Sugar-free products: also successful in confectionery industry?

The effect of sugar related claims on taste expectation, product healthiness perception and purchase intention

Master's Thesis Marketing Management

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October 21, 2015

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October 2015
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Management Summary

In recent years, sugar-free products are emerging as a result of the increasing consumer awareness of health-related issues (de Ruyter et al., 2012). Manufactures use claims on the front of a package to communicate these benefits. However, within the confectionery industry it is ambiguous what influence claims have on purchase intention. Claims could have consequences for taste expectations because a reduction in the amount of sugar or the replacement of sugar for sweeteners will give significant changes in the texture and flavour of the product (Poor, Duhachek and Krihnan, 2013). Furthermore, consumers could develop health-related product perceptions when processing a nutrition claim on the front of a package, which in turn could affect product choice (Andrews, Netemeyer and Burton, 1998). This study examines the effect of sugar related claims on purchase intention and it is hypothesized that this relationship is driven by taste expectations and product healthiness perception. More specifically, this study will test the differences in means between four products: a 100% sugar product as the reference group, a product with a 30% less sugar claim, a sugar-free claim and the last product contains a sugar-free sweetened with Stevia claim. This results in the following problem statement:

To what extent do different types of sugar related claims influence taste expectation and product healthiness perceptions and which effect do these have on purchase intention?

On the basis of the activation theory (Colling and Luftus, 1975), the formation of taste expectation and product healthiness perceptions could be explained. With regard to taste, sugar related claims will activate less favorable concepts in the mind of the consumer than the 100% sugar product will do. 'Sugar-free' and '30% less sugar' could be associated with 'artificial additives' or 'fake taste' and consequently associate this with untasteful, whereas the 100% sugar is associated with 'enjoying and tasty'. Consumers do not want to worry about the loss of hedonic pleasure (taste) when consuming candy (Hoyer and Stokburger-Sauer, 2012). For product healthiness perceptions it is assumed that people perceive organic foods as healthier than food products that contain artificial supplements (Rollin, Kennedy and Wills, 2011). A sugar-free sweetened with Stevia claim will evoke more positive thoughts than a sugar-free (artificial sweetened) claim because of its 'natural character' and the naturalness of food is closely related to perceived healthiness (Lähteenmäki et al., 2010). It is expected that the 30% less sugar claim will prime less 'healthy' associations and nodes which leads to lower perceived product healthiness and the 100% sugar product will be associated with 'unhealthy'. It is known that expectations and perceptions can act as predictors of purchase intention (Chang and Wildt, 1994; Zeithalm, 1988), and on the basis of the Cognitive Response Model (Smith and Swinyard,

1988) the effect of product healthiness perceptions and taste expectations on purchase intention is explained.

In order to test the hypotheses an online-experiment is conducted. In total, 119 respondents participated in this research and each participant is exposed to one of the four experimental treatments. The first treatment was the '100% sugar product' and contains no extra claim, the second treatment contains a '30% less sugar' claim, the third a 'sugar-free' (artificially sweetened) claim and the last contains a 'sugar-free sweetened with Stevia' claim. The study reveals that adding a sugar related claim on the front of a package indeed affects purchase intention. Surprisingly, it was found that this relationship is fully mediated by taste expectations. Contrary to this study's expectations, product healthiness perception is not influenced at all. Sugar-related claims do influence taste expectations and the 100% sugar product generates higher taste expectations than the 30% less sugar-, sugar-free- (artificially sweetened) and sugar-free sweetened with Stevia claims. No significant differences were found between the three sugar related claims which indicates that the type of claim is irrelevant. It could be concluded that within the confectionery industry, taste is really important because consumers rely on taste expectations instead of product healthiness perceptions when deciding to purchase a product. Adding a claim to a product reduces consumers' taste expectations and this lower perceived taste actually decreases consumption.

For managers, this study creates insight in the consequences of adding a sugar-related claim to the front of a package. With the increasing awareness of health-related issues such as obesity (de Ruyter et al., 2012), and in the perspective of corporate social responsibility, it is wise to pay attention to sugar-free products as manufacturer of candy. When manufacturers produce sugar-free confectionery, it is recommended not to use a claim to communicate the sugar-free aspect, because adding a claims derogates taste expectations which will threaten purchases. The sugar-free aspect could be added to the nutrition fact panel at the back of the package. In this way, interested consumers are able to find all necessary information on the back of the product. If a product is specifically positioned at the sugar-free dimension or to a specific target group, then marketers should encourage product trial through in-store demonstrations and sampling activities so taste expectations are met. Last, when deciding to add a claim to the package, it is recommend to use words that underline the 'naturalness' of the product. It was found that consumers generate higher product healthiness perceptions for a product sweetened with Stevia than for a sugar-free claim (which contains artificial sweeteners). This will result in higher purchase intention.

Preface

Writing this master thesis is the final part of the Master Marketing Management program and it brings me back a lot of memories. This thesis is the outcome of a literature and experimental research which was conducted in cooperation with Cloetta Holland and the Tilburg School of Economics and Management, between May and October 2015. During my internship at Cloetta Holland I noticed that also in the confectionery industry sugar-free products became popular. However, I was curious about the effect of sugar-free claims because I knew that not everyone shares the same enthusiasm for sugar-free products. From this point on I had found my idea for my master thesis topic and if you are also curious about the answers, be sure to read this document entirely.

I experienced the internship at Cloetta Holland and the Master Thesis as a very interesting and educational assignment. Cloetta facilitated me to explore the world of marketing and I have enjoyed the whole period as intern. I'm really glad to tell that I can stay at Cloetta because I'm hired as Junior Shopper Activation Manager.

However, this research could not have been conducted without the help of several people. First, I would like to thank my supervisor Elke Schrover for her cooperation, constructive thinking and useful comments in the period of writing this thesis. Furthermore, I want to thank my coach of Cloetta Holland, André Ruikes for his help, time and useful input. Also special thanks to Meike Tilman for creating the packages which are used in this research. And last but not least, many thanks to my boyfriend Tim van Dam for his help and support during the writing of my master thesis, who always listened to me even though I was not always that amusing. And of course my parents, who always helped me. I hope you enjoy reading my master thesis.

Nicol van den Boomen

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Chapter 1: Introduction

This chapter will start with an introduction of the company Cloetta and the motivation of the research. Thereafter, the problem statement and relevant research questions are discussed and finally the research method, relevance and structure are mentioned.

1.1 Cloetta

This research will be conducted in cooperation with Cloetta Holland BV. Cloetta is a leading confectionery company and is manufacturing and marketing sugar confectionery, pastilles and chewing gum. Cloetta owns some of the strongest brands on the Dutch confectionery market such as Red Band, Venco, Sportlife King and Xylifresh. Cloetta is also active in other European countries. Fashions and trends are found in all areas, even in the confectionery industry. Natural ingredients and sustainability are factors that are affecting the confectionery market to a growing extent (Cloetta report Q1, 2014) and knowledge of these trends is necessary for development of successful product innovations. Two years ago, Cloetta has indicated that it becomes much more important to invest in a healthy lifestyle. They are looking for opportunities to respond to this trend and two years ago they acquired the brand Goody Good Stuff that is free from gluten, gelatin and lactose with natural fruit juices and plant extracts. However, Cloetta is also looking for alternatives for natural candy within the current product range. Red Band is a famous brand and known for its popular wine gums. Cloetta wants to invest in Red Band and Cloetta is looking for alternatives that take into account the developments in health care and the demand for natural and sugar-free products.

1.2 Problem indication and motivation

In the last decade, more and more brands have invested in launching 'light- and sugar-free versions' of existing products. Due to the increasing consumer awareness of health-related issues, there is a rising demand for reduced sugar, reduced-energy or noncariogenic confectionery products (Riedel, Böhme and Rohm, 2015). Sugar confectionery has been developed over the centuries (Zumbé, Lee and Storey, 2001), and while the consumption of sugar-sweetened products increases (de Ruyter et al., 2012), there is also an increasingly concern among consumers over some aspects of food consumption such as diet and health. For example: beverages that contain sugar are associated with overweight (de Ruyter et al., 2012) and obesity is a health problem that is linked to sugar. This leads to the fact that the amount of calories and nutrient information on food packages is becoming much more important for consumers, governance and manufacturers.

In the confectionery market consumers also pay much attention to sugar-free and light products (Zumbé, Lee and Storey, 2001). The evaluation of the in store sampling demonstration of Goody Good Stuff, one of Cloetta's brands, revealed that many consumers like the 'healthy character' of the candy because it is free from gluten, gelatin and lactose and made of natural flavors. However, they regret the fact that it contains sugar and they would evaluate it more positively if the candy would be free from sugar. This along with the emergence of light and sugar-free products (Riedel, Böhme and Rohm, 2015) raises the question what influence sugar-free products can have so this study will examine the influence of sugar-free and light products within the confectionery industry. Before the actual product will be changed, these changes will be manipulated in this research by using claims on the front of the package. Literature shows that intrinsic product changes like texture of taste are often communicated through nutrition claims on the product package (Kozup, Creyer and Burton, 2003; Colby et al., 2010), so in this way the effect could be measured before the actual product will be changed.

In order to determine the type and number of claims this study is going to test, the current market, literature and competitors are studied. A short introduction of the different claims will be given here and the whole theoretical background of the establishment of these levels is described in chapter two. First of all, this study includes a standard 100% sugar product (candy) which can be labelled as the benchmark, because it is the regular product without any adjustment to the core product. Due to the increasing health concerns among consumers and the emergence of sugar free products in all categories (Zumbé, Lee and Storey, 2001), a sugar-free option is added to the study in contrast to the 100% sugar product. Sugar free products are often sweetened with artificial supplements such as aspartame. Nowadays, some consumers may develop an increasingly aversion to these artificial sweeteners and taking into account the rising popularity of naturally sweeteners such as Stevia (Ma et al., 2010), this study will also include an extra sugar free product that highlights a claim with the Stevia sweetener. In practice, more variations exist than those mentioned above. Manufacturers produce products that are lower in fat or sugar and for this reason, a fourth product will be added to the study that contains a claim with a sugar reduction of 30%. This amount is determined on the basis of the market saturation effect (Breuer and Brettel, 2012) and is discussed in chapter two. In conclusion, this research will contain four products and claims (100% sugar product, 30% less sugar product, sugar-free product with artificial sweeteners and a sugar-free product sweetened with Stevia).

However, these claims (used to manipulate changes to the intrinsic product) could result in different effects (Colby et al., 2010). Sugar gives a certain taste to a product, so what expectations do consumers have about the taste of the product if it is free from sugar or has a

sugar reduction? Taste has a considerable impact on product choice (Enneking et al., 2007), so when changing the product by using different claims on the front of the package, taste expectations could change too. If consumers think that sugar-free products will have a negative influence on its flavor this will have consequences for purchase decisions. So, claims may influence purchase intention. Purchase intention can be defined as the intention to purchase a particular good in the future (Chang and Wildt, 1994) and could be driven by several variables. Taste expectation could be an interesting explaining variable that mediates the relationship.

Besides taste expectation, it could be wondered to what extent the different product claims will influence product healthiness perceptions. Since last years, consumers attach more importance to health (Kozup, Creyer and Burton, 2003; Chrysochou and Grunert, 2014). Not only taste expectation will influence purchase intention, also the question if a product meet consumers' health standards is becoming an important factor in decision making (Barone et al., 1996; Carillo et al., 2014). Several studies (Garretson and Burton, 2000; Lähteenmäki et al., 2010) showed that nutrition claims influence perceived product healthiness so consumers could develop health-related perceptions when seeing a nutrition claim on a package. This could in turn could influence purchase intention and therefore, product healthiness perceptions will be included in this research. While light-products and sugar-free products are emerging, there is little knowledge about consumers' taste expectations and product healthiness perception of these products in the confectionery market. Research will be conducted to examine the effect of sugar-related claims on taste expectation and product healthiness perception and which will lead to the highest purchase intention.

1.3 Problem statement

To what extent do different types of sugar related claims influence taste expectation and product healthiness perceptions and which effect do these have on purchase intention?

1.4 Research questions

Theoretical questions

- What are consequences of the use of sugar related claims?
- What is the definition of taste expectation?
- What are antecedents of taste expectations?
- What consequences (positive / negative) do taste expectations have?
- Which aspects influence product healthiness perceptions?
- What is the definition of purchase intention?

- To what extend do product healthiness perception and taste expectation influence purchase intention?

Practical questions
- What influence do product intrinsic changes with regard to sugar have on taste expectations in the sugar confectionery industry?
- What is the explaining role of taste expectation and product healthiness perception on the relationship between the product variations and purchase intention?
- To what extent should a manager use claims to communicate product intrinsic changes, in order to generate more sales?

1.5 Research method

As indicated above, the variables and constructs will be defined through a literature study. Subsequently, the effect of changes in the intrinsic product will be measured by conducting quantitative research. An online survey will be conducted while the external validity is tried to keep as high as possible. The experiment focuses on the mediating role of taste expectations and product healthiness perception in the relationship between the different claims and purchase intention. Four groups are formed for the experiment (participants equally divide amongst the four test groups). The changes in the intrinsic product will be manipulated by using a claim at the product package, thus the claim is the manipulated stimuli. A pre-test will be conducted in order to ensure if the package designs contain enough information and to determine the effectiveness of the claim. After the pre-test, the online questionnaire will be launched which contains questions about taste expectations, product healthiness perception and purchase intention. The latter will be measured by asking participants whether they would buy the product or not after seeing the package design. Finally, the results will reveal which intrinsic product change is most preferred and so probably the most successful.

1.6 Academic relevance

The consumption of 'light products' increases and although not much empirical research exists, it's an interesting subject. Current research that focused on sugar mostly investigated its influence on body weight and obesity or other health problems instead of research on consumer behavior (de Ruyter et al., 2012; Wansik and Chandon, 2006; Kozup, Creyer and Burton, 2003). In recent years, many companies launched sugar-free products and artificial sweetened products which led to a new field of study. Especially the beverage industry is known for its large amount of variations in sugar products and as noticed by many researchers, the increasing consumption

of these sugar-free or sweetened products are the number one cause for obesity (Wansink and Chandon, 2006). However, research about product intrinsic changes with regard to sugar (sugar-free products) is almost only studied from nutrition perspective in food science and technology (Zumbé et al., 2001; Riedel, Böhme and Rohm, 2015). Though, it is important to connect this to consumer behavior and this study contributes to the current literature by extending both of these literature streams and to provide two innovative elements.

This study gives more insight in the effect of sugar-related claims on purchase intention by examining its effect on taste expectations and product healthiness perceptions. Some literature exists about these constructs. The effect of sugar-free products on taste expectations is studied by Appleton and Blundell (2007) and they showed that sugar-free and artificially-sweetened beverages affected taste and energy. As argued by Raghunathan et al. (2006) and Ma et al., (2013) changes in product intrinsic elements may also affect taste. Knowing that changing the amount of sugar is a change in the intrinsic product, it is interesting to know what influence the sugar related claims can have on taste expectation. This is particularly important in confectionery industry because sugar is the most important ingredient of candy. Other current literature examines the effect of claims on the perception of health-related product attributes (e.g. van Kleef et al., 2005) and several studies show that claims can affect perceived product healthiness (Barone et al., 1996; Andrews, Netemeyer and Burton, 1998; Colby et al., 2010; Carillo, 2014). However, these effects has been small or moderate and results are inconsistent, so this study will clarify this. Furthermore, Enneking et al., (2005) studied the effect of claims on purchase intention. However, this only holds for the beverages industry. Within the confectionery industry, this topic is hardly covered. This research will contribute to the current literature by examining the sugar related claims concept more closely. It will determine to what extent claims can influence perceived product healthiness and taste expectations and which effect these have on purchase intention because it is known that expectations and perceptions can act as predictors of behavior and attitudes (Rao and Monroe, 1988; Chang and Wildt, 1994; Zeithalm, 1988). Understanding of these concepts may be an interesting extension to the current literature.

1.7 Practical relevance

An understanding of the influence of sugar (free) claims is highly relevant to marketers of food products. The consumption of sugar-sweetened products increases, but consumers have become more health and nutrition conscious (Colby et al., 2010; Trivedi, Sridhar and Kumar, 2015). This has to be taken into account when deciding to introduce a new or adapt a current sugar

(free) product. More and more sugar-free products are launched and while these products are becoming increasingly popular in some categories (e.g. beverages), it can be wondered if this applies to all categories. Within many product categories (e.g. beverages), manufacturers make consumers aware of these adjustments by including health and nutrition claims on products. However it is interesting to know if consumers also pay attention to claims within the sugar confectionery industry, because the market is already considered as an unhealthy food category. Consumers may be sceptic about sugar-free products in the confectionery market or think it will have a major influence on taste. Furthermore, consumers are away of the potential negative effects that can be caused by sugar (Zumbé, Lee and Storey, 2001) and they are looking for alternatives that are perceived as healthier. These insights could help Cloetta and other marketers with their decisions whether they should adapt a current or develop a new product and if these benefits should be communicated via claims. If purchase intention is influenced negatively by claims, then they could decide not to communicate this on the front of the package or vice versa. If the results show that sugar free claims will decrease taste expectation which will lead to decreased purchase intention, than product trial and tasting should be really important in order to persuade the consumer. So, this research aims to give more insight in the world of sugar (free) products in the confectionery industry. However, not only Cloetta, but food marketers in general will have a greater understanding of consumer's perceptions and expectations of sugar related claims and its influence on purchase intention within the confectionery industry. Marketers can use these insights to influence sales.

1.8 Structure

After this introduction chapter, an overview of the current academic literature about the subject will be given and the mediating effect of product healthiness perception and taste expectation is discussed. With the use of literature the hypotheses will be formulated. In chapter 3 the research method is explained and it will be clear which research method will be used. Chapter 4 discusses the results of the research. In the last chapter, chapter 5, the conclusions, recommendations and limitations of the research will be discussed even as the possible directions for future research.

Chapter 2 Theoretical background

This chapter starts with more information about the confectionery industry in general. Thereafter, the establishment of the four levels is discussed, keeping in mind that this will be manipulated by using claims. In the second paragraph, the formation and consequences of taste expectation is explained with the use of the activation theory, and paragraph three discusses product healthiness perception. The cognitive response model explains the influence of these constructs on purchase intention in paragraph 4, and the last section pays attention to the two mediating effects.

2.1 Confectionery industry

Sugar confectionery can be defined as the art of making confections that contain at least one form of four different sugars: sucrose, dextrose, fructose or lactose (Zumbé, Lee and Storey, 2001). Sugar is known for its positive psychological effects on mood (Match and Mueller, 2007) and they give a mouth feel and favorable flavor. Sweets are very popular and the consumption of these products increases. This led to increased health problems such as obesity and in order to counteract these problems manufacturers started producing sugar-free or reduced sugar products (Wansink and Chandon, 2006). Nowadays, there exist countless formats of confectionery with different degrees of sweetness, textures and flavors. A successful approach for producing sugar-free products is to use substitutes for sugars and combine it with intensity sweeteners like polyols (Riedel, Böhme and Rohm, 2015); (Zumbé, Lee and Storey, 2001).

In this study, the effect of different sugar related claims in the confectionery industry will be investigated. Sugar exists in countless formats and manufactures adapt their products by reducing its amount of sugar with a certain percentage or product sugar-free products (Zumbé, Lee and Storey, 2001). Many different 'light' or sugar-free versions arise and the effect of these different products cannot be examined by using one single claim that captures all variations. Therefore, this study will use more claims so their individual effects can be examined. In order to determine the number of claims this study is going to test, the current market and literature has been studied. Several studies noticed that there has to be a significant difference between claims, before attitudes or perceptions could be measured (e.g. Riedel, Böhme and Rohm, 2015). The first product is going to be the *standard regular product* that contains 100% sugar, which can be labelled as the benchmark[1]. In contrast with the regular product, this research includes a *sugar-free option*. Many sugar-free products are seen in other

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[1] The 100% sugar product is the benchmark, because this is the basic product before any adjustments are made to the core product.

industries, for example within the beverages industry were Coca Cola knows a large assortment. Together with the increasing health concerns among consumers (Trivedi, Sridhar and Kumar, 2015; Zumbé, Lee and Storey, 2001), it is realistic to include a sugar-free product as option. It is assumed that this option is sweetened with artificial supplements such as aspartame because this is still the most commonly used sweetener for manufactures when decreasing the amount of sugar. This level could be compared with Coca-Cola light or other sugar-free products. Furthermore, taken into account the rising popularity of more natural sweeteners such as Stevia (Ma et al., 2013), it is interesting to include a second sugar-free product in the research that contains 'natural' sweeteners instead of artificial sweeteners such as aspartame. Therefore the third option will contain a claim that *highlights the 'naturalness' of sweeteners* by explicitly mentioning Stevia. In addition to these sugar-free products, the current market counts many products with a sugar or fat reduction (Riedel, Böhme and Rohm, 2015; Kozup, Creyer and Burton, 2003). Therefore, a fourth option is added to the research to anticipate on this trend. This product is positioned between the 100% sugar- and sugar-free products and will contain a claim *with 30% less sugar* which is determined by examining the market saturation effect. Previous literature describes the market saturation effect as the stage at which no more of something can be absorbed or accepted (Breuer and Brettel, 2012). Within Cloetta, it is known that promotions above a 30% markdown will no longer lead to extra sales. Though, sales is not the same as sugar and studies that used nutrition claims in their research have been checked too. Liem et al. (2012) examined the difference between three types of soup and used the following claims based on literature: the reference level, a product with a 15% less sodium label and a product with a 30% less sodium label. Furthermore, Zumbé, Lee and Storey (2001) investigated polyols in confectionery and they showed, among other things, the way product claims are regulated. Consumers in Europe require a 30% to 33% sugar reduction compared to the reference group whereas the food in the USA must contain at least 25% less sugar than the reference food. Taken this and the market saturation effect into account, the 30% will be used as starting point for the product with a sugar reduction. In conclusion, this research will manipulate changes in the intrinsic product in such a way that four different variations will emerge: the regular product (100% sugar), a sugar-free product (with artificial sweeteners), a sugar-free product sweetened with Stevia and a 30% less sugar product.

However, the use of different claims may have several consequences. Colby et al., (2010) show that claims can alter *consumers' product perceptions*. Claims influence consumer knowledge and they will develop a general idea about the product. Consumers may think that health-related claims offer a solution for health problems so this could be an important

consequence to take into account, because it could affect product choice (Andrews, Netemeyer and Burton, 1998). Claims could also have consequences for taste expectations. A reduction in the amount of sugar or the replacement of sugar for substitutes will give significant changes to the flavour of the texture of the product (Neelamegham and Jain, 1999; Zsybillo and Jacoby, 1974; Poor, Duhachek and Krihnan, 2013). Consequently, product healthiness perceptions and taste expectations can affect purchase intention, because it is known that expectations and perceptions can act as predictors of purchase intention (Chang and Wildt, 1994; Zeithalm, 1988). Therefore, taste expectation, product healthiness perception and purchase intention are included as mediating and dependent variables and these constructs will be discussed in further detail.

2.2 taste expectation

Taste is a form of sensory perception. It can be described as a peculiarly unique sensation which is not only compiled of one sensory input, like the tongue, but is also created by a combination of multiple sensory inputs (Elder and Krishna, 2010). The influence of the sugar related claims on taste expectation could differ and in order to determine which product will lead to the highest taste expectation and which product will be less preferred, several constructs are examined to understand the formation of taste expectations. Sugar confectionery (candy) serves as the simple purpose of provoking an almost instantaneous feeling of well-being and happiness by the pleasant flavours, aromas and mouth feel (Zumbé, Lee and Storey, 2001). Sweeteners can be used to replace some or all of the sugar in a product, which enables the development of sugar-free or reduced sugar products (Zumbé, Lee and Storey, 2001). Sugar adds flavor to a product and taste emerges as critical factor for the acceptance of food (Hoyer and Stokburger-Sauer, 2012), so it could be wondered if consumers are willing to compromise on taste when they want to purchase candy because. As argued by Verbeke (2005) consumers do not want to compromise on taste when it comes to functional foods. Sugar confectionery does not belong to functional foods, but is billed as *hedonic consumption.* Hedonic consumption (Hirschman and Holbrook, 1982) could be defined as the need for pleasure and people eat hedonic products for pleasure, not according to energy or health needs. Sugar consumption can be seen as hedonic consumption because of the fact that sugar is known for its positive psychological effects on mood (Match and Mueller, 2007). When it comes to hedonic consumption, taste is particularly important (Hoyer and Stokburger-Sauer, 2012) and consumers do not want to worry about the loss of hedonic pleasure (taste) when consuming confectionery. Consumers may think that reducing the amount of sugar will lead to a loss of hedonic pleasure because then less sugar is

left to give the product the desired taste. Sugar adds flavor to a product so reducing the amount of sugar could affect taste expectations. Following this line of reasoning, the intuition exists that consumers are not willing to compromise for taste in the confectionery industry. This gives the impression that consumers will prefer the regular 100% sugar product above the other products that contain a sugar related claim. In order to strengthen this impression and to determine which of the three other sugar-related claims will be expected to be tastier, the formation of taste expectations will be explained by the activation theory (Collins and Loftus, 1975).

The Activation Theory

This theory (Collin and Luftus, 1975) states that in a memory network, links between concepts are driven by the function of the importance or strength of each link between those concepts. A concept will be primed by a 'sugar-free' claim and then activation will be spread by a set of links in the network. For example, the sugar-free claim leads to inferences that the product is 'artificially modified', 'unnatural' or 'chemical due to artificial sweeteners' (Andrews, Neteymeyer and Burton, 1998). These *associations* or *inferences* trigger different areas of the brain in such a way that information associated with a concept triggers other brain areas that are also activated by similar thoughts. To illustrate this, if you receive information that is associated with a bad taste, your brain activates areas that are also activated by the smell of a bad odor. Aaron (1994) found that people, who held positive beliefs about full-fat margarines, evaluate margarines that carry a full-fat label as more pleasant than the same product which was labelled with a 'reduced fat-claim'. If this is translated to candy, of which is known its taste is given by sugar, people who hold positive beliefs about sugar will evaluate a 100% sugar product more pleasant than the same product that contains a sugar reduced or sugar-free claim. Thus, beliefs about specific ingredients influence heavily the way consumers evaluate information. Less favorable associations with a specific ingredient can affect actual flavor expectations without products being different (Wansink and Park, 2002). Following this line of reasoning, artificial sweeteners may evoke negative associations such as 'chemicals' and 'bad-for-you'. Many people know that those sweeteners are artificially modified or they simply have bad experiences with the taste of sugar-free products. This activation can influence taste expectations negatively, because consumers may associate artificial with distasteful or fake taste. In contrast, a more positive activation can be spread if consumers will be primed by a more natural ingredient claim such as Stevia. Stevia is a natural sweetener that gives the taste of sugar but contains fewer calories. Literature argues that consumers are not willing to

compromise for taste (Verbeke, 2005), but if the benefits of a product are based on components that are naturally present in the product, consumers are more willing to accept these benefits (Raghunathan, Naylor and Hoyer, 2006). So when consumers process the Stevia claim, activation is spread that Stevia is naturally and tasteful and therefore will serve as a good substitute for sugar. Taste expectations will be more positive because consumers have positive associations with Stevia. More recent studies support these findings. Rollin, Kennedy and Wills (2011) studied consumers' attitudes towards emerging food technologies. They argued that research has found that namely European citizens are not favorably disposed to Genetically Modification (GM). GM content in food has a negatively impact on purchase intention because there is a lack of knowledge and awareness of this technology and it is associated with negative thoughts. However, consumers are more accepting GM technologies using plant based products (Rollin, Kennedy and Wills, 2011), because of its natural basis. So, a sugar-free product sweetened with Stevia will evoke more positive associations and therefore influence taste expectations positively. In contrast, artificial sweeteners could evoke negative associations as 'fake taste' and 'chemical,' and consumers could develop an aversion against this sugar-free product. These negative associations will therefore influence taste expectations negatively.

In addition to the sugar-free products, manufacturers are also suitable to develop sugar-reduced alternatives (Zumbé, Lee and Storey, 2001) which is related to the 30% less sugar claim. However, as argued before, sugar gives the product a certain taste and by reducing the amount of sugar, taste expectations could decrease too. Liem et al., (2012) found more favorable taste expectations for products without a sodium label compared with a product that contains a 15% or 30% sodium reduced label. They argue that a reduction is possible, as long as consumers are not aware of the reduction and it is compensated by other ingredients. Furthermore, Wertenboch (1988) found that consumers expected the product to be less tasty when it contains a label with a nutrition reduction. His study shows that potato chips with a 25% fat-label were expected to be tastier than the same product that contains the label '75% less fat.' A reason consumers prefer the first above the latter could be found in the fact that the products could be seen as hedonic products which are characterized by the pleasure you obtain when consuming the product. The product with the nutrition reduction loses this feeling because people may think that it will be less tasty due to its large nutrition reduction (Wansink and Chandon, 2006). Sugar gives a certain taste to the product so it is expected that consumers' taste expectations will decrease when the amount of sugar is reduced.

In conclusion, taste is particularly important in hedonic consumption (Hoyer and Stokburger-Sauer, 2012) and reducing the amount of sugar will lead to a loss of hedonic

pleasure and thus a lost in taste. Therefore, sweeteners are used to develop suitable sugar-reduced and non-sugar alternatives. However, sugar related claims will activate less favorable concepts in the mind of the consumer than the 100% sugar product will do. The Stevia concept will prime more positive associations than the 30% less sugar claim and the sugar-free (artificially sweetened) claim. The product with the sugar-free claim that contains artificial sweeteners will generate the lowest taste expectations because consumers may think that the product involves too many adaptions which will prime more negative associations (Poor, Duhachek and Krishnan, 2013). Based on this literature, the following hypotheses are proposed:

H1a: The 100% sugar product will have a more positive influence on taste expectation than the products that contain a 30% less sugar, are sugar-free but artificially sweetened or sweetened with stevia claim.

H1b: The product with the sugar-free sweetened with Stevia claim will generate more positive taste expectations than the products with the sugar-free (artificial sweeteners) claim and the 30% less sugar claim.

H1c: The product with the 30% less sugar claim will generate more positive taste expectations than the product that contains the sugar-free (artificial sweeteners) claim.

2.3 Product healthiness perception

In addition to taste expectations, food choices are also made based on *health* (Wansink and Chandon, 2006; Johansen and Hersleth, 2011; Trivedi, Sridhar and Kumar, 2015). The *increasing health concern* among consumers, manufactures and government offers possibilities and challenges. Many manufactures respond by producing healthier options. The advantage of these products could be communicated by using claims (Kozup, Creyer and Burton, 2003). Research shows that claims can have impact on *perceived product healthiness* (Lätheenmäki, 2013; Garretson and Burton, 2000). Perceived product healthiness will be defined as the extent to which a consumer think a product will be healthy and therefore meet health standards (Barone et al., 1996). In order to assess product healthiness or taste expectations, people have to process relevant information. In this case, they rely on nutrition information provided by food manufactures, such as claims on the front of a package (Garetson and Burton, 2000; Bech-Larsen and Grunert, 2003; Kozup, Creyer and Burton, 2003). The sugar related claims in this

research can give the assumption that the product is 'healthier' than its regular variant, and therefore it is interesting to know if this is important in sugar confectionery.

The naturalness of food products is closely related to perceived healthiness (Lähteenmäki et al., 2010). This could be explained by the fact that people think that natural ingredients in products are good for them and ensure health. It is assumed that people tend to perceive organic foods as healthier than food products that contain artificial supplements (Bech-Larsen and Grunert, 2003; Rollin, Kennedy and Wills, 2011). In order to explore what impact the four products can have on perceived product healthiness, this research will use the *associative network theory* (Collins and Loftus, 1975; Alba and Marmorstein, 1987). As it is for taste expectation, information-processing models such as the activation theory are relevant to get more insight in consumer understanding of nutrition claims. Because of the activation that will be primed when processing a claim, claims may evoke thoughts that go beyond the actual claim (Bettman, 1970). For example, when a consumer is faced to the claim 'low in sugar', the consumer will develop ideas of that claim based on information that already is stored in the consumer's memory. The understanding of the claim will be influenced by activation that is spread in the memory. The claim may bring other ideas to mind such as 'I know that sugar can lead to obesities, so this product is healthier, or low in sugar does not necessarily mean that the product is healthy because of its artificial components.' In this way, activation can lead the consumer to make inferences about the perceived consequences of that claim on product healthiness. Candy belongs to the unhealthy food category (Raghunathan, Naylor and Hoyer, 2006) and the regular 100% sugar product does not contain a nutrition claim. In terms of product healthiness perception, it could be expected that consumers may associated this product with 'unhealthy,' 'calorie bomb,' and 'obesity', because candy is seen as unhealthy food. In this case, it is supposed that consumers will have more positive product healthiness perceptions for the products which contain a reduced-sugar or sugar-free claim than for the regular 100% sugar product. The strongest benefit of the sugar-free claim sweetened with Stevia is that it has a 'healthy character'. As argued before, the naturalness of food is closely related to healthiness (Lähteenmäki et al., 2010). Stevia is an herb and therefore a 'natural' product, meant to be a sugar substitute and products that already have a healthy image for consumers are easier to accept (van Kleef et al., 2005). So if Stevia has a positive healthy image and consumers will process the Stevia claim, their brain will prime the Stevia concept with other concepts and links such as healthy character, non-caloric and natural sweetener that may be good for you. Thus in line with the activation theory, it can be argued that consumers will compromise for natural ingredients such as Stevia. They will have a more positive product healthiness perception than

they have for artificial sweeteners because of the activation that is spread when concepts are primed by seeing the Stevia product. In contrast, products that contain methods as genetic engineering will be accepted less rapidly because of its expected negative impact on perceived healthiness. When consumers process the 'sugar-free' claim they could generate ambiguous feelings. Nowadays many consumers know that the sugar in these products is replaced with artificial sweeteners (Zumbé, Lee and Storey, 2001). People could have ambiguous feelings about artificial sweeteners, because they may evoke negative associations such as 'chemicals,' 'unnaturally,' and 'bad for you'. The studies of Grunert et al., (2001) and Rollin, Kennedy and Wills (2011) support these findings. On the basis of a laddering technique they studied the way consumers think about genetic modification (GM) towards candy. They find that consumers make a major distinction between GM and non-GM products, in such a way that consumers prefer non-GM products over GM products even though there were mentioned fewer benefits for that product. It can be stated that 'natural' or non-genetic modification products are associated with safety and good health, whereas genetic modification products are associated with poorer health, uncertainty and other negative associations. In this way, it could be expected that consumers have less positive product healthiness perceptions for sugar-free products because of its artificial additives.

Thus, consumers can have negative associations towards artificial sweeteners. It will be associated with a lower product healthiness perception than the Stevia product because different links between concepts in the brains are activated. A 30% less sugar claim is expected to have lower impact than a sugar-free claim because then less 'healthy' associations and nodes are primed. Therefore it is supposed that:

H2a: The product with the sugar-free sweetened with stevia claim leads to a higher product healthiness perception than the 100% sugar product, the product with the 30% less sugar claim, and the product with the sugar-free (artificial sweetened) claim.

H2b: The product with the sugar-free (artificial sweeteners) claim leads to a higher product healthiness perception than the 100% sugar product and the 30% less sugar claim.

H2c: The product with the 30% less sugar claim leads to a higher product healthiness perception than the 100% sugar product.

2.4 Purchase intention

Purchase intention can be defined as the intention to purchase a particular good in the future (Chang and Wildt, 1994). If the claims may alter consumer taste expectation or product healthiness perception, this could influence product choice. When consumers want to buy a product or service, they do not always have the right tangible cues or enough information to evaluate the product in such a way that they will make a good product choice. During this process, consumers have to rely on *existing knowledge* and *expectations* (Neelamegham and Jain, 1999). In consumer behavior language, expectations could be defined as ''subjective notions of things to come and predictions of the nature or brand performance'' (Olson and Dover, 1979). In other words, what the consumer predicts and what he thinks that will happen. It is considered that product expectations are pre-trial beliefs about the product and it can be stated that a high expectation is likely to increase product choice and that low expectations will lead to product rejection. When it comes to expectations and beliefs, consumers could develop beliefs with regard to taste if they are exposed to a nutrition claim. The way in which purchase intention is influenced by taste expectations can be explained by the *Cognitive Response Model* (Smith and Swinyard, 1988). The basic proposition of the model states that spontaneous cognitive responses, such as thoughts or beliefs, that are revealed by marketing and communication expressions act as mediator of behavior formation. Intrinsic product changes will be communicated via claims which will fuel the cognitive process. Cognition is the mental process related to knowledge (Peck and Childers, 2008) and refers to thinking, problem solving, reasoning, judgment and decision making. So, it is the way our brains receive, process and send signals. When consumers process the nutrition labels, they use their own thinking, reasoning and existing knowledge to generate new knowledge. In this way, beliefs and expectations are formed and according to Fishbein and Ajzen (1975), expectations and beliefs are fundamental for *attitude formation.* For example, when someone expects that a reduction in sugar gives fewer flavors to a confectionery product, his taste expectations are influenced less positive which may lead to a less favorable attitude towards the product. Consequently, this negative belief or attitude could influence potential purchase behavior. Neelamegham and Jain (1999) also suggest that (taste) expectations are important influences of product choice and behavior and Hoyer and Stokburger-Sauer (2012) found that, particular in hedonic consumption, taste has a key role in judgment and decision making. This because consumers need to rely on their expectations when making a choice and hedonic consumption is strongly related to the emotional value an individual experiences when consuming a product. Summarizing, it could be concluded that expectations plays an important role for food choice consumption. Even

before a product is tasted, taste expectations could improve or deteriorate the perception of a product. Therefore it is supposed that:

> **H3:** *The higher consumers' taste expectations, the higher their purchase intention*

Following this line of reasoning, it could be argued that product healthiness perceptions influence purchase intention in the same way. A perception is the way consumers process and organize information they receive and then give a meaning to it (Zeithalm, 1988). Consumer's behavior is based on their perceptions, on their thoughts and own reality, thus not only on the reality itself. It is possible that two individuals will interpret a similar product differently. This could also be explained by the *Cognitive Response Model* (Fishbein and Ajzen, 1975), because when consumers process the claims, they will form a perception based on existing knowledge, beliefs and new information. The claim will give them new information which will be interpret differently by everyone, and this is used to form product healthiness perceptions (Zeithalm, 1988). If consumers have positive thoughts and associations, they will expand these positive thoughts. Based on the above, the following is hypothesized:

> **H4:** *The higher consumers' product healthiness perception, the higher their purchase intention*

Finally, the mediating role of taste expectation and product healthiness perceptions will be tested. The aim of this research is to examine to what extent claims influence purchase intention relative to the same product without a claim. If this relationship is driven by taste expectations and product health perceptions, and consumers may evoke negative expectations when processing a claim, there has to be considered if manufacturers should communicate these benefits on the package. Taken into account the activation theory (Collin and Luftus, 1975) and the way consumers process a claim, it could be explained that the claims can lead to different effects in purchase intention because of the accumulated knowledge that claims can change taste expectations and healthiness perceptions. Therefore, the following is supposed:

> **H5:** *Taste expectations will mediate the effect of sugar-related claims on purchase intention.*
>
> **H6:** *Product healthiness perceptions will mediate the effect of sugar-related claims on purchase intention.*

2.5 Conceptual model and summary

As derived from the theoretical background, it is expected that sugar-related claims will influence purchase intention through taste expectation and product healthiness perception. When consumers are exposed to one of the four claims, activation will be spread in the brain. Associations will give consumers certain expectations and perceptions which in turn will influence purchase intention, which can be explained on the basis of the cognitive response model (Smith and Swinyarf, 1988). Figure 1 shows the conceptual model and the hypothesis will be tested by running an online experiment. The experiment is described in chapter 3.

Product – claim

- Regular product (100% sugar)
- Sugar free product (artificial sweeteners)
- 30% less sugar product
- Sugar free product sweetened with stevia

H1abc → **Taste expectation** ← H5

H2abc → **Product healthiness perception** ← H6

H3, H4 → **Purchase intention**
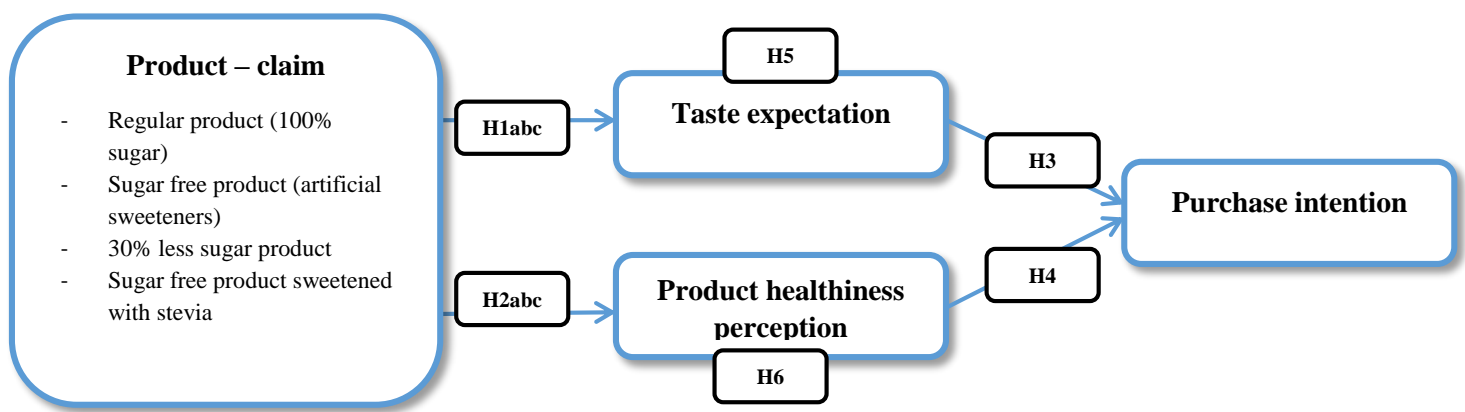
Figure 1: Conceptual model

Chapter 3: Research method

In order to answer the research questions and to test the hypotheses of this study, this chapter provides an overview of the methodology used. The chapter starts with discussing the experimental design and the procedure, followed by the development of the questionnaire and validity. The final paragraph discusses the data analyzing method.

3.1 Experiment

There are different forms of experiments, such as a *field-, lab- and online- experiment.* Online experiments have become increasingly popular because of its advantages compared to traditional lab experiments, such as reduced demand characteristics and its generalization of results to wider populations (Dandurand et al., 2008). One of the disadvantages of an online experiment is that the researcher cannot control for the participants environment (Dandurand et al., 2008), which can have consequences for the validity. A noisy or bustling environment could distract the participants' attention. A field experiment takes place in real life settings where the researchers study actual behavior such as for example actual purchase behavior (Hair et al., 2010). Therefore, a field experiment has more external validity than the other experiments because it is conducted in a natural environment (Hair et al., 2010). *External validity* refers to what extend the results could be generalized, beyond this study. However, field experiments obtain lower internal validity because there is no complete control over the manipulation and the assignment of the participants. *Internal validity* refers to the extent of which the observed effects are actually caused by no other variables than then the treatment variable (Malhotra and Birks, 2003). A lab-experiment has more control over internal validity and is often a less expensive method (Hair et al., 2010). It is desirable to have both internal and external validity in your experimental research, but often a balancing between those two is required (Dandurand et al., 2008). It could be argued that if an experiment lacks internal validity, it does not make much sense to generalize the results. So factors that threaten internal validity may in turn threaten external validity (Malhotra and Birks, 2003). This research makes use of an *online experiment* because of its advantages. Furthermore, by achieving high internal validity and trying to maintain a high level of external validity by using similar packages as may be used in the real world, valid results could be found, which can also be generalized.

3.2 Experimental design (and participants)

The experiment that will be used for this study has a *between subject design*. Each participant takes place in one condition which will prevent participants working out the aim of the

experiment (Charness, Gneezy and Kuhn, 2012). Furthermore there are no carry-over effects, which can occur in a within participants design where all participants will be exposed to all treatments. A between subject design knows a higher simplicity in terms of procedure and statistical analyses and therefore it is chosen to use this design with complete *randomization*. The latter means that the experimental units (participants) will have the same chance of receiving any treatment: the treatments are assigned to test units on a random basis (Rubin, 1974). This research counts one independent variable with four levels which lead to a design that will contain *four experimental treatments*. Each treatment will be randomly assigned to one experimental group (EG). EG1 is exposed to treatment 1 which is the regular 100% sugar package (appendix 1 shows the different treatments. Paragraph 3.4 describes the establishment of these packages). EG2 will be exposed to the second treatment which is the package with the 30% less sugar claim. EG3 should evaluate treatment 3 which is the package with the sugar free (with artificial sweeteners) claim and EG4 is exposed to the package with the sugar free but sweetened with Stevia claim. The difference in means between the four experimental groups will determine the effect of the claims. It is desirable that the sample size of an experiment contains at least 20 participants per cell (Hair et al. 2010), so data of at least 80 participants will be gathered. They will be approached via online and offline social networks (e.g. social media, study association).

3.3 Pre-test

A *pre-test* is conducted to test if the 100% sugar package without a claim contains enough information and to control for the amount of the 30% less sugar claim. For the latter, participants are asked by what percentage the amount of sugar should drop, so they would consider buying a sugar reduced product. The pre-test can be found in appendix 2 and the results in appendix 3. 20 participants fulfilled the pre-test and the results reveal an $M = 3.95$ on a scale of 1 to 7 with 1 = too much information and 7 = too little information for the question if the product contains enough information for consumers to evaluate the product. This means that the participants think that the package contains not too much but also not too little information, because a score of 4.00 would be exactly in the middle. So the 'regular' 100% sugar treatment without a blue bar or claim contains enough information for consumers to evaluate the product. Furthermore, the results of the pre-test give $M = 30,5\%$ ($SD = 10.1$) as acceptable percentage of reduction. This indicates that the participants would consider to buy the product if it contains 30.5% less sugar. The percentage that derived from the literature was about 30% so with these results in mind and in consultation with Cloetta, it is decided to proceed with the 30% less sugar claim.

3.4 Procedure

The changes in the intrinsic product will be manipulated by using a claim on the product package, thus the claim is the manipulated stimuli. In order to maintain a high external validity of the results, this research will use existing designs which will not be changed drastically. Red Band is known for its famous red packages and wine gums, but there should be controlled for internal validity. If consumers are already familiar with the product, this could be a threat because their answers may be biased. Therefore, there is chosen to use the package designs of a new range of Red Band called ''Sweet 'n Pure.'' This range is positioned at the more health conscious consumer, and in 2013 it is launched on the Dutch market with 2 flavours. However, the range does not live up to the expectations as sales remind behind (source: internal reference within Cloetta). This sub brand will be repositioned at the end of 2015 with a new package design. Many consumers are not yet familiar with this product which will be positive for internal validity. In the survey, participants are asked if they are familiar the package and the ones who are, will be removed. The original package can be found in appendix 1 A. For the four experimental treatments, the name 'Sweet 'n Pure' is deleted because it can already give participants a certain direction and replaced by the normal Red Band name. The overall idea of the package is copied but a new header is added to this product which reveals something of the texture: 'Zacht zoete Winegums'.

The different levels are displayed with a claim in a blue bar. The first package is the regular 100% sugar product and does not contain a claim. It is specifically chosen not to add a claim to the regular option because in practice the 'regular' product never contains specific communication such as ''regular'' or ''classic''. Only products with special features contain claims or specific nutrition communications. The second treatment is the package with the ''*30% less sugar*'' claim. The third treatment is the package with the ''*sugar-free*'' claim in the blue bar. This is the option with artificial sweeteners but these words have been omitted, because in practice artificial sweeteners are never mentioned on the front of a package. Consumers may associate artificial sweeteners with negative thoughts so it is decided to use 'sugar-free' as claim because it also happens in reality. The fourth package contains the claim related to Stevia: ''*Sugar-free*'' with a sub header: *'Sweetened with Stevia''*. The Stevia aspect is an advantage or benefit of the product and in practice benefits are often mentioned in the communication. Therefore, a sub header is added to the package. In order to make sure this is done properly, all packages are created in consultation with the design agency of Cloetta. Finally, this results in four different packages of which the designs can be found in appendix 1.

3.4.1 Questionnaire

For this experiment, data will be gathered by conducting an *online questionnaire.* The survey consists of three parts. In the introduction the participants are told that Cloetta is developing a new candy and they are interested in the consumers' opinion and ideas. They would like to have their opinion so they can adjust and improve the package. In this way, the real aim of the research is covered. After this introduction, the first part of the questionnaire is about candy in general and thereafter, the participant is exposed to one of the four experimental treatments. The third part will be the same for all surveys and consists of questions that will be used to measure the mediation and dependent variables of the conceptual model. The questionnaire will contain questions that examine the constructs of taste expectation, product healthiness perception and intention to purchase. One control question is added which will be used to clean the sample. After seeing the package, participants are asked if they already know the product. If consumers already know the package they may give biased answers so they will be deleted from the sample. Two other extra questions examine which brand respondents usually buy and how often they buy candy. In the end, the participants are asked demographic questions about their age, gender and educational level. Age will be measured on a ratio scale and is an open question whereas gender, household and education will be measured through a multiple choice format. The several dependent measures can be found in table 3.1 with more detailed explanation per dependent variable below the table. An example of the questionnaire can be found in appendix 4.

Measure	No. of items	Source
Taste expectations	2	Raghunathan, Naylor and Hoyer, 2006
Perceived product healthiness	1	Poor, Duhachek, Krishnan, 2013
Purchase intention	3	Burton, Garretson and Velliquette, 1999
Table 3.1 Dependent measures		

3.4.2 Measurement scales

Taste expectations

This dependent variable will be measured with a scale derived and used by Raghunathan, Naylor and Hoyer (2006). The scale was administered to participants in a pre-test to indicate taste inferences. They developed a two-item scale to measure tastiness and enjoyment anchored by a ten-point scale ('not at all' and 'very'). A Cronbach's alpha of .86 was measured which indicates that the reliability of the construct is good and the two items are closely related.

Perceived product healthiness

Recently, Poor, Duhachek and Krishnan (2013) needed to indicate the perceived healthiness of products for a manipulation check. They developed a nine-point scale anchored by 'not at all healthy' and 'very healthy.' This is a single-item scale and is used because there are not many other scales that measure perceived product healthiness. Most of them measures the naturalness of the product, the nutrition aspect and how organic the products are. A single-item construct could be used for this dependent variable because that question is unambiguous, not really open for more than one interpretation (Wanous, Reichers and Hudy, 1997) and covers perfectly the whole idea/aspect of the dependent variable in total.

Purchase intention

Purchase intention is measured by three seven-point scales and was originally developed by Burton, Garretson and Velliquette (1999). It measures purchase intention based upon information that the consumer has read on the product's package. The three scale items will measure how likely, probably and how more or less likely consumers are to buy the product after seeing the package. These scale items have a reported alpha of .89.

3.4.3 Pilot test

A pilot test can secure valid and reliable measures of a questionnaire (Malhotra and Birks, 2003). The questionnaire is *pre-tested* among respondents to keep it simple, short, logic and complete. Nine respondents were asked to complete the questionnaire and to provide feedback. First, the product category 'candy' is defined more clearly because the respondents asked if this category also includes chocolate and cookies. Further, some words and phrasing of questions seemed to be a little difficult so these are rephrased into more simplistic words. The objective of the study was not overtaken.

3.5 Summary

In this study, an experiment with a between subject design will be conducted. The experiment consists of four conditions with a Red Band package as stimulus and a claim as manipulating variable. Via an online survey questions will be asked to measure its effect on taste expectation, product healthiness perception and purchase intention. In order to ensure that the respondents do not detect the aim of the research, the introduction will ask for the respondents' opinion which is necessary for the development of a new candy. The survey consists of 11 questions and the respondents will be randomly divided amongst the four stimuli.

Chapter 4 data analysis

This chapter provides the data analysis of this research. Firstly, the sample has been checked for irregularities and missing data. Then the quality of the sample is established by comparing it to the population, and there will be checked if the assumptions for ANOVA and mediation analyses are met. Paragraph 3 starts with the results of the real data analysis by using the PROCESS macro for SPSS which allows a model with two mediators. To test for mediation, the Preacher and Hayes (2004) bootstrap test will be conducted for measuring indirect effects on purchase intention, using the product types as independent variable and taste expectations and product healthiness perception as dependent variables. The formulated hypotheses will be tested by running the analyses several times. The chapter ends with a conclusion of the whole data analysis.

4.1 The sample and population

Firstly, the collected data has been checked for irregularities. 142 participants took part in this study, of which 17 did not complete the survey and therefore were removed from the dataset. Furthermore, 5 respondents answered 'yes' to the question if they already were familiar with the package and thus removed from the dataset because their answers may be biased. The data is checked for missing data with a MCAR test with X^2 (6) = 4.187, p = .651 (appendix 5.1). This means that it failed to reject the 0 hypothesis which is good because it indicates that the missing values are completely at random. The question 'how often do you buy candy' counts one missing value and this respondent is deleted from the sample. The final sample exists of 119 respondents.

4.1.1 Descriptive statistics

In order to check the quality of the sample, the demographics 'age', 'education', 'household' and 'gender' will be compared with the Dutch population. The demographics of the Dutch population are acquired from the CBS and appendix 5.2, table 1 shows the information about the sample and population. 52,9% of the sample is woman and 47,1% men (N = 119). The chi-square goodness of fit test is conducted in order to check if the sample agrees with the population. The result gives a X^2 (1) = 0.179, p = 0.672 which means that it is failed to reject the 0 hypotheses which is good because that means that the observed group of participants equals the expected group of participants (51% female and 49% men in population). So, with regard to gender, the sample does not significantly differ from the population. When it comes to education, another chis-square is carried out with a result of X^2 (4) = 129.393, p = < .000.

This implicates that the sample is significantly different from the population. The sample shows an overrepresentation of the WO education level. With regard to age, the sample is also significantly different from the population (X^2 (4) = 85,294, p = 0.000) which implicates that the results of this research has to be generalized with care.

The results of the additional questions show that 15,3% of the sample buy candy at least once a week and the majority of the participants buy candy every other week (54,3%). 7,6% of the participants never buy candy but this applies mostly to people within a household of more than 2 persons, so they could influence the household's shopper. The largest group of the participants buy Red Band (37%) followed by Haribo (23,5%). Private label is also popular (14,3%). The participants could indicate if they, in general, ever buy sugar-free or light products. The results show that 44,5% of the respondents do buy light products and sugar-free products are bought by 37% of the respondents. Remarkable is that 25,2% never buy one of these products. Thereafter the participants were asked if they are willing to pay more for these products. 21% is willing to pay more for light products, and 45% for sugar-free products which is an useful insight because more and more products are becoming sugar-free. In contrast, 33% is not willing to pay more for sugar-free or light products.

4.1.2 Randomization

The experiment counts four different conditions and this study used a completely randomized design. For the reliability and validity of the study it is important that all respondents are randomly assigned to one of the four conditions. This means that each group should contain participants who share approximately the same demographics and characteristics. In order to check if the respondents are randomly assigned to the four experimental treatment groups, several chi-square tests and a one way ANOVA will be performed. Three conditions consist of 30 respondents and one condition of 29 respondents. First, a one way ANOVA will be used to investigate any difference in age between the groups. The test result (appendix 5.3) showed no significant difference between the groups (F(3) = .259, p = .855), which means that with regard to age the groups are successfully randomized. The other characteristics gender, household and education are tested by means of a chi-square test. As can be seen in table 4.1, there is no significant difference between the groups and thus it can be concluded that the randomization was successful.

Test variable	χ_2	df	*P* -value
Gender	3.797	3	.284
Education	6.017	12	.915
Household	11.354	12	.499

Table 4.1 results chi-square test for randomization

4.1.3 Cronbach's alpha

To measure the reliability of the different developed scale items for taste expectation and purchase intention, Cronbach's alpha will be used. This coefficient measures how closely related a set of items are as a group (Malhotra and Birks, 2003). It helps to determine if the scale is reliable. The two item scale that measures taste expectation is indicated with a Cronbach's Alpha of .886 (appendix 5.4) and the three item scale that measures purchase intention has a Cronbach's Alpha of .947. The results indicate that the reliability of the developed constructs is good. In order to check if the constructs can be improved even further, it has been analyzed if the Cronbach's alpha increases if certain scale items are deleted. The analyses revealed that deleting scale items did not improve the constructs.

4.2 Assumptions

Before running the analyses, the assumptions for ANOVA and mediation analysis should be met. For ANOVA it holds that all data is measured on ratio scale and the data is checked for outliers with a boxplot and histogram (appendix 5.5). These graphs give the impression that the data is normally distributed. The Kolmogorov-Smirnov test is conducted to test the normality assumption. Table 4.2 shows that the data within three of the four groups is normally distributed, because these p-values are not significant. This means that the hypothesis that the data is normally distributed has failed to reject, which is good because you want normal distribution. It is considered that ANOVA is robust against the normality assumption so even though one normality test is violated, the analysis could go on (Malhotra and Birks, 2003).

	Group	Kolmogorov-Smirnov Sig.	Shapiro-Wilk Sig.
Purchase intention	100% sugar product	.029	.001
	30% less sugar product	.200	.353
	Sugar free (artificial sweeteners product)	.200	.303
	Sugar free sweetened with Stevia	.197	.124

Table 4.2 Tests of Normality

This experiment uses a between subject design and thus the homogeneity of variances should be checked with the Levene's Test. Purchase intention ($p = .294$) is not significant which means that the error variances of this dependent variable is equal across the groups, which is good thus the assumption is met. In addition to these ANOVA assumptions, the assumption for mediation should be met. A necessary assumption in mediation analysis is the no-interaction assumption or the homogeneity of regression, which means that the effect of the mediator on the dependent

variable does not change across values of X. This assumption should be met twice, because there are two mediators. To test for homogeneity of regression, you need to estimate the interaction effect of the independent variable with the covariate (mediator). The results of the test (see appendix 5.5.1) show that the interaction effect of taste expectation with the independent variable is insignificant with $F(11) = 0.533$, $p = .876$ just as the insignificant interaction effect of product healthiness perception with $F(5) = 1.486$, $p = .203$, so it can be concluded that the effect of the mediators on purchase intention is the same between al four experimental groups which is good.

4.3 Results

To give a first look at the data, a one-way ANOVA is conducted with purchase intention, taste expectation and product healthiness perception as dependent variables.

Purchase intention

The results of the one-way ANOVA show significant differences among the means of the different claims on purchase intention $F(3) = 4.216$, $p < .05$; $M_{100\%} = 4.8736$; $M_{30\%less} = 3.7556$; $Ms_{tevia} = 3.7333$; $Ms_{ugarfree} = 3.5444$ (appendix 5.6). In order to reveal which groups are significant different form each other, follow up analyses will be conducted. The results of the Bonferroni post-hoc test show that the 100% sugar product ($M = 4.8736$) lead to higher purchase intention than the product with the 30% less sugar claim ($M = 3.7556$), the product with sugar-free (artificial sweeteners) claim ($M = 3.5444$) and the sugar-free sweetened with Stevia claim ($M = 3.7333$). Other differences between the different sugar related claims are not significant. Adding a claim lead to lower purchase intentions.

Taste expectation

The results of a one-way ANOVA show a significant effect of the four different products on taste expectation ($F(3) = 3.494$, $p < .05$; $M_{100\%} = 5.3276$; $M_{30\%less} = 4.5000$; $Ms_{tevia} = 4.4167$; $Ms_{ugarfree} = 4.2167$). Follow up analyses will reveal which groups are different from each other. The Bonferroni test shows that those assigned to the 100% sugar product ($M = 5.3276$) generates higher taste expectations than those assigned to the product with the sugar-free claim with artificial sweeteners ($M = 4.2167$). Other differences in taste expectation between the different products and claims are not significant.

Product healthiness perception

The effect on product healthiness perception is not significant $F(3) = 1.005$, $p <.393$. Sugar-related claims do not affect product healthiness perception so no further follow up analyses will be conducted. Descriptive statistics can be found in table 4.3.

	Taste expectation (M)		Product Healthiness perception (M)		Purchase intention (Y)	
	M	SD	M	SD	$\bar{Y}$	SD
100% sugar (regular)	5.3276	1.0201	4.0700	1.132	4.8736	1.3375
30% less sugar	4.500	1.3519	3.9700	1.273	3.7556	1.6445
Sugar Free (artificial)	4.2167	1.6225	3.8000	1.375	3.5444	1.5474
Sugar Free (Stevia)	4.4167	1.5816	4.3700	1.402	3.7333	1.8055
All groups combined	4.6092	1.4616	4.0500	1.301	3.9692	1.6587

Table 4.3 Descriptive statistics for the claims on the package study

These results will only give a first impression, because the effects of the sugar-related claims are estimated directly on the dependent variable without taking into account the mediating role of taste expectations and product healthiness perceptions. The following step is to estimate the total model with these two variables as mediators instead of dependent variables. Therefore, the bootstrap techniques implemented by Preacher and Hayes (2008) will be used.

4.4 Indirect, direct and total effects

The conceptual model contains two mediators, so the PROCESS macro add-in of Hayes (2014) for SPSS is used. This macro contains several templates to test complex models. However, the independent variable in this study is a categorical variable with 4 categories. The PROCESS macro only executes analyses with independent variables that must be either dichotomous or continuous. In order to solve this problem, the independent categorical variable will be transformed into several dummy variables and with the strategic use of covariates the model can be estimated. There are created three dummy variables ($k - 1$) with the 100% sugar product as reference level (see appendix 5.7). Process is going to run three times and with each run, one dummy variable is the independent variable and the other ones the covariates. Important to note is that this study will report the beta's of the model whit the 100% sugar product as base level. It is acceptable to work with these beta's because these beta's do not change if another dummy level will be assigned as independent variable or covariate, and are exactly the same in significance level and direction across all runs. Appendix 5.8 shows the output of the three runs.

The only thing that differs in output are the indirect effects, which are needed to test for mediation. This will be discussed in paragraph 4.4.3.

4.4.1 Effect of adding a claim on taste expectation and product healthiness perception

First, it will be tested whether the sugar related claims do influence taste expectations. More specifically, it is expected that the 100% sugar product generates the highest taste expectation followed by the product with the 30% less sugar claim. Then the sugar-free product sweetened with Stevia claim and as last the product with the sugar-free (artificial sweeteners) claim. The results (appendix 5.8) reveal significant differences among the means of the different claims on taste expectation F (3, 115) = 3.4942, p = < .05. A significant difference was found between the 100% sugar product (base level) and the 30% less sugar claim (b = -.828, t(115) = -2.24, p = <.05), as for the sugar-free (artificial sweeteners) claim (b = -1.111, t(115) = -3.01, p = <.05). Also, there is a significant difference between the 100% sugar product and the sugar-free sweetened with Stevia claim (b = -.919, t(115) = -2.47, p = <.05). So according to these results, participants exposed to the 30% less sugar claim scored 0.828 points less on taste expectations compared to the 100% sugar product, and participants who were exposed to the product with the sugar-free sweetened with Stevia claim had 0.911 less taste expectations than the 100% sugar product. Finally, the sugar-free product with artificial sweeteners is perceived to be 1.1109 points less tasty than the 100% sugar product (p = <.05).

It could be concluded that the 100% sugar product (without a sugar-related claim) generates the highest taste expectations. In order to determine the significance differences in means between the 30% less sugar claim and the two sugar-free related claims, the 30% less sugar variant is set as base level and the other ones as dummy variables (output in appendix 5.9). As said above, a significant difference is found between the 100% sugar product and the product with the 30% less sugar claim (b = .83, t(115) = 2.24, p = <.05), so the 100% sugar product is perceived to be 0.827 points tastier than the base level. However, there are no significant differences in taste expectation between the 30% less sugar claim and the sugar-free (artificial sweeteners) claim (b = -.28, t(115) = -.77, p = > .10) as between the 30% less sugar and sugar-free sweetened with Stevia claim (b = -.08, t(115) = -.23, p = > .10). In order to check whether the product with the sugar-free (artificial sweeteners) claim has significantly different taste expectations than the product with the sugar-free sweetened with Stevia claim, the first one is set as base level. No significant difference is found between these two products (b = .20, t(115) = -.56, p = > .10). It could be concluded that the 100% sugar product has significant higher taste expectations than the products with the 30% less sugar, sugar-free and sugar-free

sweetened with Stevia claims. However, the three latter show no significant differences in taste expectations which lead to the acceptance of *hypothesis 1a* and the rejection of *hypothesis 1b and 1c.* It could be concluded that adding a claim will decrease taste expectations.

The second hypothesis assumed that the four experimental treatments differ in their means of product healthiness perceptions with the highest perception for the product with the sugar-free sweetened with Stevia claim and the lowest for the 100% sugar product. No significant result is found for product healthiness perception F (3, 115) = 1.0051, p = .3933, which means that the different products with claims do not influence product healthiness perceptions. Also no significant differences in means are found between the 100% sugar product and the products with the 30% less sugar, the sugar-free (artificial sweeteners), and the sugar-free sweetened with Stevia claims ($b_{30\% \text{ less}}$ = -.10, t(115) = -0.3, p => 0.1; $b_{\text{sugar-free}}$ = -.27, t(115) = -0.80, p => 0.1 and b_{Stevia} = 0.3, t(115) = 0.88, p => 0.1). No further calculations can be carried out and thus *hypotheses 2a, b and* c will be rejected. However, when the product with the sugar-free (artificial sweeteners) claim is assigned as base level, one result is worth mentioning (appendix 5.8). Adding a claim still not influences product healthiness perception, because in total the effect is not significant (F(3,115) = 1.0052, p = 0.393). However, the product with the sugar-free sweetened with Stevia claim shows a significant coefficient (b_{Stevia} = 0.57, t(115) = 1.69, p = <0.1), which indicates that people who are exposed to the product with the sugar-free sweetened with Stevia claim scores 0.57 times higher on product healthiness perception than people who are exposed to the sugar-free (artificial sweeteners) claim. So using 'natural' words in the claim, generates higher product healthiness perceptions.

	Taste expectations	Product healthiness perception	Purchase intention
30% less sugar	-0.828	-0.102*	-0.493*
Sugar-free (artificial sweeteners)	-1.111	-0.269*	-0.469*
Sugar-free sweetened with Stevia	-0.911	0.298*	-0.518*
Taste expectations			0.735
Product healthiness perception			0.160**

* Not significant at < 0.05 level; ** Statistical significant at < 0.10 level

Table 4.4: estimated coefficients with the 100% sugar product as base level

4.4.2 Effect on purchase intention

The next step is to check whether the two mediators affect purchase intention. The results indicate that the model explains 53.9% of the variance and is significant ($R^2 = .53$, $F(5,113) = 26.41$, $p = <.00$). It was found that taste expectation predicts purchase intention significantly with $b = 0.7353$, $t(108) = 9.3770$, $p < .001$. It was supposed that higher taste expectations increase purchase intention so *hypothesis 3* is accepted. Furthermore it is predicted that the higher consumers' product healthiness perception, the higher purchase intention will be. The results show that, with an alpha of .10, this coefficient is significant ($b = .1596$, $t(108) = 1,8677$, $p = <.10$). This means that product healthiness perception only marginally influences purchase intention, so hypothesis 4 can be accepted with caution.

4.4.3 Direct effects

The next step is to determine the significance and direction of the direct effect of adding a claim on purchase intention when controlling for taste expectation and product healthiness perception as mediators. According to the results, no significant direct effects are found ($b_{30\% less} = -.49$, $t(113) = -1.61$, $p = > 0.1$; $b_{sugar-free} = -.47$, $t(113) = -1.51$, $p = > 0.1$ and $b_{Stevia} = -.52$, $t(113) = -1.67$, $p = > 0.1$). A non-significant effect probably indicates complete mediation, but in order to determine this there will be tested for mediation first.

4.4.4 The mediating effect

To test for mediation, the bootstrap confidence interval of Preacher and Hayes (2008) will be used. If the bootstrap interval does not include the zero, the indirect effect is significant and mediation is established, and vice versa. This study has a multicategorical independent variable that is transformed into three dummy variables. Because one relative indirect effect will quantify the effect of being in one group relative to a reference group (Hayes and Preacher, 2014), the indirect effects of all three dummy variables should be taken into account in order to test for mediation. Recently, Hayes (2014) has written about the mediating effect of a multicategorical independent variable and it is argued that if the bootstrap interval of at least one dummy variable does not cross zero, the conclusion that M mediates the effect of X on Y is supported. Table 4.4 gives the confidence intervals for the indirect effects for taste expectations and product healthiness perception with the 100% sugar product as base level and the other as independent variables.

	Bootstrap interval (95% confidence)			
	Taste expectation		Product healthiness perception	
	Lower bound	Upper bound	Lower bound	Upper bound
D_1; 30% less sugar	-1.11372	-0.1697	-0.1985	0.0644
D_2; Sugar free (artificial)	-1.3750	-0.3257	-0.2708	0.0384
D_3; Sugar free (Stevia)	-1.2516	-0.1871	-0.0329	0.2458

Table 4.4 Bootstrap interval for indirect effects taste expectation and product healthiness perception

As can be seen in table 4.4, the confidence interval of all three dummy variables does not cross zero for taste expectation (-1.11372 to -0.1697; -1.3750 to -0.3257; -1.2516 to -0.1871)[2]. Therefore, it can be concluded that taste expectation mediates the relationship between different claims on packages and purchase intention which leads to the acceptance of *hypothesis 5*. In contrast, for product healthiness perception, all the lower and upper bounds per dummy variable cross the zero (-0.1985 to 0.0644; -0.2708 to 0.0384; -0.0329 to 0.2458), even when another product than the 100% sugar product is allocated as base level. This indicates that the effect of different claims on purchase intention is not affected through product healthiness perception, which will reject *hypothesis 6*.

In order to classify the type of mediation, the significance levels of the estimated betas are checked. Figure 4.1 gives an overview with red arrows that indicate a non-significant effect.
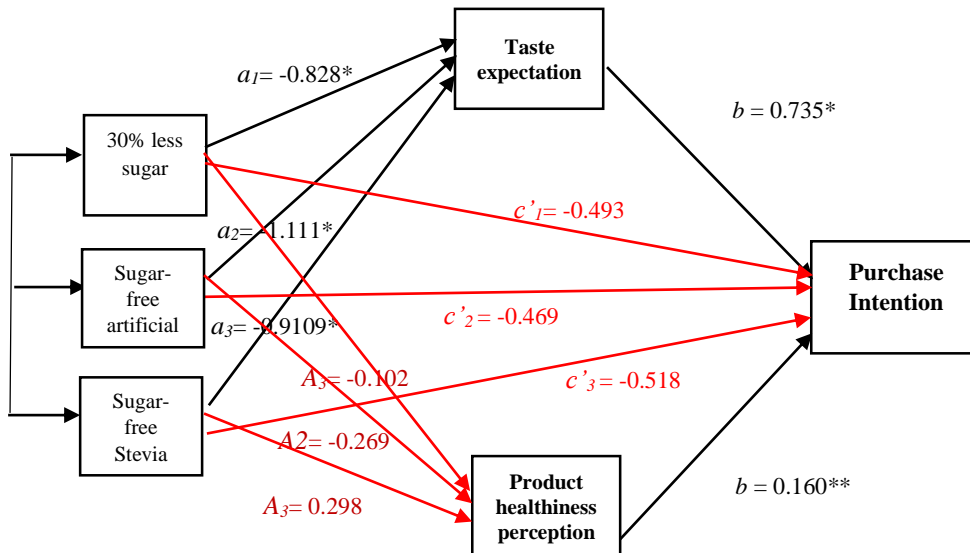
Figure 4.1: conceptual model with estimated betas
* Statistically significant at < .05 level. ** Statistically significant at < .10 level.

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[2] When allocating another product as base level, the confidence intervals will change. Appendix 5.8 shows the different relative indirect effects. Hayes (2014) argued that which each run, the confidence interval of at least one dummy variable should not include the zero in order to determine the mediating effect. For taste expectation, the results show that with different base levels, every time at least one confidence interval does not include zero.

It was already argued that adding a claim significantly affects taste expectations which in turn will influence purchase intention. Also, the direct effects (c'_{123}) are not significant and as argued by Zhao, Lynch and Chen (2010) the direct effect does not have to be significant to call for mediation. It indicates *an indirect-only mediation* which means that the whole relationship is explained through taste expectation. An extra mediator is not necessary because the relationship is already explained by taste expectation. This could be the reason why product healthiness perception was not significant.

4.5 Conclusion and summary

The results indicate that adding a claim on the front of the package affects purchase intention. Inconsistent with the expectations, this relationship is not explained by product healthiness perception, since there was no significant indirect effect found. However, consistent with our hypothesis, taste expectation does explain the relationship. The indirect effect of taste expectation on purchase intention was found to be significant. The direct effect was not significant and, therefore an indirect-only mediation is established (Zhao, Lynch and Chen, 2010), which means that the whole relationship is mediated by taste expectation. The 100% sugar product is perceived to be tastier than the products with the 30% less sugar claim, the sugar-free (artificial sweeteners) claim and the sugar-free sweetened with Stevia claim. The type of claim is irrelevant, because no significant differences for taste expectation were found between the products with the sugar-related claims. Adding a claim will decrease taste expectations.

Chapter 5 Conclusion, Discussion, Recommendation and Future research

This chapter describes the results found in the previous chapter and discusses the main findings and theoretical and managerial implications. Thereafter, recommendations will be given and the last paragraph outlines the limitations of this research and gives implications for further research.

5.1 Conclusion

This study investigated the impact of sugar-related claims in the confectionery industry with the following problem statement: '*To what extent do different types of sugar related claims influence taste expectation and product healthiness perceptions and which effect do these have on purchase intention?'* More specifically, this study tested four packages with three claims: a 100% sugar product (without a claim), a 30% less sugar claim, a sugar-free claim (artificially sweetened) and a sugar-free sweetened with Stevia claim. On the basis of the Activation Theory (Collin and Luftus, 1975), it was expected that the claims would influence taste expectation and product healthiness perception differently. Consequently, taste expectation and product healthiness perception would affect purchase intention which could be explained by the Cognitive Response Model (Fishbein and Ajzen, 1975). In the present research, there has been provided support that adding a claim to the front of a package affects purchase intention. Inconsistent with the expectations, this relationship is not explained by product healthiness perception, since no significant indirect effect was found. However, consistent with the hypothesis, it was found that taste expectation explains the relationship. Sugar-related claims do influence taste expectations and the 100% sugar product generates the highest taste expectations. The type of sugar related claim is irrelevant because no significant differences were found between the three sugar related claims. Furthermore, no direct effect of the claims on purchase intention is found which means that purchase intention is fully explained by taste expectations. The only thing found about product healthiness perception is that the sugar-free sweetened with Stevia claim leads to higher product healthiness perceptions than the other sugar-free claim (artificial sweetened). In conclusion, it could be argued that within the confectionery industry, taste is really important and that consumers rely on taste expectations when deciding to purchase a product. Adding a claim to a product reduces consumers' taste expectations and this lower perceived taste actually decreases consumption.

5.2 Discussion

Earlier research has shown that emphasizing a nutrition reduction (e.g. salt or fat) by means of a front pack label can evoke a negative effect on taste expectation (Liem et al., 2012). Consistent with prior research it could be concluded that emphasizing a *sugar reduction* by means of a claim also has a negative impact on taste expectation. In addition, more recent studies are emphasizing the increasingly importance of health with regard to food (Lähteemäki et al., 2010; Colby et al., 2010). Claims are expected to increase perceived healthiness of products, so it was expected that consumers make food choices not only on the basis of taste. The health phenomenon could be influenced by adding a claim on a package and several studies showed that claims (Poor, Duhachek and Krishnan, 2013) do affect healthiness perceptions and perceived risk. For example, Kozup, Creyer and Burton (2003) examined health claims and nutrition information of restaurant menu items and they found that consumers indeed use the available nutrition information when forming product attitudes and disease risk perceptions. This study used nutrition claims so this research contributes to existing literature by providing support that within the confectionery industry, nutrition claims do not affect product healthiness perceptions. Consumers' purchase intentions are related to taste expectations instead of product healthiness perception and this could be explained as follows. Candy is seen as a hedonic product, because sugar is known for its positive psychological effects on mood. Hedonic consumption is the need for pleasure and people eat hedonic products for pleasure, not according to health needs (Match and Mueller, 2007). Consumers do not want to worry about the loss of hedonic pleasure (taste) when consuming the product. Therefore, it is assumed that within confectionery industry, purchase intention is driven by taste and the pleasure they obtain when consuming the product. This means that consumers do not pay attention to healthy aspects. The sugar (free) related claims give the impression that the product loses the desired taste, and therefore the regular 100% sugar variant has the highest taste expectations.

Furthermore, this research provide insight to existing literature about nutrition claims. Several studies (Garretson and Burton, 2000; Kozup, Creyer and Burton, 2003; Wansink and Chandon, 2006) have investigated different types of nutrition claims with the outcome that the type of claim is of no importance. The results of this study confirm that even in the confectionery industry the type of nutrition claim is irrelevant, because they do not lead to different taste expectations. It only matters if a product contains a claim or not. However, with regard to product healthiness perceptions, one result showed that emphasizing the 'naturalness of the product' in the claim (Sweetened with Stevia) leads to higher product healthiness perceptions. So, it could be interesting to know if in other product categories, where health

perceptions are more important in the purchase decision process, the same result will be found. In that case, it is worth mentioning that the use of 'natural' words in a claim will be processed more positively in terms of product healthiness perceptions.

5.3 Practical implications

With the increasing awareness of health-related issues such as obesity (de Ruyter et al., 2012), and in the perspective of corporate social responsibility, it is wise to pay attention to sugar-free products as manufacturer of candy. For marketers of packaged food products it is interesting to know if they should use claims on the front of a package to communicate the sugar-free benefit of the product. The findings show that, within the confectionery industry, adding a nutrition claim on the front of a package has a non-favorable effect on taste expectations and therefore decreases purchase intention. So it seems that claims derogates taste expectations which could threaten purchases. This study is conducted to take a first initiative towards actual product development. Therefore, a few recommendations will be given. First, it is recommend not to use a nutrition claim on the front of a package to communicate the sugar-free aspect. The sugar-free benefit could be mentioned at the nutrition fact panel at the back of the package. The amount of calories will decrease so consumers who are interested in the healthy aspect, could use this. In the context of taking responsibility, food marketers could tell the trade that they are dealing with the sugar and obesity aspect by producing sugar-free options, but for consumers they should not communicate this on the front of a package. Secondly, if managers would positioning their product specifically at the sugar-free dimension or at a specific target group, and therefore want to use a claim to communicate this then product trial is really important. If consumers could try and thus taste the product, they could be convinced. It is really important to take into account consumers taste expectations so in-store demonstrations and sampling activities will be important. When deciding to add a claim to the package, it is recommend to use words that underline the 'naturalness' of the product. It is found that consumers generate higher product healthiness perceptions for a product sweetened with Stevia than for a normal sugar-free product with artificial sweeteners. This is an important insight for food marketers because it emphasizes the importance of organic and naturalness in food products. So with regard to product development, it is advised to use 'natural' sweeteners like Stevia instead of artificial sweeteners when replacing sugar for a substitute.

5.4 Limitations and future research

The current research knows a few limitations, which also offer many opportunities for further research. First, this study investigated the effect of nutrition claims on taste expectation, product

healthiness perception and purchase intention. It was found that the nutrition claims do not affect product healthiness perception. However, it may be interesting to investigate if this result would be the same when replacing the nutrition claim for a health claim or when adding a health claim to the package. Existing literature showed that health claims can affect perceived healthiness (Garretson and Burton, 2000; Trivedi, Sridhar and Kumar, 2015) and purchase intention (Kozup, Creyer and Burton, 2003). So, the difference between health and nutrition claims could be studied in order to explore whether health claims would affect product healthiness perception. It may be interesting to know whether consumer's still rely on taste expectations when deciding to purchase a product or that health claims will influence product healthiness perceptions which in turn will influence purchase intention. Secondly, consumers can develop product healthiness perception very differently. This study did not take into account personal health motivations and it could be a good addition to the study. One finds product healthiness really important and one pays no attention to health labels. So it may be interesting to examine consumers' health motivation because this affects the processing of health-related information (Chrysochou and Grunert, 2014). For consumers who are interested in health, product healthiness perceptions would be more important than for consumers who do not pay attention to this aspect when buying candy. So it may be interesting to include health motivation as moderator in the conceptual model. Furthermore, the sample in this study knows an overrepresentation of young adults that are highly educated. Future research could focus on other subgroups and investigate if product healthiness perception is important for them. Lastly, the aim of nutrition claims could be examined more in depth. This study does not explain how consumers perceive nutrition claims. Garretson and Burton (2000) showed that consumers use the Nutrition Facts panel at the back of a package to rely on nutrition information and that a claim will generate attention. So it could be that front-of-package claims will generate awareness and interest but they are not used for direct health evaluations. It is assumed that consumers will rely on the nutrition facts panel at the back of the package for healthiness perceptions. The claims do influence taste expectations but it is not examined what function they have. It is interesting to know if the claims could be effective in generating awareness or attention so future research should focusses on the impact and aim of claims.

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Appendix

Appendix 1   Experimental treatments

A. Original package:

B. Adapted packages

Regular (100%)   **30% less sugar**

Sugar-free   **Sugar-free sweetened with Stevia**

Geachte heer/mevrouw,

Dankjewel voor het invullen van deze vragenlijst. Cloetta (bekend van o.a. Red Band) is bezig met de ontwikkeling van een nieuw snoepje en daarover wil ik graag jouw mening weten. Deze vragenlijst bevat 4 korte vragen.

U krijgt een product te zien, bekijk deze goed en ga daarna door met de vragenlijst.

1. Bent u bekend met deze verpakking?
    Ja
    Nee

2. Vindt u dat de bovenstaande verpakking te veel of te weinig informatie bevat?

    Teveel informatie   1 2 3 4 5 6 7   Te weinig informatie

3. Als het suikergehalte van dit snoep werd verlaagd, met hoeveel % zou dit dan minimaal moeten zijn zodat het voor u aantrekkelijk wordt om dit te kopen?

    < open vraag >

Hartelijk dank voor uw tijd en medewerking.

1. Bent u bekend met deze verpakking?

#	Answer		Response	%
1	Ja		0	0%
2	Nee		20	100%
	Total		20	100%

2. Hoeveel informatie vindt u dat er op de verpakking staat?

#	Question	1	2	3	4	5	6	7	Total Responses	Mean
1	Te veel informatie(1) Te weinig informatie(7)	0	3	3	11	4	0	0	20	3.95

3. Als het suikergehalte van dit snoep wordt verlaagd, met hoeveel % zou dit dan minimaal moeten zijn zodat het voor u aantrekkelijk wordt om dit te kopen?

Statistics

Percentage

N	Valid	20
	Missing	0
Mean		30,5000
Median		32,5000
Std. Deviation		10,11773

Percentage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10,00	1	5,0	5,0	5,0
	15,00	1	5,0	5,0	10,0
	20,00	2	10,0	10,0	20,0
	25,00	5	25,0	25,0	45,0
	30,00	1	5,0	5,0	50,0
	35,00	4	20,0	20,0	70,0
	40,00	5	25,0	25,0	95,0
	50,00	1	5,0	5,0	100,0
	Total	20	100,0	100,0	

Statistic	Value
Total Responses	20

Appendix 4   Questionnaire

Geachte heer/mevrouw,

Ten eerste hartelijk dank voor het invullen van deze vragenlijst. Hiermee word ik enorm geholpen bij het schrijven van mijn afstudeerscriptie voor de Universiteit van Tilburg.

Mijn onderzoek gaat over de ontwikkeling van een nieuw snoepje en daarover wil ik graag uw mening weten, zodat het snoepje nog aangepast of veranderd kan worden. Als eerste zijn er een aantal vragen over snoep in het algemeen. Daarna krijgt u een afbeelding van een product te zien waarna een korte vragenlijst volgt. Het invullen van deze vragenlijst duurt niet langer dan 5 minuten en bevat 11 korte vragen. De antwoorden worden anoniem verwerkt.

Nicol van den Boomen

Hieronder volgen een aantal vragen over snoep in het algemeen.

1.   **Hoe vaak koopt u snoep?**

☐ 1 of meerdere keren per week
☐ 1 x per 2 weken
☐ 1 x per 3 weken
☐ 1 x per 4 weken
☐ Minder dan 1 x per 4 weken
☐ Nooit

2.   **Welk merk snoep koopt u voornamelijk?**

☐ Red Band
☐ Haribo
☐ Look o Look
☐ Katja
☐ Autodrop
☐ Eigen merk (huismerk)
☐ Anders,
namelijk…………………………………………………………………………

U krijgt nu een product te zien, bekijk deze en ga daarna door met de vragenlijst.

Red Band®

PER STUK VERPAKT

zacht . zoete
winegums
berries

53

3. Bent u bekend met deze verpakking?

☐ Ja
☐ Nee

4. **Hoe lekker denkt u dat deze snoepjes zullen zijn?**

Helemaal niet lekker	1	2	3	4	5	6	7	Heel erg lekker

5. In welke mate denkt u dat u van dit snoepje gaat genieten?

Helemaal niet genieten	1	2	3	4	5	6	7	Heel erg genieten

6. Hoe gezond denkt u dat dit product is, in vergelijking met de snoep die u eet of kent?

Erg ongezond	1	2	3	4	5	6	7	Erg gezond

7. Kunt u aangeven in hoeverre u overweegt het getoonde product aan te kopen?

Niet geneigd	1	2	3	4	5	6	7	Wel geneigd
Onmogelijk	1	2	3	4	5	6	7	Zeer mogelijk
Onwaarschijnlijk	1	2	3	4	5	6	7	Zeer waarschijnlijk

8. Koopt u wel eens suikervrije producten of producten met minder suiker? Kruis aan voor u van toepassing is, er zijn meerdere antwoorden mogelijk.

☐ Light producten
☐ 30% minder suiker producten
☐ Suikervrije producten
☐ Anders, namelijk…………..

9. Voor welk van onderstaande producten bent u bereid meer te betalen? Er zijn meerdere antwoorden mogelijk

☐ Light producten
☐ 30% minder suiker producten
☐ Suikervrije producten
☐ Anders, namelijk…….

10. Wat is uw geslacht

☐ Man
☐ Vrouw

11. Wat is uw leeftijd

…………………………jaar

12. Wat is de samenstelling van uw huishouden?

☐ Alleenstaand

☐ Tweepersoonshuishouden zonder (thuiswonende) kinderen

☐ Eénoudergezin

☐ Gezin (ouders met één of meer kinderen)

☐ Groepswonen (bijv. studentenwoning)

☐ Anders, namelijk………………………………………

13. Welk hoogst genoten opleiding heeft u gevolgd?

☐ Middelbaar onderwijs
☐ LBO
☐ MBO
☐ HBO
☐ Wetenschappelijk onderwijs
☐ Anders,
namelijk……………………………………………………………………………….

Hartelijk dank voor uw tijd en medewerking!

Appendix 5   Data analysis

Appendix 5.1   Missing values – MCAR test

EM Estimated Statistics

EM Means[a]

aanschaf_snoep	merk_snoep	Huishouden	Opleiding
3,27	3,20	3,00	4,08

a. Little's MCAR test: Chi-Square = 4,187, DF = 6, Sig. = ,651

Appendix 5.2   Descriptive statistics

Wat is uw geslacht?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Man	56	47,1	47,1	47,1
	Vrouw	63	52,9	52,9	100,0
	Total	119	100,0	100,0	

Welk hoogst genoten opleiding heeft u gevolgd?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Middelbaar onderwijs	1	,8	,8	,8
	LBO	2	1,7	1,7	2,5
	MBO	36	30,3	30,3	32,8
	HBO	27	22,7	22,7	55,5
	Wetenschappelijk onderwijs	53	44,5	44,5	100,0
	Total	119	100,0	100,0	

Wat is de samenstelling van uw huishouden?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alleenstaand	25	21,0	21,0	21,0
	Tweepersoonshuishouden zonder (thuiswonende) kinderen	32	26,9	26,9	47,9
	Eénoudergezin	6	5,0	5,0	52,9
	Gezin (ouders met één of meer kinderen)	30	25,2	25,2	78,2
	Groepswonen (bijv. studentenwoning)	26	21,8	21,8	100,0
	Total	119	100,0	100,0	

Chi-Square Test

Frequencies

Wat is uw geslacht?

	Observed N	Expected N	Residual
Man	56	58,3	-2,3
Vrouw	63	60,7	2,3
Total	119		

Test Statistics

	Wat is uw geslacht?
Chi-Square	,179[a]
df	1
Asymp. Sig.	,672

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 58,3.

Chi-Square Test

Frequencies

Welk hoogst genoten opleiding heeft u gevolgd?

	Observed N	Expected N	Residual
Middelbaar onderwijs	1	28,5	-27,5
LBO	2	11,6	-9,6
MBO	36	44,0	-8,0
HBO	27	19,4	7,6
Wetenschappelijk onderwijs	53	15,5	37,5
Total	119		

Test Statistics

	Welk hoogst genoten opleiding heeft u gevolgd?
Chi-Square	129,393[a]
df	4
Asymp. Sig.	,000

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum

Chi-Square Test

Frequencies

Wat is uw leeftijd?

	Observed N	Expected N	Residual
Younger than 20	10	27,4	-17,4
20-40 years	71	28,6	42,4
41-65 years	27	41,7	-14,7
66-80 years	10	15,5	-5,5
81 years or older	1	6,0	-5,0
Total	119		

Test Statistics

	Wat is uw leeftijd?
Chi-Square	85,294[a]
df	4
Asymp. Sig.	,000

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 6,0

	Demographics	Sample %	Population %
Education*	High school	3	31
	MBO	30	34
	HBO	22	15
	WO	45	12
	Different	0	8
Age**	Younger than 20	8	23
	20-40 years	60	24
	40-65 years	23	35
	65-80 years	9	13
	80 years or older	-	5
Gender**	Male	47	49
	Female	53	51

Table 5.4: demographics
*Note: *Source: CBS, 2012 **Source: CBS, 2014*

Hoe vaak koopt u snoep?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Minimaal 1 x per week	18	15,1	15,3	15,3
	1 x per twee weken	32	26,9	27,1	42,4
	1 x per drie weken	14	11,8	11,9	54,2
	1 x per vier weken	17	14,3	14,4	68,6
	minder dan 1 x per vier weken	28	23,5	23,7	92,4
	nooit	9	7,6	7,6	100,0
	Total	118	99,2	100,0	
Missing	System	1	,8		
Total		119	100,0		

Welk merk snoep koopt u voornamelijk?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Red Band	44	37,0	37,0	37,0
	Haribo	31	26,1	26,1	63,0
	Katja	4	3,4	3,4	66,4
	Autodrop	4	3,4	3,4	69,7
	Eigen merk	19	16,0	16,0	85,7
	Anders	17	14,3	14,3	100,0
	Total	119	100,0	100,0	

antwoord bij anders

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	103	86,6	86,6	86,6
chupa chup lollies	1	,8	,8	87,4
geen	2	1,7	1,7	89,1
Ik koop geen snoep	1	,8	,8	89,9
Klene	1	,8	,8	90,8
napoleon	2	1,7	1,7	92,4
Napoleon	1	,8	,8	93,3
Niet	1	,8	,8	94,1
Nooit	1	,8	,8	95,0
pinda's	1	,8	,8	95,8
tic tac	1	,8	,8	96,6
venco	2	1,7	1,7	98,3
Venco	2	1,7	1,7	100,0
Total	119	100,0	100,0	

Koopt wel eens light producten

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		66	55,5	55,5	55,5
	1	53	44,5	44,5	100,0
	Total	119	100,0	100,0	

Koopt wel eens producten die 30% minder suiker bevatten

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		89	74,8	74,8	74,8
	1	30	25,2	25,2	100,0
	Total	119	100,0	100,0	

Koopt wel eens suikervrije producten

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		75	63,0	63,0	63,0
	1	44	37,0	37,0	100,0
	Total	119	100,0	100,0	

Koopt geen suikervrije- of light producten

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		89	74,8	74,8	74,8
	1	30	25,2	25,2	100,0
	Total	119	100,0	100,0	

Bereid om meer te betalen voor light producten

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		94	79,0	79,0	79,0
	1	25	21,0	21,0	100,0
	Total	119	100,0	100,0	

Bereid om meer te betalen voor 30% minder suiker producten

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		95	79,8	79,8	79,8
	1	24	20,2	20,2	100,0
	Total	119	100,0	100,0	

Bereid om meer te betalen voor suikervrije producten

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		65	54,6	54,6	54,6
	1	54	45,4	45,4	100,0
	Total	119	100,0	100,0	

Niet bereid om meer te betalen voor suikervrije of light producten

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		80	67,2	67,2	67,2
	1	39	32,8	32,8	100,0
	Total	119	100,0	100,0	

Appendix 5.3   Randomization – comparing descriptive statistics between groups
Comparing the descriptive statistics between the four experimental groups.

Descriptives

Wat is uw leeftijd?

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
100% sugar product	29	31,72	11,741	2,180	27,26	36,19	21	61
30% less sugar product	30	33,80	13,690	2,499	28,69	38,91	21	62
Sugar free (artificial sweeteners) product	30	31,07	12,281	2,242	26,48	35,65	18	58
Sugar free sweetened with Stevia	30	31,83	12,900	2,355	27,02	36,65	19	61
Total	119	32,11	12,562	1,152	29,83	34,39	18	62

Test of Homogeneity of Variances

Wat is uw leeftijd?

Levene Statistic	df1	df2	Sig.
,733	3	115	,534

ANOVA

Wat is uw leeftijd?

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	124,953	3	41,651	,259	,855
Within Groups	18494,626	115	160,823		
Total	18619,580	118			

Comparing gender between the four experimental groups

Crosstab

Count

		GROEP				Total
		100% sugar product	30% less sugar product	Sugar free (artificial sweeteners) product	Sugar free sweetened with Stevia	
Wat is uw geslacht?	Man	12	11	18	15	56
	Vrouw	17	19	12	15	63
Total		29	30	30	30	119

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3,797[a]	3	,284
Likelihood Ratio	3,822	3	,281
Linear-by-Linear Association	1,433	1	,231
N of Valid Cases	119		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 13,65.

Comparing household between the four experimental groups

Crosstab

Count

		GROEP				Total
		100% sugar product	30% less sugar product	Sugar free (artificial sweeteners) product	Sugar free sweetened with Stevia	
Wat is de samenstelling van uw huishouden?	Alleenstaand	8	6	6	5	25
	Tweepersoonshuishouden zonder (thuiswonende) kinderen	8	11	7	6	32
	Eénoudergezin	3	1	2	0	6
	Gezin (ouders met één of meer kinderen)	7	6	6	11	30
	Groepswonen (bijv. studentenwoning)	3	6	9	8	26
Total		29	30	30	30	119

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11,354[a]	12	,499
Likelihood Ratio	12,581	12	,400
Linear-by-Linear Association	4,336	1	,037
N of Valid Cases	119		

a. 4 cells (20,0%) have expected count less than 5. The minimum expected count is 1,46.

Welk hoogst genoten opleiding heeft u gevolgd? * GROEP

Crosstab

Count

		GROEP				Total
		100% sugar product	30% less sugar product	Sugar free (artificial sweeteners) product	Sugar free sweetened with Stevia	
Welk hoogst genoten opleiding heeft u gevolgd?	Middelbaar onderwijs	1	0	0	0	1
	LBO	1	1	0	0	2
	MBO	9	8	10	9	36
	HBO	5	8	7	7	27
	Wetenschappelijk onderwijs	13	13	13	14	53
Total		29	30	30	30	119

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6,017[a]	12	,915
Likelihood Ratio	6,534	12	,887
Linear-by-Linear Association	,598	1	,439
N of Valid Cases	119		

a. 8 cells (40,0%) have expected count less than 5. The minimum expected count is ,24.

Appendix 5.4 Cronbach's alpha

Taste expectation

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,879	,880	2

Purchase intention

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,944	,944	3

Appendix 5.5 Assumptions

Dependent variable: Purchase intention
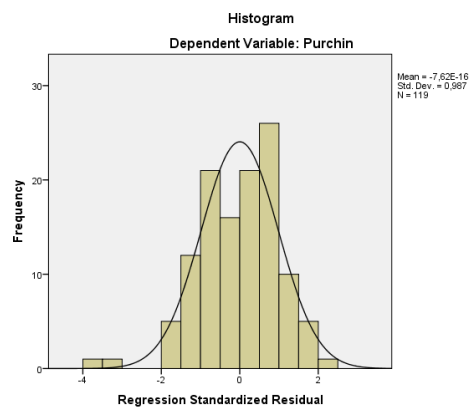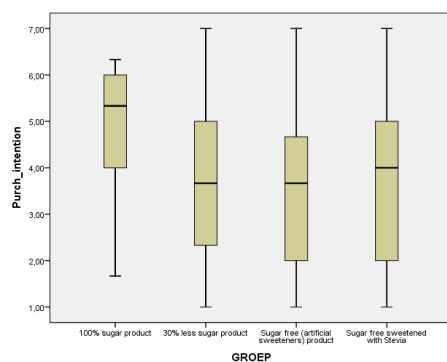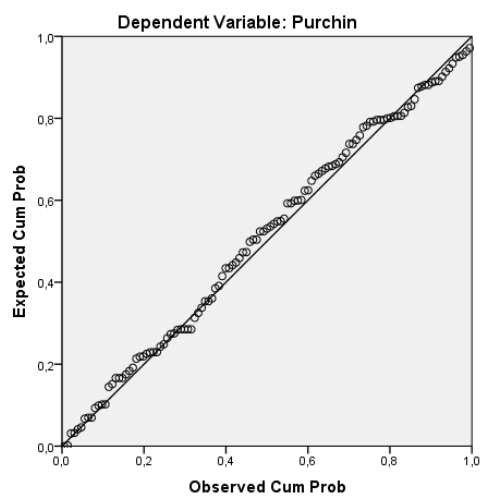
Normally distributed

Tests of Normality

	GROEP	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Purch_intention	100% sugar product	,172	29	,029	,857	29	,001
	30% less sugar product	,110	30	,200*	,962	30	,353
	Sugar free (artificial sweeteners) product	,116	30	,200*	,960	30	,303
	Sugar free sweetened with Stevia	,131	30	,197	,945	30	,124

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

ANOVA is robust against failure for normality, as long as the number of observations per cell are equal.

Between participants homogeneity of variances

Levene's Test of Equality of Error Variances a

Dependent Variable: Purch_intention

F	df1	df2	Sig.
1,254	3	115	,294

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + GROEP

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Purchin	1,254	3	115	,294
Taste expectation	3,412	3	115	,020
Product healthiness perception	1,721	3	115	,167

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Purchin	Welch	5,246	3	63,681	,003
Taste expectation	Welch	4,845	3	63,029	,004
Product healthiness perception	Welch	,868	3	63,784	,462

a. Asymptotically F distributed.

Appendix 5.5.1   Assumption for mediaton:

Tests of Between-Subjects Effects

Dependent Variable: Purchin

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	207,070ᵃ	35	5,916	4,176	,000
Intercept	43,255	1	43,255	30,530	,000
TasteEx	26,854	11	2,441	1,723	,082
GROEP	1,733	1	1,733	1,223	,272
TasteEx * GROEP	8,302	11	,755	,533	,876
PHealth	5,715	5	1,143	,807	,548
PHealth * GROEP	10,524	5	2,105	1,486	,203
Error	117,594	83	1,417		
Total	2199,444	119			
Corrected Total	324,665	118			

a. R Squared = ,638 (Adjusted R Squared = ,485)

You do not want to reject the hypothesis so insignificance is good.

Tests of Between-Subjects Effects

Dependent Variable: Purchin

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	235,274ᵃ	59	3,988	2,632	,000
Intercept	144,417	1	144,417	95,318	,000
TasteEx	25,379	8	3,172	2,094	,051
PHealth	7,691	5	1,538	1,015	,417
G_less	4,073	1	4,073	2,689	,106
G_SG	1,249	1	1,249	,824	,368
G_Stevia	4,341	1	4,341	2,865	,096
TasteEx * G_less	5,049	7	,721	,476	,848
TasteEx * G_SG	2,663	6	,444	,293	,938
TasteEx * G_Stevia	7,843	7	1,120	,740	,639
PHealth * G_less	10,812	4	2,703	1,784	,144
PHealth * G_SG	5,246	5	1,049	,692	,631
PHealth * G_Stevia	16,934	5	3,387	2,235	,062
Error	89,391	59	1,515		
Total	2199,444	119			
Corrected Total	324,665	118			

a. R Squared = ,725 (Adjusted R Squared = ,449)

Appendix 5.6Results one way ANOVA

Descriptives one-way ANOVA on purchase intention

Descriptives

Purchin

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
100% sugar product	29	4,8736	1,33753	,24837	4,3648	5,3823	1,67	6,33
30% less sugar product	30	3,7556	1,64453	,30025	3,1415	4,3696	1,00	7,00
Sugar free (artificial sweeteners) product	30	3,5444	1,54742	,28252	2,9666	4,1223	1,00	7,00
Sugar free sweetened with Stevia	30	3,7333	1,80548	,32963	3,0592	4,4075	1,00	7,00
Total	119	3,9692	1,65873	,15206	3,6681	4,2703	1,00	7,00

Test of Homogeneity of Variances

Purchin

Levene Statistic	df1	df2	Sig.
1,254	3	115	,294

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Purchin	Between Groups	32,169	3	10,723	4,216	,007
	Within Groups	292,496	115	2,543		
	Total	324,665	118			
Taste expectation	Between Groups	21,059	3	7,020	3,494	,018
	Within Groups	231,021	115	2,009		
	Total	252,080	118			
Product healthiness perception	Between Groups	5,102	3	1,701	1,005	,393
	Within Groups	194,595	115	1,692		
	Total	199,697	118			

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Purchin	100% sugar product	29	4,8736	1,33753	,24837	4,3648	5,3823	1,67	6,33
	30% less sugar product	30	3,7556	1,64453	,30025	3,1415	4,3696	1,00	7,00
	Sugar free (artificial sweeteners) product	30	3,5444	1,54742	,28252	2,9666	4,1223	1,00	7,00
	Sugar free sweetened with Stevia	30	3,7333	1,80548	,32963	3,0592	4,4075	1,00	7,00
	Total	119	3,9692	1,65873	,15206	3,6681	4,2703	1,00	7,00
Taste expectation	100% sugar product	29	5,3276	1,02012	,18943	4,9396	5,7156	2,50	6,50
	30% less sugar product	30	4,5000	1,35188	,24682	3,9952	5,0048	2,00	6,50
	Sugar free (artificial sweeteners) product	30	4,2167	1,62249	,29622	3,6108	4,8225	1,00	7,00
	Sugar free sweetened with Stevia	30	4,4167	1,58159	,28876	3,8261	5,0072	1,00	7,00
	Total	119	4,6092	1,46160	,13398	4,3439	4,8746	1,00	7,00
Product healthiness perception	100% sugar product	29	4,07	1,132	,210	3,64	4,50	2	7
	30% less sugar product	30	3,97	1,273	,232	3,49	4,44	1	6
	Sugar free (artificial sweeteners) product	30	3,80	1,375	,251	3,29	4,31	2	7
	Sugar free sweetened with Stevia	30	4,37	1,402	,256	3,84	4,89	2	7
	Total	119	4,05	1,301	,119	3,81	4,29	1	7

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Purchin
Bonferroni

(I) GROEP	(J) GROEP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
100% sugar product	30% less sugar product	1,11801*	,41531	,049	,0030	2,2330
	Sugar free (artificial sweeteners) product	1,32912*	,41531	,011	,2141	2,4441
	Sugar free sweetened with Stevia	1,14023*	,41531	,042	,0253	2,2552
30% less sugar product	100% sugar product	-1,11801*	,41531	,049	-2,2330	-,0030
	Sugar free (artificial sweeteners) product	,21111	,41178	1,000	-,8944	1,3166
	Sugar free sweetened with Stevia	,02222	,41178	1,000	-1,0833	1,1277
Sugar free (artificial sweeteners) product	100% sugar product	-1,32912*	,41531	,011	-2,4441	-,2141
	30% less sugar product	-,21111	,41178	1,000	-1,3166	,8944
	Sugar free sweetened with Stevia	-,18889	,41178	1,000	-1,2944	,9166
Sugar free sweetened with Stevia	100% sugar product	-1,14023*	,41531	,042	-2,2552	-,0253
	30% less sugar product	-,02222	,41178	1,000	-1,1277	1,0833
	Sugar free (artificial sweeteners) product	,18889	,41178	1,000	-,9166	1,2944

*. The mean difference is significant at the 0.05 level.

Multiple Comparisons

Dependent Variable: Taste expectation
Bonferroni

(I) GROEP	(J) GROEP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
100% sugar product	30% less sugar product	,82759	,36910	,161	-,1633	1,8185
	Sugar free (artificial sweeteners) product	1,11092*	,36910	,019	,1200	2,1018
	Sugar free sweetened with Stevia	,91092	,36910	,090	-,0800	1,9018
30% less sugar product	100% sugar product	-,82759	,36910	,161	-1,8185	,1633
	Sugar free (artificial sweeteners) product	,28333	,36596	1,000	-,6991	1,2658
	Sugar free sweetened with Stevia	,08333	,36596	1,000	-,8991	1,0658
Sugar free (artificial sweeteners) product	100% sugar product	-1,11092*	,36910	,019	-2,1018	-,1200
	30% less sugar product	-,28333	,36596	1,000	-1,2658	,6991
	Sugar free sweetened with Stevia	-,20000	,36596	1,000	-1,1825	,7825
Sugar free sweetened with Stevia	100% sugar product	-,91092	,36910	,090	-1,9018	,0800
	30% less sugar product	-,08333	,36596	1,000	-1,0658	,8991
	Sugar free (artificial sweeteners) product	,20000	,36596	1,000	-,7825	1,1825

*. The mean difference is significant at the 0.05 level.

Appendix 5.7 Dummy variables

Dummy variables.

Treatment group	1 (100% sugar)	2 (30% less sugar)	3 (Sugar Free, artificial)	4 (Sugar Free, Stevia)
Dummy 1	0	1	0	0
Dummy 2	0	0	1	0
Dummy 3	0	0	0	1

Table 4.4: Dummy variables

This means that there could be determined if being exposed to one of the claim containing packages (30% less sugar, sugar free or sugar free sweetened with stevia) predicts a different taste expectation, product healthiness perception or purchase intention than seeing the 100% sugar product. So if 30% less sugar was significant in the regression, with a positive beta coefficient, this would mean that the 30% less sugar package will give significantly more positive taste expectations than the 100% sugar package.

With each run, one dummy variable is the independent variable and the other ones the covariates. Important to note is that all results will be the same but only the indirect effect results will differ. The output gives indirect effects for each category relative to the reference category. If there is mediation, path a x b should both be significant so that the independent variable predicts the mediator and the mediator predicts the dependent variable. Before real calculation starts, the output of the total effect model is studied and determined if the dependent variables and mediators are significant.

Condition	M	$= i_1 + a_1D_1 + a_2D_2 + a_3D_3$
Reference (100% sugar product)	5.328	$= 5.3276 + (-0.8276)(0) + (-1.1109)(0) + (-0.9109)(0)$
30% less sugar claim	4.500	$= 5.3276 + (-0.8276)(1) + (-1.1109)(0) + (-0.9109)(0)$
Sugar free claim (artificial)	4.217	$= 5.3276 + (-0.8276)(0) + (-1.1109)(1) + (-0.9109)(0)$
Sugar free sweetened with Stevia claim	4.417	$= 5.3276 + (-0.8276)(0) + (-1.1109)(0) + (-0.9109)(1)$

Table 1 Derivation of group means

Appendix 5.8 Results process – 100% sugar as base level

Output Process – 30% less sugar product as independent variable

100% sugar version as base level.
30% less sugar product as independent variable.
Sugar free and Sugar free product sweetened with Stevia as covariates.

➡ Matrix

```
[DataSet1] F:\SPSS\data bestand RB groepen GOEDE Dummies.sav


Run MATRIX procedure:

**************** PROCESS Procedure for SPSS Release 2.13.2 **************

         Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3


**********************************************************************
Model = 4
    Y = Purchin
    X = G_less
   M1 = TasteEx
   M2 = PHealth

Statistical Controls:
CONTROL= G_SG      G_Stevia

Sample size
       119


**********************************************************************
```

```
Outcome: TasteEx

Model Summary
          R        R-sq        MSE          F        df1        df2          p
      ,2890       ,0835      2,0089      3,4942      3,0000    115,0000       ,0179

Model
              coeff         se           t           p        LLCI        ULCI
constant      5,3276       ,2632     20,2420       ,0000      4,8062      5,8489
G_less        -,8276       ,3691     -2,2422       ,0269     -1,5587      -,0965
G_SG         -1,1109       ,3691     -3,0098       ,0032     -1,8420      -,3798
G_Stevia      -,9109       ,3691     -2,4680       ,0151     -1,6420      -,1798

*************************************************************************
Outcome: PHealth

Model Summary
          R        R-sq        MSE          F        df1        df2          p
      ,1598       ,0255      1,6921      1,0051      3,0000    115,0000       ,3933

Model
              coeff         se           t           p        LLCI        ULCI
constant      4,0690       ,2416     16,8448       ,0000      3,5905      4,5474
G_less        -,1023       ,3388      -,3020       ,7632      -,7733       ,5687
G_SG          -,2690       ,3388      -,7940       ,4288      -,9400       ,4020
G_Stevia       ,2977       ,3388       ,8788       ,3813      -,3733       ,9687

*************************************************************************
Outcome: Purchin

Model Summary
          R        R-sq        MSE          F        df1        df2          p
      ,7341       ,5389      1,3248     26,4128      5,0000    113,0000       ,0000

Model
              coeff         se           t           p        LLCI        ULCI
constant       ,3067       ,5154       ,5951       ,5530      -,7144      1,3279
TasteEx        ,7353       ,0784      9,3770       ,0000       ,5800       ,8907
PHealth        ,1596       ,0854      1,8677       ,0644      -,0097       ,3289
G_less        -,4931       ,3063     -1,6098       ,1102     -1,1000       ,1138
G_SG          -,4693       ,3113     -1,5075       ,1345     -1,0861       ,1475
G_Stevia      -,5179       ,3107     -1,6669       ,0983     -1,1335       ,0976
```

```
*************************** TOTAL EFFECT MODEL ***************************
Outcome: Purchin

Model Summary
          R         R-sq         MSE           F          df1          df2            p
      ,3148        ,0991       2,5434       4,2160       3,0000     115,0000        ,0072

Model
              coeff          se            t            p          LLCI          ULCI
constant     4,8736        ,2962      16,4564        ,0000        4,2869        5,4602
G_less      -1,1180        ,4153      -2,6920        ,0082       -1,9407        -,2953
G_SG        -1,3291        ,4153      -3,2003        ,0018       -2,1518        -,5065
G_Stevia    -1,1402        ,4153      -2,7455        ,0070       -1,9629        -,3176

***************** TOTAL, DIRECT, AND INDIRECT EFFECTS *********************

Total effect of X on Y
      Effect          SE            t            p          LLCI          ULCI
     -1,1180        ,4153      -2,6920        ,0082       -1,9407        -,2953

Direct effect of X on Y
      Effect          SE            t            p          LLCI          ULCI
      -,4931        ,3063      -1,6098        ,1102       -1,1000         ,1138

Indirect effect of X on Y
              Effect      Boot SE      BootLLCI      BootULCI
TOTAL         -,6249        ,2595       -1,1570        -,1515
TasteEx       -,6085        ,2470       -1,1372        -,1697
PHealth       -,0163        ,0589        -,1985         ,0644
(C1)          -,5922        ,2482       -1,1233        -,1425

******************** ANALYSIS NOTES AND WARNINGS *************************

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
     5000

Level of confidence for all confidence intervals in output:
     95,00

------ END MATRIX -----


restore.
```

Output Process – Sugar free (artificial sweetened as independent variable)

100% sugar version as base level.
Sugar free (artificial sweetened) product as independent variable.
30% less sugar and Sugar free product sweetened with Stevia as covariates.

```
*************** PROCESS Procedure for SPSS Release 2.13.2 **************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
     Documentation available in Hayes (2013). www.guilford.com/p/hayes3


**********************************************************************
Model = 4
    Y = Purchin
    X = G_SG
   M1 = TasteEx
   M2 = PHealth

Statistical Controls:
CONTROL= G_Stevia G_less

Sample size
        119


**********************************************************************
```

```
Outcome: TasteEx

Model Summary
          R         R-sq        MSE           F          df1         df2           p
      ,2890       ,0835      2,0089       3,4942       3,0000   115,0000        ,0179

Model
             coeff          se           t           p          LLCI         ULCI
constant     5,3276       ,2632     20,2420        ,0000       4,8062       5,8489
G_SG        -1,1109       ,3691     -3,0098        ,0032      -1,8420       -,3798
G_Stevia     -,9109       ,3691     -2,4680        ,0151      -1,6420       -,1798
G_less       -,8276       ,3691     -2,2422        ,0269      -1,5587       -,0965


*************************************************************************
Outcome: PHealth

Model Summary
          R         R-sq        MSE           F          df1         df2           p
      ,1598       ,0255      1,6921       1,0051       3,0000   115,0000        ,3933

Model
             coeff          se           t           p          LLCI         ULCI
constant     4,0690       ,2416     16,8448        ,0000       3,5905       4,5474
G_SG         -,2690       ,3388      -,7940        ,4288       -,9400        ,4020
G_Stevia      ,2977       ,3388       ,8788        ,3813       -,3733        ,9687
G_less       -,1023       ,3388      -,3020        ,7632       -,7733        ,5687


*************************************************************************
Outcome: Purchin

Model Summary
          R         R-sq        MSE           F          df1         df2           p
      ,7341       ,5389      1,3248      26,4128       5,0000   113,0000        ,0000

Model
             coeff          se           t           p          LLCI         ULCI
constant      ,3067       ,5154       ,5951        ,5530       -,7144       1,3279
TasteEx       ,7353       ,0784      9,3770        ,0000        ,5800        ,8907
PHealth       ,1596       ,0854      1,8677        ,0644       -,0097        ,3289
G_SG         -,4693       ,3113     -1,5075        ,1345      -1,0861        ,1475
G_Stevia     -,5179       ,3107     -1,6669        ,0983      -1,1335        ,0976
G_less       -,4931       ,3063     -1,6098        ,1102      -1,1000        ,1138
```

```
*************************** TOTAL EFFECT MODEL ****************************
Outcome: Purchin

Model Summary
          R       R-sq       MSE         F       df1       df2         p
      ,3148      ,0991     2,5434     4,2160    3,0000   115,0000     ,0072

Model
            coeff        se         t         p       LLCI       ULCI
constant    4,8736     ,2962    16,4564     ,0000     4,2869     5,4602
G_SG       -1,3291     ,4153    -3,2003     ,0018    -2,1518     -,5065
G_Stevia   -1,1402     ,4153    -2,7455     ,0070    -1,9629     -,3176
G_less     -1,1180     ,4153    -2,6920     ,0082    -1,9407     -,2953

***************** TOTAL, DIRECT, AND INDIRECT EFFECTS *****************

Total effect of X on Y
    Effect        SE         t         p       LLCI       ULCI
   -1,3291      ,4153    -3,2003     ,0018    -2,1518     -,5065

Direct effect of X on Y
    Effect        SE         t         p       LLCI       ULCI
    -,4693      ,3113    -1,5075     ,1345    -1,0861      ,1475

Indirect effect of X on Y
          Effect    Boot SE   BootLLCI   BootULCI
TOTAL     -,8598      ,2782    -1,4232     -,3195
TasteEx   -,8169      ,2635    -1,3750     -,3257
PHealth   -,0429      ,0677     -,2708      ,0384
(C1)      -,7740      ,2656    -1,3256     -,2820


******************** ANALYSIS NOTES AND WARNINGS *************************

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
    5000

Level of confidence for all confidence intervals in output:
   95,00

------ END MATRIX -----

restore.
```

Output: sugar free product sweetened with Stevia as independent variable

100% sugar version as base level.
Sugar free product sweetened with Stevia as independent variable.
Sugar free (artificial sweetened) and 30% less sugar as covariates.

```
Run MATRIX procedure:

**************** PROCESS Procedure for SPSS Release 2.13.2 **************

          Written by Andrew F. Hayes, Ph.D.        www.afhayes.com
     Documentation available in Hayes (2013). www.guilford.com/p/hayes3


**********************************************************************
Model = 4
    Y = Purchin
    X = G_Stevia
   M1 = TasteEx
   M2 = PHealth

Statistical Controls:
CONTROL= G_less   G_SG

Sample size
        119


**********************************************************************
```

```
Outcome: TasteEx

Model Summary
          R         R-sq        MSE          F         df1        df2          p
       ,2890       ,0835      2,0089      3,4942      3,0000   115,0000       ,0179

Model
              coeff         se          t          p         LLCI        ULCI
constant      5,3276      ,2632     20,2420      ,0000       4,8062      5,8489
G_Stevia      -,9109      ,3691     -2,4680      ,0151      -1,6420      -,1798
G_less        -,8276      ,3691     -2,2422      ,0269      -1,5587      -,0965
G_SG         -1,1109      ,3691     -3,0098      ,0032      -1,8420      -,3798


*********************************************************************************
Outcome: PHealth

Model Summary
          R         R-sq        MSE          F         df1        df2          p
       ,1598       ,0255      1,6921      1,0051      3,0000   115,0000       ,3933

Model
              coeff         se          t          p         LLCI        ULCI
constant      4,0690      ,2416     16,8448      ,0000       3,5905      4,5474
G_Stevia       ,2977      ,3388       ,8788      ,3813       -,3733       ,9687
G_less        -,1023      ,3388      -,3020      ,7632       -,7733       ,5687
G_SG          -,2690      ,3388      -,7940      ,4288       -,9400       ,4020


*********************************************************************************
Outcome: Purchin

Model Summary
          R         R-sq        MSE          F         df1        df2          p
       ,7341       ,5389      1,3248     26,4128      5,0000   113,0000       ,0000

Model
              coeff         se          t          p         LLCI        ULCI
constant       ,3067      ,5154       ,5951      ,5530       -,7144      1,3279
TasteEx        ,7353      ,0784      9,3770      ,0000        ,5800       ,8907
PHealth        ,1596      ,0854      1,8677      ,0644       -,0097       ,3289
G_Stevia      -,5179      ,3107     -1,6669      ,0983      -1,1335       ,0976
G_less        -,4931      ,3063     -1,6098      ,1102      -1,1000       ,1138
G_SG          -,4693      ,3113     -1,5075      ,1345      -1,0861       ,1475
```

```
*************************** TOTAL EFFECT MODEL ****************************
Outcome: Purchin

Model Summary
          R        R-sq        MSE          F        df1        df2          p
      ,3148       ,0991     2,5434     4,2160     3,0000   115,0000       ,0072

Model
             coeff         se          t          p        LLCI       ULCI
constant    4,8736      ,2962    16,4564      ,0000      4,2869     5,4602
G_Stevia   -1,1402      ,4153    -2,7455      ,0070     -1,9629     -,3176
G_less     -1,1180      ,4153    -2,6920      ,0082     -1,9407     -,2953
G_SG       -1,3291      ,4153    -3,2003      ,0018     -2,1518     -,5065

***************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p        LLCI       ULCI
    -1,1402      ,4153    -2,7455      ,0070     -1,9629     -,3176

Direct effect of X on Y
     Effect         SE          t          p        LLCI       ULCI
     -,5179      ,3107    -1,6669      ,0983     -1,1335      ,0976

Indirect effect of X on Y
             Effect     Boot SE    BootLLCI    BootULCI
TOTAL        -,6223       ,2943     -1,2310      -,0678
TasteEx      -,6698       ,2716     -1,2516      -,1871
PHealth       ,0475       ,0638      -,0329       ,2482
(C1)         -,7173       ,2628     -1,2815      -,2458


******************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
    5000

Level of confidence for all confidence intervals in output:
    95,00

------ END MATRIX -----


restore.
```

Appendix 5.9 Results Process – other base level

30% less sugar product is the base level

Treatment group	1 (100% sugar)	2 (30% less sugar)	3 (Sugar Free, artificial)	4 (Sugar Free, Stevia)
Dummy 1	1	0	0	0
Dummy 2	0	0	1	0
Dummy 3	0	0	0	1

100% sugar product as independent variable.
30% less sugar product as base level.
Sugar free (artificial sweetened) and sugar free product with stevia as covariates.

```
Run MATRIX procedure:

**************** PROCESS Procedure for SPSS Release 2.13.2 **************

        Written by Andrew F. Hayes, Ph.D.        www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3


*************************************************************************
Model = 4
    Y = Purchin
    X = G1_reg
   M1 = TasteEx
   M2 = PHealth

Statistical Controls:
CONTROL= G2_SF    G3_Stevi

Sample size
       119
```

```
Outcome: TasteEx

Model Summary
          R        R-sq        MSE          F         df1         df2           p
      ,2890       ,0835      2,0089      3,4942      3,0000    115,0000        ,0179

Model
              coeff         se           t           p         LLCI        ULCI
constant     4,5000       ,2588      17,3899       ,0000       3,9874      5,0126
G1_reg        ,8276       ,3691       2,2422       ,0269        ,0965      1,5587
G2_SF        -,2833       ,3660       -,7742       ,4404      -1,0082       ,4416
G3_Stevi     -,0833       ,3660       -,2277       ,8203       -,8082       ,6416

*************************************************************************
Outcome: PHealth

Model Summary
          R        R-sq        MSE          F         df1         df2           p
      ,1598       ,0255      1,6921      1,0051      3,0000    115,0000        ,3933

Model
              coeff         se           t           p         LLCI        ULCI
constant     3,9667       ,2375      16,7020       ,0000       3,4962      4,4371
G1_reg        ,1023       ,3388        ,3020       ,7632       -,5687       ,7733
G2_SF        -,1667       ,3359       -,4962       ,6207       -,8320       ,4986
G3_Stevi      ,4000       ,3359      1,1909       ,2361       -,2653      1,0653

*************************************************************************
Outcome: Purchin

Model Summary
          R        R-sq        MSE          F         df1         df2           p
      ,7341       ,5389      1,3248     26,4128      5,0000    113,0000        ,0000

Model
              coeff         se           t           p         LLCI        ULCI
constant     -,1864       ,4706       -,3961       ,6928      -1,1187       ,7459
TasteEx       ,7353       ,0784      9,3770       ,0000        ,5800       ,8907
PHealth       ,1596       ,0854      1,8677       ,0644       -,0097       ,3289
G1_reg        ,4931       ,3063      1,6098       ,1102       -,1138      1,1000
G2_SF         ,0238       ,2981        ,0799       ,9364       -,5667       ,6144
G3_Stevi     -,0248       ,2994       -,0828       ,9342       -,6180       ,5684
```

```
*************************** TOTAL EFFECT MODEL ***************************
Outcome: Purchin

Model Summary
          R        R-sq        MSE          F        df1        df2          p
       ,3148       ,0991     2,5434     4,2160     3,0000   115,0000      ,0072

Model
                coeff         se          t          p        LLCI       ULCI
constant      3,7556       ,2912    12,8980      ,0000      3,1788     4,3323
G1_reg        1,1180       ,4153     2,6920      ,0082       ,2953     1,9407
G2_SF         -,2111       ,4118     -,5127      ,6092     -1,0268      ,6045
G3_Stevi      -,0222       ,4118     -,0540      ,9571      -,8379      ,7934


***************** TOTAL, DIRECT, AND INDIRECT EFFECTS ***************

Total effect of X on Y
     Effect          SE          t          p        LLCI       ULCI
     1,1180       ,4153     2,6920      ,0082       ,2953     1,9407

Direct effect of X on Y
     Effect          SE          t          p        LLCI       ULCI
      ,4931       ,3063     1,6098      ,1102      -,1138     1,1000

Indirect effect of X on Y
          Effect     Boot SE    BootLLCI    BootULCI
TOTAL      ,6249       ,2595       ,1515      1,1568
TasteEx    ,6085       ,2470       ,1687      1,1372
PHealth    ,0163       ,0589      -,0644       ,1985
(C1)       ,5922       ,2482       ,1425      1,1231
```

Output: Sugar free product (artificial sweetened) as independent variable.

30% less sugar product as base level
100% sugar product and sugar free product sweetened with stevia as covariates

Matrix

```
Run MATRIX procedure:

**************** PROCESS Procedure for SPSS Release 2.13.2 **************

          Written by Andrew F. Hayes, Ph.D.        www.afhayes.com
     Documentation available in Hayes (2013). www.guilford.com/p/hayes3


**********************************************************************
Model = 4
    Y = Purchin
    X = G2_SF
   M1 = TasteEx
   M2 = PHealth

Statistical Controls:
CONTROL= G3_Stevi G1_reg

Sample size
        119


**********************************************************************
```

```
Outcome: TasteEx

Model Summary
          R        R-sq        MSE          F        df1        df2          p
      ,2890       ,0835     2,0089     3,4942     3,0000   115,0000       ,0179

Model
             coeff         se          t          p       LLCI       ULCI
constant    4,5000       ,2588    17,3899       ,0000     3,9874     5,0126
G2_SF       -,2833       ,3660     -,7742       ,4404    -1,0082      ,4416
G3_Stevi    -,0833       ,3660     -,2277       ,8203     -,8082      ,6416
G1_reg       ,8276       ,3691     2,2422       ,0269      ,0965     1,5587


************************************************************************
Outcome: PHealth

Model Summary
          R        R-sq        MSE          F        df1        df2          p
      ,1598       ,0255     1,6921     1,0051     3,0000   115,0000       ,3933

Model
             coeff         se          t          p       LLCI       ULCI
constant    3,9667       ,2375    16,7020       ,0000     3,4962     4,4371
G2_SF       -,1667       ,3359     -,4962       ,6207     -,8320      ,4986
G3_Stevi     ,4000       ,3359     1,1909       ,2361     -,2653     1,0653
G1_reg       ,1023       ,3388      ,3020       ,7632     -,5687      ,7733


************************************************************************
Outcome: Purchin

Model Summary
          R        R-sq        MSE          F        df1        df2          p
      ,7341       ,5389     1,3248    26,4128     5,0000   113,0000       ,0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    -,1864       ,4706     -,3961       ,6928    -1,1187      ,7459
TasteEx      ,7353       ,0784     9,3770       ,0000      ,5800      ,8907
PHealth      ,1596       ,0854     1,8677       ,0644     -,0097      ,3289
G2_SF        ,0238       ,2981      ,0799       ,9364     -,5667      ,6144
G3_Stevi    -,0248       ,2994     -,0828       ,9342     -,6180      ,5684
G1_reg       ,4931       ,3063     1,6098       ,1102     -,1138     1,1000
```

```
*************************** TOTAL EFFECT MODEL ***************************
Outcome: Purchin


Model Summary
          R        R-sq         MSE           F         df1         df2           p
      ,3148       ,0991      2,5434      4,2160      3,0000    115,0000       ,0072


Model
            coeff          se           t           p        LLCI        ULCI
constant    3,7556       ,2912     12,8980       ,0000      3,1788      4,3323
G2_SF       -,2111       ,4118      -,5127       ,6092     -1,0268       ,6045
G3_Stevi    -,0222       ,4118      -,0540       ,9571      -,8379       ,7934
G1_reg      1,1180       ,4153      2,6920       ,0082       ,2953      1,9407


***************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************


Total effect of X on Y
     Effect          SE           t           p        LLCI        ULCI
     -,2111       ,4118      -,5127       ,6092     -1,0268       ,6045


Direct effect of X on Y
     Effect          SE           t           p        LLCI        ULCI
      ,0238       ,2981       ,0799       ,9364      -,5667       ,6144


Indirect effect of X on Y
           Effect     Boot SE    BootLLCI    BootULCI
TOTAL      -,2349       ,3083      -,8516       ,3648
TasteEx    -,2083       ,2861      -,7628       ,3480
PHealth    -,0266       ,0654      -,2251       ,0629
(C1)       -,1817       ,2779      -,7309       ,3603
```

Sugar free (artificial sweetened) is the base level

Treatment group	1 (100% sugar)	2 (30% less sugar)	3 (Sugar Free, artificial)	4 (Sugar Free, Stevia)
Dummy 1	1	0	0	0
Dummy 2	0	1	0	0
Dummy 3	0	0	0	1

Output:

100% sugar product as the independent variable
Sugar free (artificial sweeteners) is the base level
30% less sugar and sweetened with stevia are the covariates.

➡ **Matrix**

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Release 2.13.2 **************

          Written by Andrew F. Hayes, Ph.D.         www.afhayes.com
     Documentation available in Hayes (2013). www.guilford.com/p/hayes3


************************************************************************
Model = 4
    Y = Purchin
    X = G1_100
   M1 = TasteEx
   M2 = PHealth

Statistical Controls:
CONTROL= G2_30    G3_stev

Sample size
       119


************************************************************************
```

```
Outcome: TasteEx

Model Summary
          R        R-sq        MSE           F         df1         df2           p
      ,2890       ,0835     2,0089      3,4942      3,0000    115,0000       ,0179

Model
               coeff          se           t           p         LLCI        ULCI
constant      4,2167       ,2588     16,2949       ,0000       3,7041      4,7292
G1_100        1,1109       ,3691      3,0098       ,0032        ,3798      1,8420
G2_30          ,2833       ,3660       ,7742       ,4404       -,4416      1,0082
G3_stev        ,2000       ,3660       ,5465       ,5858       -,5249       ,9249

***********************************************************************
Outcome: PHealth

Model Summary
          R        R-sq        MSE           F         df1         df2           p
      ,1598       ,0255     1,6921      1,0051      3,0000    115,0000       ,3933

Model
               coeff          se           t           p         LLCI        ULCI
constant      3,8000       ,2375     16,0003       ,0000       3,3296      4,2704
G1_100         ,2690       ,3388       ,7940       ,4288       -,4020       ,9400
G2_30          ,1667       ,3359       ,4962       ,6207       -,4986       ,8320
G3_stev        ,5667       ,3359      1,6872       ,0943       -,0986      1,2320

***********************************************************************
Outcome: Purchin

Model Summary
          R        R-sq        MSE           F         df1         df2           p
      ,7341       ,5389     1,3248     26,4128      5,0000    113,0000       ,0000

Model
               coeff          se           t           p         LLCI        ULCI
constant      -,1626       ,4507      -,3607       ,7190      -1,0556       ,7304
TasteEx        ,7353       ,0784      9,3770       ,0000        ,5800       ,8907
PHealth        ,1596       ,0854      1,8677       ,0644       -,0097       ,3289
G1_100         ,4693       ,3113      1,5075       ,1345       -,1475      1,0861
G2_30         -,0238       ,2981      -,0799       ,9364       -,6144       ,5667
G3_stev       -,0486       ,3009      -,1616       ,8719       -,6447       ,5475
```

```
****************** TOTAL, DIRECT, AND INDIRECT EFFECTS *********************

Total effect of X on Y
     Effect         SE          t          p         LLCI        ULCI
     1,3291        ,4153      3,2003      ,0018       ,5065      2,1518

Direct effect of X on Y
     Effect         SE          t          p         LLCI        ULCI
      ,4693        ,3113      1,5075      ,1345      -,1475      1,0861

Indirect effect of X on Y
            Effect     Boot SE    BootLLCI    BootULCI
TOTAL        ,8598      ,2782       ,3189      1,4232
TasteEx      ,8169      ,2635       ,3250      1,3742
PHealth      ,0429      ,0677      -,0385       ,2708
(C1)         ,7740      ,2656       ,2812      1,3248
```

Output:

Sugar free sweetened with stevia as independent variable
Sugar free product (artificial sweeteners) as base level
30% less sugar product and 100% sugar product as covariates

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Release 2.13.2 **************

          Written by Andrew F. Hayes, Ph.D.         www.afhayes.com
     Documentation available in Hayes (2013). www.guilford.com/p/hayes3

*********************************************************************************
Model = 4
    Y = Purchin
    X = G3_stev
   M1 = TasteEx
   M2 = PHealth

Statistical Controls:
CONTROL= G2_30     G1_100

Sample size
        119

*********************************************************************************
```

```
Outcome: TasteEx

Model Summary
          R        R-sq       MSE          F        df1        df2          p
      ,2890       ,0835     2,0089     3,4942     3,0000   115,0000       ,0179

Model
              coeff         se          t          p        LLCI        ULCI
constant     4,2167      ,2588    16,2949       ,0000      3,7041      4,7292
G3_stev       ,2000      ,3660      ,5465       ,5858      -,5249       ,9249
G2_30         ,2833      ,3660      ,7742       ,4404      -,4416      1,0082
G1_100       1,1109      ,3691     3,0098       ,0032       ,3798      1,8420

**********************************************************************
Outcome: PHealth

Model Summary
          R        R-sq       MSE          F        df1        df2          p
      ,1598       ,0255     1,6921     1,0051     3,0000   115,0000       ,3933

Model
              coeff         se          t          p        LLCI        ULCI
constant     3,8000      ,2375    16,0003       ,0000      3,3296      4,2704
G3_stev       ,5667      ,3359     1,6872       ,0943      -,0986      1,2320
G2_30         ,1667      ,3359      ,4962       ,6207      -,4986       ,8320
G1_100        ,2690      ,3388      ,7940       ,4288      -,4020       ,9400

**********************************************************************
Outcome: Purchin

Model Summary
          R        R-sq       MSE          F        df1        df2          p
      ,7341       ,5389     1,3248    26,4128     5,0000   113,0000       ,0000

Model
              coeff         se          t          p        LLCI        ULCI
constant     -,1626      ,4507     -,3607       ,7190     -1,0556       ,7304
TasteEx       ,7353      ,0784     9,3770       ,0000       ,5800       ,8907
PHealth       ,1596      ,0854     1,8677       ,0644      -,0097       ,3289
G3_stev      -,0486      ,3009     -,1616       ,8719      -,6447       ,5475
G2_30        -,0238      ,2981     -,0799       ,9364      -,6144       ,5667
G1_100        ,4693      ,3113     1,5075       ,1345      -,1475      1,0861
```

```
*************************** TOTAL EFFECT MODEL ****************************
Outcome: Purchin


Model Summary
          R        R-sq         MSE           F         df1         df2           p
      ,3148       ,0991      2,5434      4,2160      3,0000    115,0000       ,0072


Model
               coeff          se           t           p        LLCI        ULCI
constant      3,5444       ,2912     12,1730       ,0000      2,9677      4,1212
G3_stev        ,1889       ,4118       ,4587       ,6473      -,6268      1,0045
G2_30          ,2111       ,4118       ,5127       ,6092      -,6045      1,0268
G1_100        1,3291       ,4153      3,2003       ,0018       ,5065      2,1518


***************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************


Total effect of X on Y
     Effect          SE           t           p        LLCI        ULCI
      ,1889       ,4118       ,4587       ,6473      -,6268      1,0045


Direct effect of X on Y
     Effect          SE           t           p        LLCI        ULCI
     -,0486       ,3009      -,1616       ,8719      -,6447       ,5475


Indirect effect of X on Y
            Effect     Boot SE    BootLLCI    BootULCI
TOTAL        ,2375       ,3351      -,4163       ,8929
TasteEx      ,1471       ,3008      -,4571       ,7204
PHealth      ,0904       ,0812      -,0088       ,3545
(C1)         ,0566       ,2861      -,5256       ,6123
```