and Pai (2011) about the relation of affective feelings to typefaces, can be partly supported by the results of the current study. Only the group of males was significantly influenced by the typeface color. A possible explanation why females were not significantly influenced by the typeface color is the fact that men and women perceive sensory stimuli differently. According to Citrin et al. (2003), women have a higher need for tactile input than men. Taking this into consideration, it can be assumed that in the group of women, touch could have dominated over vision. Thus, women's product taste perception was most likely to a greater extent influenced by the surface texture of the packaging than by the typeface color of product claim.

A further topic of importance in this research is that of congruency. Two types of congruency were examined in this research. In the first place, the congruency between packaging attributes. In this respect, it was expected that packages congruent in tactile features and typeface color of product claim would lead to a higher package design evaluation, product taste intensity and purchase intention. The study results do not support this assumption in the case of product taste intensity, but indeed in the case of package design evaluation and purchase intention. This latter findings are in line with previous studies of Reber et al. (2004) and van Rompay and Pruyn (2011) who claimed that congruence between product packaging elements can foster processing and consequently lead to more favorable

consumer responses. Hence, this current research showed that the congruence combination of a rough packaging surface and black typeface color of product claim (or smooth surface and pink typeface) indeed facilitated processing of the product packaging by consumers, leading to a favorable packaging evaluation and purchase intention. In contrast to this, the study results showed that congruency between packaging attributes does not lead to a higher product taste intensity. A possible explanation for this result is that respondents' product taste evaluation could have been to a greater extent influenced by the tactile feature of the packaging rather than by the typeface color of product claim. In this regard, Spence and Gallace (2011) claimed that changing the feel of a product's package can have a greater effect on the affective response than changing any other sensory stimuli. Thus, it can be assumed that touch dominated the sense of vision and therefore had a higher influence on respondents' taste perception.

In the second place, this current study investigated the congruency between packaging attributes and gender. According to the study results, it can be confirmed that males prefer chewing gum packages representing masculine attributes (i.e., rough surface and black typeface), while females have a preference for more feminine packages (i.e., smooth surface and pink typeface). This can be explained by term symbolic meaning. As already mentioned, several studies have proven that the design of a package, such as its size, shape, color and typeface, can convey meaning to consumers and thereby influence their product evaluation (Hoegg & Alba, 2007; Becker et al., 2011; Machiels & Karnal, 2016). Another complementary explanation for this study result is self-congruency theory (Grubb & Grathwohl, 1967). This theory claims that people use and buy products that to some extent reflect their own identity. Indeed, it seems that the packaging with rough surface and black typeface conveyed an impression of strength and masculinity. Consequently, it was higher evaluated by males than females, as males were more easily able to identify themselves with the masculine packaging. On the contrary, females could more easily identify themselves with the more feminine packaging (i.e., smooth surface and pink typeface color).

Finally, this study considered smoking as a moderating variable. It was assumed that smokers and nonsmokers would have different motives to consume chewing gum. Smokers were expected to have a higher motivation to process information regarding chewing gum packaging. In this respect, it was hypothesized that the main effects of tactile features and typeface color of product claim on the dependent variables, would be higher for smokers than nonsmokers. The study results partly supported this hypothesis. The main effects of the

independent variables on package design evaluation and purchase intention were indeed higher for smokers, but these effects were not significant for product taste intensity.
Although the study results indicate that there might be differences between smokers and nonsmokers in the perception of chewing gum packaging and consumer responses, it should be noted that the sample of this group of respondents cannot be considered as fully representative. The reason for this is that the number of smokers was unequally distributed among the four research conditions. Although, 36 percent of total respondents were smokers, only 25 percent smokers participated in research condition four (see table 2, page 13). To conclude, it must be noted that the sample of smokers was not large enough in this current research. The study results need therefore to be confirmed with a larger sample of smokers in future studies.

5.3 LIMITATIONS AND FUTURE RESEARCH

In the following, the strengths and weaknesses of this study will be discussed.

The main strength of this study lays in the designed chewing gum packaging. With the help of a company specialized in 3D printing, high quality and unique chewing gum dispensers were created. The rough-surfaced packaging fulfilled its purpose of intensifying the taste perception of respondents. A further strength of this research is that new insights were gained concerning the effect of chewing gum packaging elements on consumer responses.

With regard to the limitations of this study it is to mention that the applied packaging differed in terms of tactile feature (rough or smooth) and typeface color of product claim (black or pink). Other packaging elements that also have an influence on consumer responses were not taken into consideration for this study. For example, previous studies have proven that packaging elements such as shape, size, and color also have the power of influencing consumers' product evaluation (Machiels & Karnal, 2016).
Another limitation of this study concerns the used product - mint chewing gums. The study results cannot be transferred, for instance, to a fruit chewing gum as the product taste in this research has been measured with the taste descriptions "fresh", "intense", and "menthol". In order to measure the product taste intensity of a fruit chewing gum, it would be necessary to implement taste descriptions such as "fruity", "acidic", and "sweet".

In addition, this study is limited with regard to the selected sample. Most of respondents were students of the University of Twente, consequently they did not significantly differ in terms of demographics (e.g., age, education, and nationality). Moreover, it was missed to ensure that the sample of this research would include a sufficient proportion of smokers, leading to an unrepresentative sample of this group.

Suggestions for future studies are, first of all, repeating the current study with a larger sample of smokers in order to confirm if there are indeed differences in the perception of chewing gum packaging between smokers and nonsmokers. In the second place, in this study respondents were invited to see and feel the product packaging before tasting the actual product. Therefore, it cannot be fully determined which of the two senses (i.e., vision or touch) dominated the taste experience. For this reason, it would be recommendable to implement a blindfolded condition to the current study. Finally, this study could also be repeated with another product, such as fruit chewing gums or other confectionary products.

5.4 THEORETICAL AND PRACTICAL IMPLICATIONS

In this section, theoretical and practical implications of this research are presented. First, the theoretical implications are discussed, followed by the practical implications.

This study provided valuable insights into the effects of product packaging elements on consumer responses. As there is scarce research on the impact of chewing gum packaging elements on package design evaluation, product taste intensity and purchase intention, this research adds value to existing theoretical knowledge. Besides, this study contributes to the emerging literature on 3D-printed product packaging. For instance, in a recent study of van Rompay et al. (in press), it was discovered that the taste evaluation of beverages (coffee and chocolate) was influenced by different 3D-printed surface patterns (angular and rounded). The continuous further development in 3D-printing technology offers the possibility to study unexplored packaging elements. In this current study, the impact of a rough versus smooth packaging surface has been studied, as well as typeface colors of product claims.
As other packaging elements were not considered, it would be interesting to study different packaging shapes in combination with rough and smooth surfaces. Furthermore, a white packaging color has been used in this research. In future studies, different colors of chewing gum packaging could be examined instead of only considering the typeface color of the

product claim. Lastly, different types of chewing gums could be implemented in future studies. For instance, it would be interesting to study whether a rough packaging can also intensify the taste perception of a fruit chewing gum.

The practical implications of this study could be of interest to food manufacturers, product and packaging designers, as well as marketers. According to the study results, it is possible to influence consumers' taste perception through making use of a rough packaging surface. Applying this knowledge to the chewing gum segment, which is currently undergoing a crisis on the European market, it would be beneficial for gum manufacturers to implement such a packaging in order to attract consumers' attention. For instance, the chewing gum that has been used for the tasting in this research is originally sold in a smooth plastic dispenser displaying a "strong mint" product claim. Nevertheless, this study has indicated that a rough packaging would be more suitable for this particular strong mint chewing gum as it would intensify consumers' taste perception. Thus, using a rough packaging surface would reinforce the credibility of the product claim and subsequent purchase probability (Fajardo & Townsend, 2015).

Another practical implication is that product and packaging designers should be aware of congruency when designing a product packaging. This study showed that congruent packages in terms of tactile feature and typeface color of product claim, can facilitate processing of the packaging and positively influence consumer responses (i.e., package design evaluation and purchase intention). In addition, this research showed that the congruence between packaging attributes and gender is also important. Manufacturers should therefore always keep in mind the gender of their target group when designing new product packaging.

5.5 CONCLUSION

The main focus of this study laid on the effects of tactile packaging features and typeface color of product claims, and how these packaging elements influence consumers' responses. Accordingly, the following central research question was postulated:

What are the effects of tactile packaging features and typeface color of product claim on consumers' package design evaluation, product taste intensity and purchase intention?

The study findings indicate that the surface of a product packaging can influence the taste perception of consumers. Packages provided with a rough surface led to a more intense taste perception compared to packages with a smooth surface. Besides, it was investigated whether a black typeface color of product claim can intensify the taste perception of consumers compared to a pink typeface. The study results demonstrated that this in only the case for males but not for females. Another interesting study finding is that congruency between packaging elements (i.e., packaging surface and typeface color of product claim) led to a higher package design evaluation and purchase intention by consumers (compared to incongruent packaging elements). Finally, the study demonstrated the importance of congruency between packaging attributes and gender. Females preferred product packages representing feminine attributes, while males had a preference for “masculine” packages.

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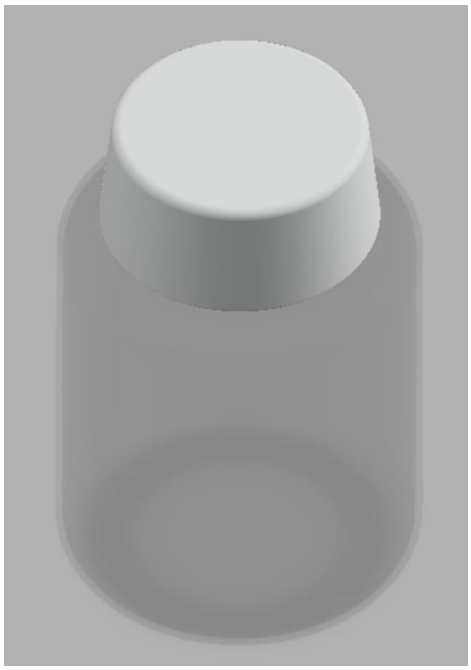
APPENDIX 1: MANUFACTURING INFORMATION 3D PRINTED DISPENSERS

Characteristics of dispenser (cup)

Appearance:	Plastic - matte (white)
Material:	Polyaryletherketone (PAEK) plastics
Mass:	6 g
Volume:	4238 mm3
Area:	6125mm3
Density:	0 g / mm3
Diameters(bottom)	20.0 mm
Diameters(above)	17.0 mm
Height (internal)	17.5mm



Characteristics of dispenser (body part)

Appearance:	Plastic - matte (white)
Material:	Polyaryletherketone (PAEK) plastics
Mass:	17 g
Volume:	12920 mm3
Area:	25950 mm3
Density:	0 g / mm3
Diameters(bottom)	26.5 mm
Diameters(opening)	20.0 mm
Height (internal)	52.0 mm

APPENDIX 2: RESEARCH INSTRUCTIONS

Chewing gum experiment

INSTRUCTIONS

Dear participant,

My name is Carlos Lehbrink and I am studying Communication Science with the specialization Marketing Communication at the University of Twente. This research is part of my Master Thesis. Thank you very much for taking some time to help me with this research.

This study is about a new chewing gum that is to be launched on the market. The chewing gum brand is still searching for a suitable product packaging. Your task will be to taste the product and to give your opinion on a potential product package.

The research works as follows: You will receive a prototype of a chewing gum dispenser. Now, it is tasting time! Feel free to take one chewing gum out of the dispenser.
Finally, please fill in the handed out questionnaire (will not take longer than a couple of minutes). There are no right or wrong answers. This questionnaire is filled in anonymously and the answers will only be used for this particular research.

Thank you very much for your participation!

Carlos Lehbrink

Master Student University of Twente

APPENDIX 3: QUESTIONNAIRE

What is your gender?
- ❍ Male
- ❍ Female

What is your age?

[ ] years

What is your nationality?
- ❍ Dutch
- ❍ Other, namely: _____

How often do you consume chewing gum?

- ❍ Nearly every day
- ❍ Occasionally
- ❍ Hardly ever

Do you regularly smoke?
- ❍ Yes
- ❍ No

How is your perception of the chewing gum dispenser/packaging? Please, describe it as precisely as possible by checking the correct boxes.

Smooth	❍	❍	❍	❍	❍	Rough
Soft	❍	❍	❍	❍	❍	Hard
Feminine	❍	❍	❍	❍	❍	Masculine
Not expensive	❍	❍	❍	❍	❍	Very expensive
Not appealing	❍	❍	❍	❍	❍	Very appealing
Not exciting	❍	❍	❍	❍	❍	Very exciting

How would you describe the taste of the chewing gum you tested? Please, describe the taste as precisely as possible by checking the correct boxes.

	Not at all	Slightly	Moderately	Very	Extremely
Fresh	❍	❍	❍	❍	❍
Intense	❍	❍	❍	❍	❍
Menthol	❍	❍	❍	❍	❍
Acidic	❍	❍	❍	❍	❍
Sweet	❍	❍	❍	❍	❍
Spicy	❍	❍	❍	❍	❍

How would you evaluate the product claim/slogan displayed on the chewing gum dispenser?

Trustworthy	❍	❍	❍	❍	❍	Untrustworthy
Reliable	❍	❍	❍	❍	❍	Unreliable
Credible	❍	❍	❍	❍	❍	Not credible

Please read the following statements carefully and mark the extent to which you agree or disagree with each statement.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I would buy this product if I happened to see it in a store.	❍	❍	❍	❍	❍
I would actively seek out this product in a store.	❍	❍	❍	❍	❍
I would consider buying this product.	❍	❍	❍	❍	❍
I would recommend this product to others.	❍	❍	❍	❍	❍

End of questionnaire. Thank you for your participation!

APPENDIX 4: ADDITIONAL RESULTS TABLE

Dependent variable	Smoker?	Typeface Color	Tactile feature	M	SD
Package design evaluation	Yes	pink	smooth	3.67	1.04
		black	rough	3.61	0.99
		pink	rough	2.13	0.63
		black	smooth	2.61	0.66
Package design evaluation	No	pink	smooth	2.59	0.65
		black	rough	2.49	1.08
		pink	rough	2.49	0.72
		black	smooth	2.26	0.59
Purchase intention	Yes	pink	smooth	3.30	1.05
		black	rough	3.68	0.79
		pink	rough	1.95	0.89
		black	smooth	2.68	0.43
Purchase intention	No	pink	smooth	2.65	0.76
		black	rough	2.59	0.88
		pink	rough	2.15	0.52
		black	smooth	2.61	0.71

Table 5: Interaction effects smoking, typeface color and tactile feature on dependent variables