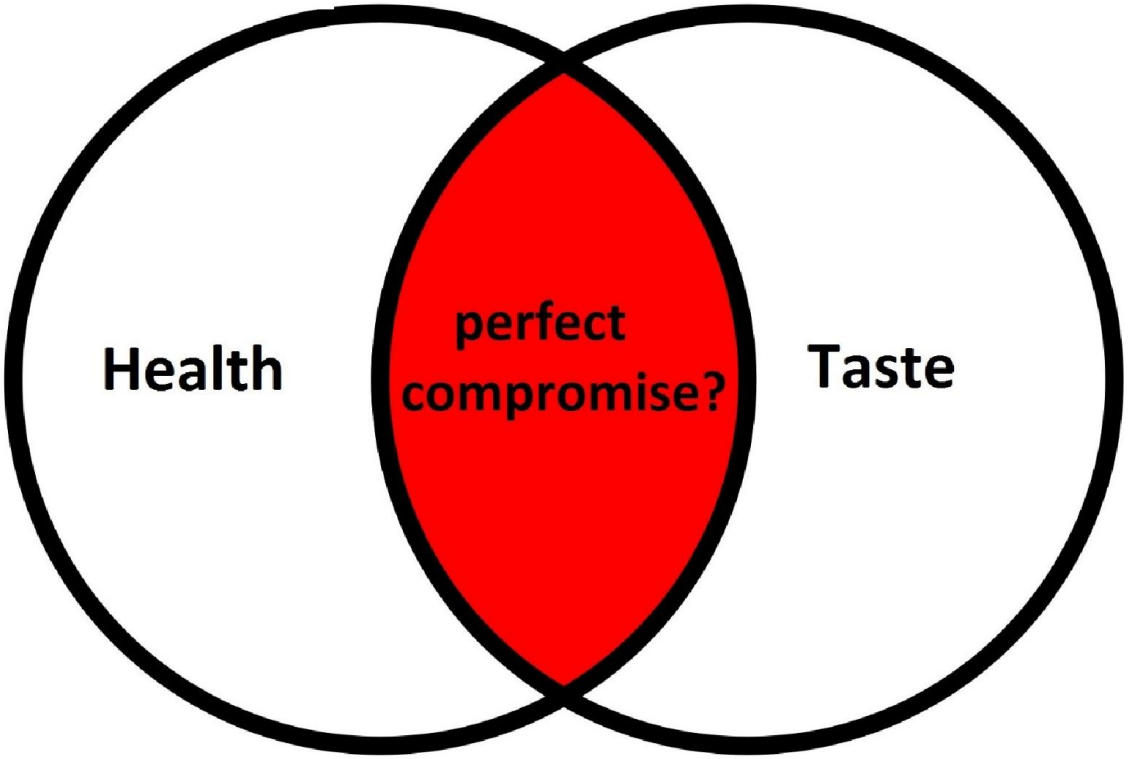
# The diverse effects of nutrition claims on highly and low tempting food products: healthiness as a USP

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# Abstract

This study investigates the effects of different nutrition claims on purchase intention for food products with different levels of temptation strength. Essentially, this study realigns the scientific proceedings of two distinct food related research fields (purchase intention differences caused by various nutrition claims/differences in consumption of low and highly tempting food products) and synthesizes them into one coherent concept.

In an experiment focused on examining variances of purchase intention between a highly and a low tempting product, it was discovered that additional nutrition claims created differences in purchase intention for highly tempting products (cupcakes), whereas this effect was not present for low tempting products (muesli-bars). Significantly higher purchase intentions for cupcakes with low fat claims compared to cupcakes with antioxidants claims were found. Yet, low fat claims for cupcakes evoked purchase intentions which were not significantly lower than purchase intentions of cupcakes without nutrition claims.

From a marketing point of view, this suggests that additional low fat nutrition claims can cause highly tempting, but unhealthy products to be perceived as being healthier than a nutrition claim-free version of the same product, while not significantly reducing purchase intentions. Through this, new consumer segments who are craving for health- as well as taste-related aspects, combined in a single product, can be reached. From a governmental health campaign point of view, the results indicate that nutrition claims have little effect for promoting the healthiness of low tempting, but healthy food products, whereas highly tempting products with nutrition claims may be misinterpreted as being a healthy choice, when in fact they are not.

# 1 Introduction

When making food choices, consumers are constantly challenged to balance between immediate gratifications and long-term health considerations, due to the omnipresent availability of tasty but unhealthy food-products (Kroese, Evers, & De Ridder, 2012). Consumers are tempted to make unhealthy, hedonic food choices as indulgent foods stimulate the potential failure of self-control (De Ridder, De Vet, Stok, Adriaanse, & De Wit, 2012; Geyskens, Pandelaere, DeWitte, & Warlop, 2005; Muraven & Baumeister, 2000). Consequently, unhealthy food products are often chosen over healthy foods, which are perceived as a less attractive alternative in the contrasting light of tasty alternatives (Belei, 2012). Healthy eating and tasty food consumption are commonly regarded as being contradictory choices in the mind of the consumer (Raghunathan, Walker Naylor, & Hoyer, 2006), as tasty products are mainly consumed to fulfill one´s appetite, whereas healthy foods are considered to be a more conscious decision against taste- and for health-benefits. People´s belief that healthy foods are generally less fulfilling than tasty foods aggravates the self-control conflict (Finkelstein & Fishbach, 2010). Many studies have shown that the ability to resist temptation varies per individual and that successful self-regulation is mainly attributed to the individual perception of product-attractiveness (Geyskens, Dewitte, Pandelaere, & Warlop, 2006; Hassan, Shiu, & Michaelidou (2010); Van Koningsbruggen, Stroebe, & Aarts, 2012).

The lack of attractiveness of healthy food products in comparison to attractive, tasty but unhealthy products symbolizes a challenge for the food industry, as well as for governmental health programs.

From a governmental point of view, this is an important social issue as obesity is a growing problem which is related to negative health outcomes and increased medical costs (De Ridder et al., 2012; Greener, Douglas, & Van Teijlingen, 2010).

Aside from that, consumers tend to associate products which they consider as being tasty with also being unhealthy (Kroese et al., 2012; Raghunathan et al., 2006). Due to this, the food industry is missing out on consumers who are looking for a tradeoff with both, health and taste attributes, united in a single product (Bech-Larsen & Grunert, 2003; Belei, 2012; Krystallis & Chrysochou, 2012).

As an attempt to resolve the conflict of healthy eating and enjoying tasty, but unhealthy products, the food industry has created a variety of functional food products, called "healthful indulgences" (Belei, Geyskens, Goukens, Ramanathan, & Lemmink, 2012).
According to Belei, Geyskens et al. (2012), the unique selling proposition of healthful indulgences is that "they represent an "improved" version of foods generally perceived as unhealthy, consumed primarily for reasons of taste, pleasure, and indulgence" (p. 900) by carrying a nutrition claim which suggests an increased healthiness of the product compared against conventional versions.
Such nutrition claims can either stress the presence of functional additives (e.g. extra antioxidants, vitamins, omega-3 fatty acids), the absence or the reduced amounts of considerably unhealthy attributes (e.g. low calories, low sugar, low sodium) in the carrier product (Urala, Arvola, & Lähteenmäki, 2003), which is the product featuring the specific claim (Ares & Gambaro, 2007; Van Kleef, Van Trijp, & Luning, 2005).

Functional foods represent an attractive choice for health-concerned consumers, as they tend to enhance the nutritional attributes of food products (O'Connor & White, 2010; Siró, Kápolna, Kápolna, & Lugasi, 2008). Yet, for consumers who are primarily focused on taste attributes and to whom health aspects are of peripheral importance, special functional products like healthful indulgences offer a significant advantage compared to functional products with a less attractive carrier product. Taste is still the predominant aspect of functional foods compared to health aspects, as consumers rarely have the tendency to compromise on taste of functional foods in exchange for health benefits (Krutulyte et al., 2011; Verbeke, 2006). Healthful indulgences do not impose the necessity to compromise on taste-quality on behalf of product-healthiness, while still representing a healthier product than the same product without functional additives. The dynamic relationship between taste- and health-related aspects represents one of the key elements of this report. As healthful indulgences are characterized by this relationship, they offer significant benefits and opportunities for governmental health agendas, the food industry and the consumer.

From a food industry perspective, it is an attractive aspect that healthful indulgences are perceived as healthier than similar products without nutrition claims as this enables them to reach a broader target-audience. However, from a governmental health campaign perspective, this aspect is not entirely positive as people have the tendency to overconsume healthful indulgences (Belei, 2012).

In fact, potential unhealthy products with low fat claims tend to counteract the intention of calorie reduction as their health references tend to camouflage the aspect that they are still not being entirely healthy products (Belei, Geyskens et al., 2012; Geyskens et al., 2005). Due to their nutrition claim, they are perceived by the consumer as less attractive and as a weaker temptation than an original version without a nutrition claim of the same product (Raghunathan et al, 2006). Weak temptations make consumers feel more guilt-free about consumption and decrease their experienced health goal conflict (Okada, 2005), which leads to increased consumption (Geyskens et al., 2005). According to Kroese, Evers, & De Ridder (2011), weak temptations tend to inhibit the mental accessibility of a weight watching goal as opposed to strong temptations, as weak temptations lead to an underestimation of a health-goal conflict. On the other side, nutrition claims which stress the presence of functional additives tend to decrease consumption, compared to a product with no nutrition claims, as they remind the consumer of his weight watching goal (Belei, Geyskens et al., 2012). Considering the effect of nutrition claims on the perceived healthiness of snacks, Schuldt and Schwarz (2010) discovered that organic cookies were perceived by consumers as having fewer calories than identical non-organic cookies, which suggests that nutrition claims positively affect the estimated amount of calories of a product, even if there might not be a difference in calories at all between products with a health related claim and the same product without a health related claim.

As nutrition claims can either stress the presence of functional additives or the reduction of potential unhealthy food attributes and can be combined with both, attractive or unattractive carrier-products, these combinations may vary with respect to perceived healthiness and attractiveness. The interaction of these factors remains an understudied field. To fill this research gap, two scientific research fields have to be united. According to Belei, Geyskens et al. (2012), healthful indulgences are a growing market, while little research has focused on different nutrition claim types and their effects on consumption.

On the other side, important work in relation to food temptations comes from Kroese et al. (2011) who state that weak temptations are more threatening to a weight watching goal than highly tempting products, as only highly tempting products tend to be perceived as unhealthy and as a threat to a weight watching goal.

As yet, no scientific literature is available about the combination of these two scientific fields, to the best of our knowledge. Applying both nutrition claim types in combination with either highly or low tempting products will be a significant contribution to the field of health goal pursuit, self- control issues and individual product tastiness perception.

In this report, the interaction of these two factors will be examined and it will be analyzed which effects different types of nutrition claims will have when they are combined with high or low tempting products.

## 1.1 Theoretical framework

### *1.1.1 Definition of terminology for claims on food products*

When talking about products with health aspects, the terminology for different health related claims has to be reviewed. According to Belei, Geyskens et al. (2012) functional additives (e.g. extra antioxidants, vitamins) in a product are advertised by applying "functional health claims", as they emphasize the health-supporting function of a food product. Additionally, Belei, Geyskens et al. (2012) define claims that advertise the reduction or absence of potentially unhealthy attributes (e.g. low fat, low sodium) as "hedonic health claims", in order to emphasize that consumers will enjoy consumption of such a product with less remorse than the consumption of the same product which contains the full amount of those potentially unhealthy attributes.

However, it has to be pointed out that the labeling "low fat" and "extra antioxidants" claims as functional health claims and hedonic health claims, as it was done by Belei, Geyskens et al. (2012), who´s remarkable study otherwise partly served as an inspiration for this study, is scientifically incorrect on two different dimensions. This urges us to shed light on the terminology for nutrition and health claims.

Firstly, a reason for the necessity of an alternative terminology is that according to Lowe and Butryn (2007) the term "hedonic hunger", which implies that food is consumed for reasons of enjoyment and taste and not for the sake of people enjoying a product with a low fat claim with decreased feelings of guilt, like suggested by Belei, Geyskens et al. (2012). Rather, hedonic foods are defined as products which are commonly perceived as delicious, but unhealthy. For example, in scientific literature, M&M´s are described as hedonic goods, because they are fun to consume (Cramer & Antonides, 2011; Dhar & Wertenbroch, 2000). According to Wansink and Chandon (2006), hedonic foods are potentially unhealthy snacks which are consumed for the goal of short-term pleasure gratification, like candy or snacks, whereas utilitarian products are mostly consumed for reasons of health. Therefore, the approach of Belei, Geyskens et al. (2012) of labeling "low fat claims" as "hedonic health claims" does not seem to suit the definition of hedonism in relation to food very well, as the term hedonic is commonly attributed to indulging and unhealthy products (Lowe & Butryn, 2007; Papies, Stroebe, & Aarts, 2007), not to light versions of these products.

Secondly, since January 2007, EU Regulation EC (No) 1924/2006 (European Commission, 2007) permits two types of claims to be made on foods: health claims and nutrition claims. (Verbeke, Scholderer, & Lähteenmäki, 2009).
According to Van Trijp and Van der Lans (2007), health claims state a beneficial aspect of the product for the consumer´s health. Their exact wording is strictly defined by EU regulations to ensure that foods objectively deliver what they state (for example "Calcium contributes to the normal function of digestive enzymes") (Lalor, Kennedy, Flynn, & Wall, 2010). Nutrition claims on the other side mention the presence of a food-attribute (e.g. increased omega-3 fatty acids, antioxidants). They can also state reduced amounts of food attributes (e.g. sugar, fat, sodium), accompanied by adjectives like low or reduced (Wansink & Chandon, 2006). Compared with each other, "health claims promise a health-related benefit, whereas nutrition claims state the presence of a nutritionally beneficial component or composition leaving the consumer to make the connection between the component and health." (Dean et al., 2012, p. 129). The approach of Belei, Geyskens et al. (2012) of labelling claims like "extra antioxidants" and "low fat" as health claims (functional or hedonic) is therefore scientifically incorrect, as they are in fact nutrition claims.

Until now no conceptual or legal definition exists, which distinguishes between nutrition claims with reduced food attributes (e.g. low fat claims) and nutrition claims with food additives (e.g. extra antioxidants) to the best of our knowledge. This report will contribute to the refinement and extension of scientific and EU terminology. Currently, both claims are summarized under the indistinct term of "nutrition claims". In order to apply a thorough and detailed terminology, it has been decided to create new scientific terms, called Enhanced Nutrition Claim (hereafter called ENC) for products that feature certain food additives (like extra antioxidants, vitamins) and Reduced Nutrition Claim (hereafter called RNC) for products that contain reduced amounts of certain food attributes (low fat e.g.).

### *1.1.2 Effects of temptation strength on self-regulation*

The temptation strength of a food product is a subjective criteria and indicates, how strongly people experience the intention to consume it (Geyskens, Dewitte, Pandelaere, & Warlop, 2006). "Temptations, by definition, have two components: They need to be both attractive and ''forbidden'' in some way (e.g., Hughes, 2002). Temptation strength then, could be conceptually framed as a multiplication of the separate forbiddingness and attractiveness factors: If both are high, temptation is strongest; if one is zero, temptation is not present." (Kroese et al., 2011, p. 282).

Krieger, Cappuccio, Katz and Moskowitz (2003) examined which aspects were most important for a products´ temptation strength by presenting consumers with different versions of healthy functional soups for the purpose of attractiveness evaluation. They found that 1. functional ingredients (to improve health), 2. attractiveness of the packaging design and 3. taste and main ingredients were the most important determinants of product attractiveness.

A variable which is closely related to temptation strength is self-regulatory behavior, which enables people to balance between conflicting goals. According to Hassan, Shiu and Michaelidou (2010), "self-control represents the ability to override initial tendencies to respond to tempting stimuli." (p.503). It implies setting abstract goals, like the goal to eat healthy, which motivates consistent choices of action (Fishbach & Dhar, 2005). For example, as opposed to the goal of immediately consuming a tempting food item, a goal to eat healthy is more abstract, as its benefits are not immediately tangible. It requires constant cognitive elaboration to set one´s food choice priorities, a process which can be perceived as exhausting and which can lead to self-control failure (Muraven & Baumeister, 2000).

A high degree of temptation strength can be challenging for people´s self-regulation and temporarily overrule a goal to eat healthy. However, it can also be the other way around. In several experiments about the influence of temptation strength on self-regulatory processes, Kroese et al. (2011) found that weak temptations inhibited the mental accessibility of participants dieting goal. Additionally, in another experiment, Kroese et al. (2012) showed that participants perceived weak tempting products as also being healthier than highly tempting products. In their experiment "temptation strength was associated with unhealthiness such that weak temptations were—unjustly—perceived to be less unhealthy compared to strong temptations." (Kroese et al., 2012, p.522). In both experiments, the exposure to weak tempting foods led to higher consumed amounts of food than exposure to highly tempting products.

These findings can be explained by the critical level model of Gilbert et al. (2004). The theory states that temptations can also activate, instead of inhibit, protection mechanisms for long term goals. According to Gilbert et al. (2004) consuming tempting foods can be characterized as a hedonic state, as eating delicious food evokes pleasure. Kroese et al. (2011) state, that exposure to highly tempting products implicitly signals consumers to engage in moderate consumption. This is due to the fact that the threat to a health goal which is experienced for highly tempting food items is getting overestimated, as consumers generally are very sensitive towards products which are in harsh conflict with their health goal (Krystallis et al., 2012). On the other side, exposure to low tempting snacks, leads to an underestimation of the health goal-conflict as these products are more in line with the health goals of the consumer (Kroese et al. (2011).

Moreover, according to the counteractive control theory (Trope & Fishbach, 2000), people´s attention shifts to their long-term goals, if they are faced with conflicting short-term temptations. The perception of short-term costs, like considering to consume a snack while having the goal to eat healthy leads to self-control measures, in order to counteract the anticipated costs (like gaining weight) of the temptations (Fishbach, Friedman, & Kruglanski, 2003). Therefore, strong temptations do not undermine self-control, but instead activate it, as people become more aware of their long-term goals. However, a critical level of temptation strength is needed, so that people can identify a temptation as a threat to their long-term goals (Gilbert et al., 2004).

Healthful indulgences tend to undermine self-control issues and cause overconsumption (Belei, Geyskens et al., 2012). Their nutrition claims tend to decrease their perceived unhealthiness and let them appear as less attractive (Raghunathan et al, 2006). Referring to this effect, Belei, Geyskens et al. (2012) state that "any claim that reminds consumers of health (i.e., a goal conflicting with the nature of the consumption situation) creates a conflict, resulting in consumption-decreasing effects." (p.908).
On the other side, additional nutrition claims disguise the aspect that healthful indulgences are still not being entirely healthy products (Belei, Geyskens et al., 2012; Geyskens et al., 2005) as they still can contain a high amount of calories, regardless of their nutrition claim (Schuldt & Schwarz, 2010; Wansink & Chandon, 2006). Therefore, the interaction of a products´ temptation strength, combined with different nutrition claims can be affected by the individual healthiness perception (Kroese et al., 2012) and therefore affect the purchase intentions.

### *1.1.3 Nutrition claims and product healthiness: influence on self-regulation*

In order to be able to comprehend consumer reactions towards foods with different degrees of attractiveness, due to various combinations of carrier product and nutrition-claims, the principles that guide the perceived product attractiveness will be outlined here.
According to the unhealthy = tasty intuition (Raghunathan et al., 2006), additional healthy food ingredients are associated with a reduction of hedonic qualities of the food item, due to a negative relationship between the attractiveness of foods and their perceived healthiness. Raghunathan et al. (2006) state that "when information pertaining to the assessment of the healthiness of food items is provided, the less healthy the item is portrayed to be, (1) the better is its inferred taste, (2) the more it is enjoyed during actual consumption, and (3) the greater is the preference for it in choice tasks when a hedonic goal is more (versus less) salient." (p.170).

A product´s perceived attractiveness can vary between identical carrier products, if different nutrition claims are added to it, as attractiveness is closely related to a products perceived healthiness. Wansink and Chandon (2006) state that exposure to health labels on food products can either activate an associated health goal or satisfy and even inhibit that goal.
In the experiment of Belei, Geyskens et al. (2012), participants were presented with chocolate pearls which either featured an ENC (extra antioxidants) or a RNC (low fat), compared to a control condition without a nutrition claim manipulation. Belei, Geyskens et al. (2012) found

that nutrition claims with extra antioxidants claims triggered “high levels of health-goal accessibility, which, together with simultaneously accessible indulgence goals attached to the indulgence, result in goal conflict.”(p.900). Antioxidant claims reminded people of their overarching health goal. Subsequently, this conflict caused reduced food consumption compared to a similar product without an antioxidants claim.
On the other side, when Belei, Geyskens et al. (2012) exposed respondents to the same product with a low fat claim, consumption of the food was significantly increased, because low fat claims did render a health goal less accessible, as they accentuate the pleasure aspects of enjoying food rather than the health aspects.
Similarly, Wansink and Chandon (2006) found that low fat nutrition labels on foods tend to increase people´s food intake compared to identical foods without low fat labels, by altering the perceived healthiness of the product which in turn increases perceptions about appropriate serving size and decreases feelings of guilt which are experienced during and after consumption.

Low fat claims direct attentions to the hedonic qualities of the food by signalizing people, that the product may be even more enjoyable, as the pleasure of regular snacks is also offered, but with fewer costs (Belei, Geyskens et al. 2012; Geyskens, Pandelaere, Dewitte, & Warlop, 2005). Low fat claims represent a low health goal conflict for people, as the hedonic motivation to consume a highly tempting product is mainly activated by the product and only to a lower degree by nutrition claims. Low fat claims activate a health goal to a much lower extent than nutrition claims like extra antioxidants (Belei, Geyskens et al. 2012). This is because of the “primacy of affirmation (Jung-Grant, Malaviya, & Sternthal, 2004), according to which affirmations (e.g., the attributes emphasized in a claim: fat) rather than their tags (e.g., “low,” “with,” or “extra”) are processed more specifically, when product benefits are expressed as negations (e.g., “not difficult to use,” “not fattening”; where “not” is the negator tag and “difficult to use” or “fattening” are affirmations), consumers’ initial and automatic responses tend to consider primarily the affirmation. That is people tend to elaborate on the affirmation (i.e., “fat”) and not on the negator (e.g., “low”).” (Belei, Geyskens et al., 2012, p. 907). Furthermore, Verbeke (2006) showed that consumers assume that they have to compromise on taste aspects when choosing healthy functional products with added nutrition claims, as these are typically not associated with being tasty. This leads to reduced purchase intentions, compared to similar non-functional foods. In contrast to the experiments of this master thesis, however, Verbeke (2006) did not consider the case of healthful indulgences.

Besides utilitarian products which are consumed for reasons of health, healthful indulgences contain extra functional ingredients which may function as an additional unique selling point and reduce doubts about consuming a snack that would be considered to be entirely unhealthy otherwise. As functional additives (like antioxidants) are associated with healthiness (Belei, Geyskens et al., 2012), it is assumed that the mental concept of healthy eating will be activated if consumers are confronted with a product with a ENC, leading to reduced consumption.

Additionally, it is assumed that if RNC´s are added to a product, purchase intentions will only be increased for a highly tempting product. For low tempting products with a RNC, there will not be a significant difference in purchase intentions, compared to low tempting products without a nutrition claim.
The assumption that this effect will only occur for highly tempting products is based on the "unhealthy = tasty intuition" concept by Raghunathan et al. (2006). While muesli-bars are generally perceived to be utilitarian products (Wanskink & Chandon, 2006), their expected tastiness is lower than the one of a cupcake. Therefore, a low fat nutrition claim will not boost the intention to buy a muesli-bar significantly, because the product is already perceived as being moderately healthy (Mahanna, Moskowitz, & Lee, 2009), which is why additional nutrition claims will have little effect on its perceived healthiness. Conversely, a product like a cupcake which is perceived as highly tempting and unhealthy may evoke counteractive behavior (Kroese et al., 2011). However, an added low-fat claim to a cupcake, will lower the consumption resistance threshold, as the perceived critical level (Gilbert, Lieberman, Morewedge, & Wilson, 2004) of perceiving the food as a health-threat is lowered and counteractive behavior will be significantly less present. Low fat claims will therefore boost the purchase intention of highly tempting products. Even if according to the unhealthy = tasty intuition (Raghunathan et al., 2006), any added nutrition claim will lower the expected tastiness of the product, a cupcake with a low fat claim will still be perceived as tempting when a nutrition claim is added, but as less harmful to a weight watching goal as the critical level of perceiving it as a serious threat to a health goal will not be exceeded. It combines the aspects of pleasure and reasonability while eating. On the other hand, a muesli-bar with a low fat claim will be perceived as significantly less pleasurable and mainly as a reasonable decision. For that reason, a low fat claim will only raise purchase intentions of highly tempting products. In order to test the assumptions of this thesis, two hypotheses were formulated.

Hypothesis 1: For highly tempting products, purchase intentions will be significantly higher than purchase intentions for low tempting products.

Whereas hypothesis 1 functions as a basic hypothesis in order to control for the necessary conditions that have to be fulfilled in this experiment, hypothesis 2 deals with rather specific assumptions.

Hypothesis 2: For highly tempting products, purchase intention will be significantly higher for products with a RNC than for products with an ENC, whereas this effect will not be present for low tempting products.

The distinction between high and low tempting products and the different expected effects of nutrition claims on purchase intention for these products represents a new scientific perspective with regard to nutrition claim effect attribution. Whereas Belei, Geyskens et al. (2012) compare the effects of "extra antioxidants claims" and "low fat claims" on the extent of consumption of a product and Kroese et al. (2011) compare effects of different products with varying temptation strength on self-regulation processes, this hypothesis synthesizes both dimensions into a single coherent scientific approach. The interaction of these two factors has so far not been examined and is believed to be an original and significant contribution.

### *1.1.4 Effects of multiple nutrition claims*

Instead of having a single nutrition claim, a food product can also feature multiple nutrition claims at the same time. To assess possible effects for a combination of multiple claims, Liem, Toraman and Zandstra (2012) examined the simultaneous presence of two different health related labels (a "healthy choice" logo and a "now reduced salt" label) on a product with reference to respondents taste expectancy. Participants were shown a package of a chicken soup and were told that after evaluating the package, they would also taste the actual soup (which was identical across all conditions). After looking at the packages, participants reported to expect the soup with the "healthy choice" logo to be more liked than the same soup with both, the "healthy choice" logo and the "now reduced salt" label. The soup with both labels had similar ratings of expected liking as the soup which only had the "now reduced salt" label. Liem, Toraman et al. (2012) argue that both labels presented at the same

time may lead to lower tastiness expectancy than the “healthy choice” logo on its own because a taste related claim as “now reduced salt” may have an adverse effect on consumer expectations, related to the taste of the product. The implications of the experiment by Liem, Toraman et al. (2012) for the following hypothesis are that two nutrition claims being present on a product at the same time may lead to lower purchase intentions than a single nutrition claim.

Barreiro-Hurle, Gracia and De-Magistris (2010) studied how people value multiple labels on a product when making choices between a healthy (plain yogurt) and a less healthy food product (pork sausages). They examined the simultaneous presence of two types of labels on product packaging. All possible pairwise combinations of the following claims were tested; 1.Nutrition facts panel (basic/detailed); 2. Low fat claims (low fat content/0% fat content) and; 3.A health claim (reduces risk of cardiovascular diseases/no health claim).
Barreiro-Hurle et al. (2010) found that the presence of multiple labels generally had a weaker effect on reported consumer´s utility, relative to the presence of each single label in isolation. The effect was present for the healthy and the less healthy food product. Only in one of six cases, multiple labels were perceived as increasing product utility. This concluded that consumers regarded the presence of two labels as contradictory. Barreiro-Hurle et al. (2010) found that consumers who trust existing labels are less likely to value additional labels.

It is therefore hypothesized that highly tempting products without any nutrition claim will evoke higher purchase intentions than highly tempting products with ENC´s or ENC´s and RNC´s in combination. Not only products which feature a single ENC, but also products which feature both, ENC and RNC, are expected to evoke lower purchase intentions, than products without any nutrition claim. According to the findings of Belei, Geyskens et al. (2012) and Wansink and Chandon (2006), for highly tempting products which only feature a single RNC, the opposite is expected to occur.

The question remains, if the hypothetical assumptions mentioned above are applicable for highly tempting products only or also for low tempting products.
Wansink, Van Ittersum and Painter (2004) found that health or diet labels exert a far greater influence on the taste perception of hedonic and less healthy foods than on healthier and utilitarian products. This can be explained by the perceived contrast of nutrition claims in relation to the healthiness of the carrier product. A nutrition claim may significantly increase

the perceived healthiness of an unhealthy hedonic product, whereas there will be a much smaller contrast between a utilitarian product and a utilitarian product with an added nutrition claim, because a utilitarian product is already perceived as healthy by itself (Mohr, 2012).

Hypothesis 3: For highly tempting products, the purchase intention for products with no nutrition claim will be higher than the purchase intention for products with a ENC (a), also the purchase intention for products a RNC will be higher than "both", products with no nutrition claim (b) or products with ENC´s (c), whereas this effect disappears for low tempting products. The combination of both claims in a cupcake will not have a significantly different effect on purchase intention than a cupcake with a single ENC.
The significant differences in purchase intention that are expected for cupcakes with an ENC compared to other nutrition-claim conditions of the cupcake, will also be expected for cupcakes with a ENC&RNC (d).

# 2 Method

In this section, the experimental setup, the pretest, the experimental procedure and all relevant variables will be described.

For the experiment, a 2 (highly tempting/low tempting food product) x 4 (ENC/RNC/both ENC and RNC in one claim/no claim) between-subjects design was used, in order to examine the interaction of different nutrition claims with product-photos of varying temptation strength.

Over the course of the experiment, every participant was presented with two photos of snack-products of varying temptation strength and healthiness which were a cupcake and a muesli-bar. The sequence of the photos was randomized within participants in a counterbalanced way. The product photos either featured ENC, a RNC, both ENC and RNC together or no claim, depending on the condition. The claims appeared as a descriptive text under the product-photos. In each of the four claim condition, both products always featured the same specific nutrition claim.

*Figure 1:* Stimulus Material: Muesli-bar (left) and cupcake (right).

## 2.1 Demographics

The total number of participants was 378 of which 178 (47,1%) were male and 200 (52,9%) were female. The mean age of all participants was 27,66, (SD = 10.74) with a range from 15 to 69 years. There were 193 (51.1%) participants with the age between 16-24 years , 97 (25.7%) participants between 25-29 years , 31 (8.2%) between 30-39 years and 55 (14.6%) participants with an age of 40 years and above. Considering the participants nationality, 189 (50.0 %) participants were Dutch, 173 (45.8 %) were German and 16 (4.2%) had another nationality. The general distribution for the level of education was as follows: 52 (13.8%) High School degree or an equivalent, 43 (11.4%) Vocational/technical school 167, Bachelor

(44.2%), Master 83(22%), Doctoral 8 (2.1%), other 25 (6.6%). Educational levels were made comparable across The Netherlands, Germany and English speaking countries, for example a vocational/technical school had another name in Dutch than in the German language, but measured the same educational level.

## 2.2 Procedure

Participants were acquired via social-media networks (Facebook, Xing), mailinglists or via flyers handed out at the campus of the University of Twente with a link on it. When respondents opened the link, they were referred to the online-questionnaire and randomly assigned to one of the experimental conditions.
Participants were told that they would help a student with his master thesis and have the chance to win one of 10 Media Markt gift cards with a value of 15€ each.
After stating their native language, participants were able to choose between the options Dutch, German and other (English). Depending on their choice, they were referred to a questionnaire in the corresponding language. All non-native Dutch or German participants were assigned to the English version.
The questionnaire content was translated from an original English version into Dutch and German versions. Translations were accomplished by two persons who independently translated the questionnaire. Whenever the translations of the two translators were not identical, a third independent person was asked to decide upon the proper wording.

According to the research ethics as advised by the University of Twente, participants were informed that all information is treated anonymously and that they were participating in the experiment on a voluntary basis and were allowed to end the experiment at any time if they wanted.

## 2.3 Design of independent variables experiment

The way, the independent variables were implemented in the experimental design will be described here.

### *2.3.1 Manipulation of highly and low tempting product-photos*

Participants were first shown either the muesli-bar or the cupcake photo in a counterbalanced order. They were asked to look at the product-photo carefully for 20-30 seconds and then to go ahead and answer questions considering their opinion about the product. Subsequently, participants repeated this procedure for the second product-photo.

### *2.3.2 Manipulation of nutrition claims*

The nutrition claim manipulations were implemented by adding a short description text under every product picture. Depending on the condition, participants were presented with either a: 1.) ENC, 2.) RNC, 3.) both ENC and RNC, or 4.) No claim.
The text under each photo was kept short in order not to prime other concepts.
In the ENC condition, the product photos contained the claim, “this product contains antioxidants.” In the RNC condition, the claim “this product is a low fat product” was used. In the condition in which both claims were present, the claim stated "this product features extra antioxidants and is a low fat product". The space under the photo in the no claim condition was left blank.

The choice of the claims is based on the pretest results of the experiment of Belei, Geyskens et al. (2012), who found that low fat claims were well suited for hedonic health claims, whereas antioxidants were well suited for functional health claims. Functional and hedonic claims can be compared to ENC´s and RNC´s, as described earlier in the theory chapter. Based on a pretest for a “functional health claim” (ENC), Belei, Geyskens et al. (2012) “selected antioxidants as a representative of functional attributes because the claim is increasingly prominent on various food packages and is known for its clear functional […] benefits on health.” (p.902). Therefore, antioxidants were used as ENC in the experiment. Belei, Geyskens et al. (2012) selected a “low fat” claim after pretesting various other claims, as it also represents a well suited health attribute, which represents the opposite of an additive like antioxidants, as an ingredient is subtracted from a food product here (fat) rather than increased.

### *2.3.3 Manipulation of the second product photo*

Subsequently, the second product photo was shown to the participants. The second photo was either a cupcake or a muesli-bar, depending on the first product which participants saw, as the sequence was randomized in a counterbalanced manner. The second product photo featured the same nutrition claim as the first product photo (ENC, RNC, ENC & RNC, no claim) which participants saw. Participants were advised to look at the photo carefully for 20-30 seconds and rate it on the same scales as the first photo.

The questions related to each product, that the participants were exposed to, are summed up in 2.5.

## 2.4 Manipulation check

### *2.4.1 Pretest for temptation strength of product photos*

In order to rate the temptation strength of the potential stimulus products in advance, 15 participants were asked in a pretest to carefully look at a photo of a food product for 20-30 seconds and then to go ahead and answer questions considering their opinion about the product. Subsequently, they saw a second photo of a food product and were asked to state their opinion about it.

For the weak tempting stimulus product, a photo of a muesli-bar which contained bits of chocolate was chosen. Krutulyte et al. (2011) examined the carrier-ingredient-fit of food of products and functional additives and identified muesli-bars as a product, where functional additives are generally well accepted by consumers. The carrier-ingredient fit describes the degree of acceptance of different functional additives in combination with the original carrier product, which in turn influences the total attractiveness of a functional food (Siegrist, Stampfli, & Kastenholz, 2008). Furthermore, a muesli-bar is considered to be a delicious snack product, which is also regarded as being healthier than other snacks such as chocolate bars (Dewitte, Bruyneel, & Geyskens, 2009; Wansink & Chandon, 2006). Due to their average amount of calories, however, muesli-bars cannot be considered as healthy as fruits or vegetables (Jack, O'Neill, Piacentini, & Schröder, 1997). Muesli-bars are situated between tasty, but unhealthy snacks and a healthy snack option and are therefore well suited as stimuli material, as ENCs or RNCs may increase or decrease their perceived temptation strength. Considering the choice of a picture for a weak tempting product, it was also important that the product would not be rated on the lower end of the attractiveness scale, as a moderate level of

attractiveness is important for the product to still be perceived as tempting (Kroese, Evers, & De Ridder, 2011) and therefore be comparable to the highly tempting product.

For the second highly tempting product photo a chocolate cupcake was chosen in order to represent a delicious but also unhealthy alternative to the muesli-bar, which is similar in size. The fact that the cupcake contained chocolate made it comparable to the muesli-bar, which also contained bits of chocolate. Chocolate is well known to be perceived as an essential part of delicious snacks. In the studies of Kroese et al. (2011), Hassan, Shiu and Michaelidou (2010) and Shiv and Fedorikhin (1999), chocolate cakes were chosen to represent highly tempting snack products, which are comparable in taste but not in size to the muesli-bar, which supports a chocolate cupcake as an appropriate choice.
The cupcake and the muesli-bar photo satisfy the three desirable conditions of Barreiro-Hurle et al. (2010) for testing claim manipulations that (i) consumers are familiar with the products, (ii) the products are at least occasionally consumed and (iii) they are non-luxury products and affordable for most consumers.

Both food products were stock photos, which were displayed without packaging, without visibility of a brand, in front of a white background and photographed from the same angle and distance, in order to avoid anything that distracts from the product itself. Hereby, the products were made comparable and respondents would not be misled by packaging design aspects like brand equity for example.
The products were presented in a counterbalanced order to the participants. One half of the participants saw the cupcake first, followed by the muesli-bar later, while the other half of participants was presented to the reversed order.
The pretest showed that the temptation strength of the cupcake ($M = 5.4$, $SD = .76$) was rated higher than the temptation strength of the muesli-bar ($M = 3.83$, $SD = 1.57$) by the 15 respondents, as intended.

### *2.4.2 Pretest measures*

In order to rate the physical attractiveness of the product photos in the pretest, a 7-point Likert Scale ranging from 1 (not tempting at all) to 7 (very tempting) was applied, similar to the scale applied in the experiment of Kroese et al. (2011), where respondents were confronted with different pictures of chocolate cakes, accompanied by this scale, in order to assess their temptation strength.

The expected taste perception was measured with an altered version of a scale used by Liem, Toraman and Zandstra (2012). The original scale measures the desire to taste a fictional can of soup. In this experiment, the scale was altered in order to enquire the expected taste of the products the participants would see. Respondents were therefore asked "How tasty do you think is this product?" on a 7-point Likert scale, ranging from 1 (not tasty at all) to 7 (very tasty).
In order to measure the temptation strength of the product-photos, the values of the physical attractiveness scale and the expected taste scale were combined into a single variable, as temptation strength consists of both variables (Kroese et al., 2011).
A reliability analysis for the combined measures of the perceived attractiveness and expected tastiness was executed, in order to determine the validity of the total temptation strength construct for both variables. High internal consistency for the total purchase intention scale (Cronbach's $\alpha = .75$) was achieved.
The levels of temptation strength of the cupcake and the muesli-bar are mentioned at the end of chapter 2.4.1.

Besides the necessity of different levels of temptation strength, another requirement was that the products had to be considered as partially unhealthy (muesli-bar) to very unhealthy (cupcake), as only products which were considered as delicious and unhealthy at the same time can be considered to be actual temptations (Kroese et al., 2012).
The perceived healthiness of the product photos was measured by a 7-point Likert scale, ranging from 1 (very unhealthy) to 7 (very healthy). The scale was also applied by Kroese et al. (2012), Van den Anker (2011) and in similar fashion in the experiment of Weijzen, De Graaf and Dijksterhuis (2007).
To fulfill the criteria of moderately and highly tempting products, the muesli-bar had to be ranked as a moderately unhealthy snack product, as it should not be perceived as unhealthy and as delicious as a cupcake. The cupcake as extremely tempting food product had to be ranked as highly tempting and unhealthy.
Pretest results revealed that this was indeed the case. The product-photos were rated as very unhealthy for the cupcake ($M=1.93$, $SD = .59$) and neither unhealthy or healthy ($M= 3.53$, $SD = 1.30$) for the muesli-bar. In conclusion, the pretest indicated that cupcakes and mueslibars were perceived as significantly different with respect to temptation strength and perceived

healthiness. Therefore, the assumption that they differ in their level of temptation strength was confirmed.

## 2.5 Measures: Design of dependent and control variables of main experiment

This section describes the choice and the setup of the dependent and control variables of the main experiment, in which the pretested photos were included.

After the participants had carefully examined the pictures of the first product photo with or without the attached claim(s) (depending on the claim condition) in the actual experiment, they rated the photo on the dimensions described in 2.5.1 - 2.5.4. After the rating of the first photo, participants were again exposed to the second product photo, which had to be rated in the same way as the first product photo.

### *2.5.1 Control variable: perceived healthiness of the product*

To examine the different effects of the nutrition claims, it was examined how the perceived healthiness of the product was affected by these manipulations. The perceived healthiness of the product photos was measured by a 7-point Likert scale, ranging from 1 (very unhealthy) to 7 (very healthy), which was also applied in the experiments of Kroese et al. (2012), Van den Anker (2011 and in similar fashion in the experiment of Weijzen et al. (2007). Participants were asked how healthy they perceived the products to be.

### *2.5.2 Control variable: perceived quality*

Participants were asked how they perceive the quality of the products. A 7-point Likert scale ranging from 1 (very low) to 7 (very high) was created to investigate perceived quality.

### *2.5.3 Control variable: individual importance of a weight watching goal*

A 7-point Likert scale measured the importance of a weight watching goal as a background variable, similar to the experiment of Martina (2011). Respondents were asked to answer the question “Are you concerned with watching your weight on a scale?”, where answers could be given from 1 (not at all) to 7 (very much).

### *2.5.4 Dependent variable: purchase intentions*

In order to measure how strongly participants desired to purchase the products presented in

the experiment, purchase intentions were measured by using two Likert scales, similar to the procedure of Meyers-Levy and Maheswaran (2004). Ranging from 1 (not at all) to 7 (very much), respondents were asked to state their intentions of buying the product now and in the future. The combined average value of the two scores represented the total purchase intentions. By applying the Juster scale (Juster, 1966), which asked participants about their purchase intention at the present moment in time (now), and by adding a second seven-point Likert scale, which measured purchase intention for the same product in the future, Meyers-Levy and Maheswaran (2004) measured purchase intention in an elaborate way.

A reliability analysis for the combined measures of the variables purchase intention1 (would like to buy product now) and purchase intention2 (would like to buy product in the future) was executed, in order to determine the validity of the total purchase intention construct for both variables. High internal consistency for the total purchase intention scale (Cronbach's $\alpha$ = .85) was achieved.

### *2.5.5. End of Procedure*

At the end of the questionnaire, respondents were debriefed and thanked for their participation. They were invited to leave their e-mail address to participate in a lottery for Media Markt gift cards.

*Table 1: Conceptual outline of experiment summarized.*

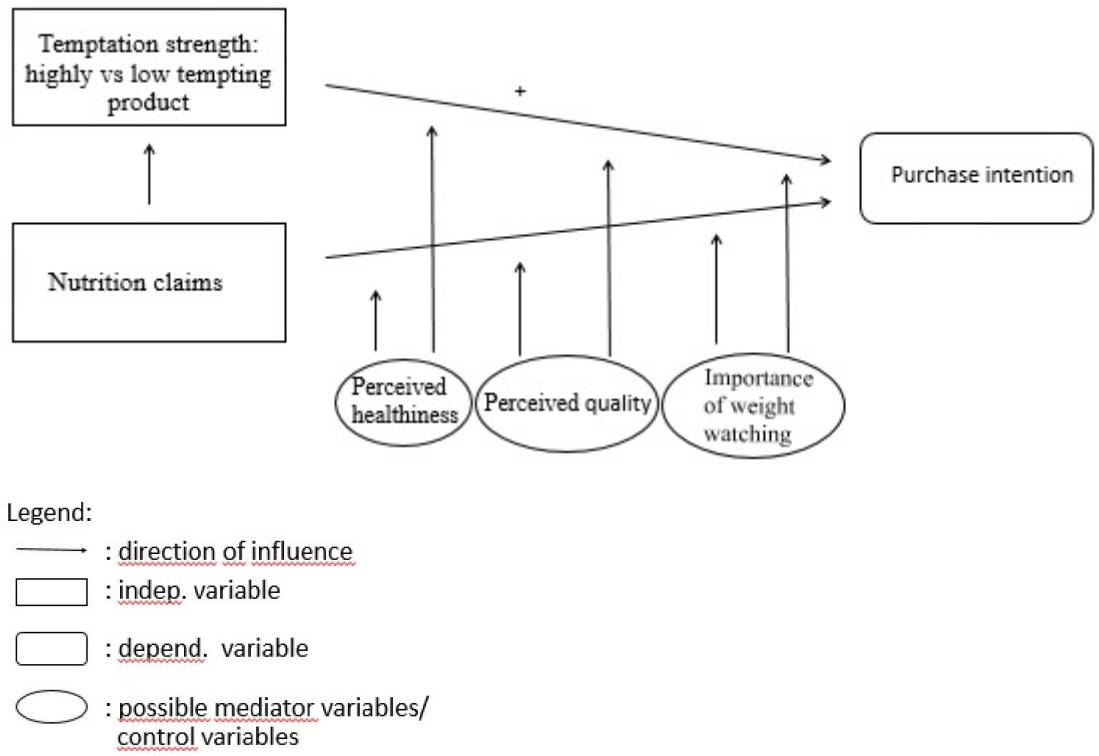
| | |
|---|---|
| Experimental conditions: | 1. ENC, 2.RNC, 3. ENC & RNC, 4. No claim |
| Independent variables: | Every participant exposed to: photo of cupcake and muesli-bar in randomized order. Each product featured either a ENC, a RNC, both a ENC and a RNC, or No Claim, as text under a product photo: both product photos contained the same nutrition claim |
| Control variables: | Perceived quality, perceived healthiness, importance of weight watching goal |
| Dependent variable: | Purchase-intention |

*Note: Physical attractiveness and expected taste were combined into the variable temptation strength; ENC = enhanced nutrition claim (extra antioxidants); RNC = reduced nutrition claim (low fat)*

Additionally, a conceptual model will be presented.

Figure 2 shows a conceptual model of the relationships between the variables of the experiment, as assumed in this report. Note, that direction of variable influence (+/-) is not reported for every variable relationship. For example, the influence of nutrition claims on purchase intention depends on the specific nutrition claim (ENC or RNC or ENC&RNC), rather than on the general variable nutrition claims. Further, for example for the control variable perceived healthiness, the assumed causal direction of influence on the relationships between temptation strength -> purchase intention and nutrition claim -> purchase intention is not generalized. It depends on individual motivations of the consumer. For example, as it may increase purchase intentions for individuals who prefer health aspects of a food (+), it may decrease purchase intentions for individuals who value taste aspects of a food the most (-).

*Figure 2*: Conceptual Model (expected variable relationships)



# 3 Results

## 3.1 General

Demographic characteristics as gender of participants, education level e.g. per condition, shown in table 2, were in general similarly distributed across all conditions of the experiment. Partially unbalanced distributions are reviewed and discussed in chapter 4.2.
Percentages in table 2 refer to the total amount of every sub-condition.

*Table 2:* Demographics per Claim Condition for highly and low tempting Products

| **Cupcake&muesli-bar**: | ENC | RNC | ENC & RNC | No claim |
|---|---|---|---|---|
| N | 94 | 92 | 89 | 103 |
| Gender | | | | |
| Male | 52 (55,31%) | 41 (44,56%) | 39 (43,82%) | 46 (44,66%) |
| Female | 42 (44,68%) | 51 (55,43%) | 50 (56,18%) | 57 (55,34%) |
| Age | | | | |
| 16-24 | 48 (51,1%) | 49 (53,3%) | 40 (44,9%) | 56 (55,4%) |
| 25-29 | 30 (31,9%) | 22 (23,9%) | 26 (29,2%) | 19 (18,8%) |
| 30-39 | 7 (7,4%) | 8 (8,7%) | 10 (11,2%) | 6 (5,9%) |
| 40-69 | 9 (9,6%) | 13 (14,1%) | 13 (14,6%) | 20 (19,8%) |
| M | 26,67 | 27,79 | 28,16 | 28,02 |
| SD | 8,18 | 10,92 | 10,17 | 12,97 |
| Nationality | | | | |
| Dutch | 54 (57,4%) | 53 (57,6%) | 31 (34,8%) | 51 (49,5%) |
| German | 39 (41,5%) | 37 (40,2%) | 52 (58,4%) | 45 (43,7%) |
| Other | 1 (1,1%) | 2 (2,2%) | 6 (6,7%) | 7 (6,8%) |
| Education | | | | |
| High school | 7 (7,4%) | 15 (16,3%) | 11 (12,4%) | 19 (18,4%) |
| Technical school | 8 (8,5%) | 10 (10,9%) | 7 (7,9%) | 18 (35,9%) |
| Bachelor | 37 (39,4%) | 47 (51,1%) | 35 (39,3%) | 48 (82,5%) |
| Master | 30 (31,9%) | 17 (18,5%) | 23 (25,8%) | 13 (12,6%) |
| Doctoral | 7 (7,4%) | 0 (0%) | 1 (1,1%) | 0 (0%) |
| Other | 5 (5,3%) | 3 (3,3%) | 12 (13,5%) | 5 (4,9%) |

*Note: demographic data per condition applies for both cupcake & muesli-bar (due to within participants manipulation: participants of each claim condition saw both, cupcake and muesli-bar with the same condition-specific claim)*

## 3.2 Hypothesis 1 results

The first hypothesis stated the following:

Hypothesis 1: For highly tempting products, purchase intentions will be significantly higher than purchase intentions for low tempting products.

To test the hypothesis and in order to fulfill the necessary criteria for the assumptions of this thesis an independent samples t-test was executed.

The analysis revealed that there were indeed significant differences between the cupcake (M = 7,12 , SD = 3.31) and the muesli-bar (M = 5.44 , SD = 3.04) $t(754) = 2.95$, p = .02, two-tailed. Therefore, the necessary basic condition of perceiving the two chosen product photos as different was satisfied.

Subsequently, independent samples t-tests were executed to test for significant difference in purchase intentions between cupcakes and muesli-bars which had the same claim condition. Results are reported in table 3. The results show that purchase intentions in the no claim condition are significantly different from each other for cupcake and muesli-bar.

*Table 3*

Differences of purchase intention per condition between highly and low tempting products

| | Cupcake | | Muesli-bar | | Difference | | |
|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | df | t | p |
| ENC | 5,34 | 2,91 | 4,94 | 2,95 | 186 | 0,64 | 0,52 |
| RNC | 6,38 | 3,24 | 5,83 | 3,26 | 182 | 1,24 | 0,21 |
| ENC & RNC | 5,81 | 3,21 | 5,19 | 2,86 | 176 | 1,03 | 0,30 |
| No claim | 7,09 | 3,55 | 5,75 | 3,04 | 204 | 2,84 | 0,01 |
| Total | 7,12 | 3,31 | 5,44 | 3,04 | 754 | 2,95 | 0,02 |

*Note: sig. difference is at a p<.05 level; RNC = reduced nutrition claim; ENC = enhanced nutrition claim purchase intention measured on 7 point Likert scale: 1 (very low) to 7 (very high)*

## 3.3 Hypothesis 2 results

The second hypothesis stated the following:

Hypothesis 2: For highly tempting products, purchase intention will be significantly higher for products with a RNC than for products with a ENC, whereas this effect will not be present for low tempting products.

To test the assumptions, a multivariate analysis of variance (MANOVA) was conducted to compare the effects of the independent variable, the four different claim conditions, on the dependent variable, the total purchase intention for cupcake and muesli-bar. Additionally, the MANOVA served the purpose of controlling for possible effects on the relationship between different nutrition claims and purchase intention caused by the additional control variables perceived healthiness, perceived quality and weight watching importance. Within the analysis, it was also checked for possible interaction effects of these variables.

As predicted, a significant difference was found for the effect of the different claims on purchase intentions for cupcake ($F_{(3, 367)} = 2.66$, $p = < .05$), after controlling for the effects of perceived quality, perceived healthiness and importance of weight watching goal.
While perceived healthiness and importance of a weight watching goal were not significantly related to purchase intention, the control variable perceived quality was significantly related to purchase intention ($F_{(1, 367)} = 62{,}47$, $p = 0.00$). The parameter estimates of the control variables showed that perceived quality had a positive impact on purchase intention (β= 1.15 , S.E.= .14).
Furthermore, there were no significant differences for the effect of the different claims on purchase intentions muesli-bar ($F_{(3, 366)} = 1{,}18$, $p = 0.315$), after controlling for the effects of perceived quality, perceived healthiness and importance of weight watching goal, as predicted. While perceived healthiness and importance of a weight watching goal were not significantly related to purchase intention, the control variable perceived quality was significantly related to purchase intention ($F_{(1, 366)} = 46{,}69$, $p = 0.00$). The parameter estimates showed that perceived quality had a positive impact on purchase intention (β = 1.04, S.E.= .15). Therefore, while the cupcake´s purchase intention was significantly influenced by both, different nutrition claims and the perceived quality of the product, the purchase intentions for the muesli-bar were only influenced by the perceived quality of the product.

Table 4: *Results of Post-Hoc Analysis of the Effects of Nutrition Claims on Purchase Intention*

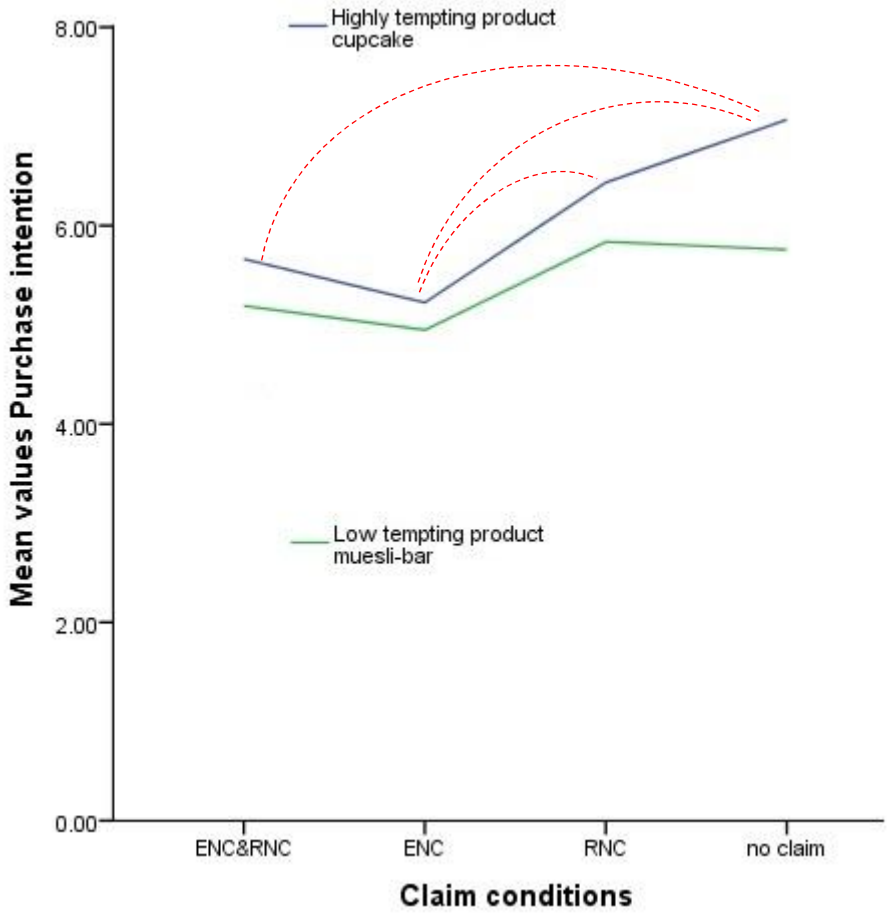
| | Condition | **Cupcake** | | | **Muesli-bar** | | |
|---|---|---|---|---|---|---|---|
| | | M | SE | Sig. | M | SE | Sig. |
| Marginal Means | (1) ENC & RNC | 5,81 | 0,32 | - | 5,21 | 0,27 | - |
| | (2) ENC | 5,34 | 0,29 | - | 5,08 | 0,26 | - |
| | (3) RNC | 6,38 | 0,30 | - | 5,88 | 0,27 | - |
| | (4) No Claim | 7,09 | 0,28 | - | 5,64 | 0,26 | - |
| Mean differences | (1) - (2) | 0,47 | 0,43 | 0,50 | 0,12 | 0,38 | 1,00 |
| | (1) - (3) | -0,57 | 0,44 | 0,50 | -0,67 | 0,38 | 0,49 |
| | (1) - (4) | -1,28* | 0,43 | 0,01 | -0,43 | 0,38 | 1,00 |
| | (2) - (3) | -1,04* | 0,42 | 0,04 | -0,80 | 0,38 | 0,29 |
| | (2) - (4) | -1,75** | 0,41 | 0,00 | -0,55 | 0,37 | 0,81 |
| | (3) - (4) | -0,73 | 0,41 | 0,26 | 0,24 | 0,37 | 1,00 |

*Note: Estimated marginal means (M and SE) reported, as it was controlled for mediating effects of covariates on purchase intention; *= sig. difference at a p<.05 level; **= sig. difference at a p<.01 level; significance test for cupcake one tailed and muesli-bar two-tailed. RNC = reduced nutrition claim; ENC = enhanced nutrition claim; purchase intention measured on 7 point Likert scale: 1 (very low) to 7 (very high)*

In order to be able to analyze post-hoc differences between all claim conditions per product category, the independent variable product type was split in SPSS for cupcake and muesli-bar. Hereby, it was possible to analyze differences between nutrition claims on the product level. Additional Post-hoc Bonferroni analysis (see table 4) revealed that the purchase intentions for cupcake in the condition where ENC´s and RNC´s were both present (M = 5,81 ; SE=0,32), were significantly lower ($p$ = .01) than in the condition where no nutrition claims were present (M = 7,09 ; SE = 0,28). In other words, this means that purchase intentions for the cupcake are lower when participants are confronted with both nutrition claims, than when they are confronted with no nutrition claim at all.

There was also a significant difference ($p$ = .00) between the condition where no nutrition-claims were present (M = 7,09; SE = 0,28) and the condition, where only ENC´s were present (M = 5,34; SE = 0,29),. There was no significant difference ($p$ = .52) between the no nutrition-claim condition (M = 7,09; SE = 0,28) and the RNC condition (M = 6,38; SE = 0,30). Furthermore, there was a significant difference ($p$ = .04) between the purchase intentions for cupcakes with RNC´s (M = 6,38; SE = 0,30) and the purchase intentions for cupcakes with ENC´s (M = 5,34; SE = 0,29). Therefore, hypothesis 2 is confirmed. See table 4 for all purchase intention values.

*Figure 3:* Purchase intention for highly and low tempting products per claim condition




*Legend:* = *significant difference between claim conditions*

*Note: significant differences exist between cupcake claim conditions (see table 4); no significant differences between muesli-bar claim conditions (see table 4); no significant differences between the same claim conditions of cupcake and muesli-bar when compared against each other except for no claim condition (see table 3)*

## 3.4 Hypothesis 3 results

The third hypothesis stated the following:

Hypothesis 3: For highly tempting products, the purchase intention for products with no nutrition claim will be higher than the purchase intention for products with a ENC (a), also the purchase intention for products a RNC will be higher than "both", products with no nutrition claim (b) or products with ENC´s (c), whereas this effect disappears for low tempting products. The combination of both claims in a cupcake will not have a significantly different effect on purchase intention than a cupcake with a single ENC. The significant differences in purchase intention that are expected for cupcakes with an ENC compared to other nutrition-claim condition, will also be expected for cupcakes with ENC&RNC (d).

To test the assumptions, the same MANOVA as for hypothesis 2 was executed with all claim conditions and the highly and low tempting products as independent variable and purchase intention for cupcake and for muesli-bar as dependent variable. Additionally, the MANOVA controlled for effects of the additional variables perceived healthiness, perceived quality and weight watching importance.

Due to several assumptions of hypothesis 3, which are summarized in one coherent hypothesis, those assumptions will be discussed here individually (a,b,c,d).

For the low tempting product (muesli-bar) there were no significant differences in purchase intention across the different claim conditions, as predicted ($F_{(3, 366)} = 1,18$, $p = 0.315$)

For the highly tempting product (cupcake) on the other hand, significant differences between the purchase intention across the different claim conditions were found ($F_{(3, 367)} = 2.66$, $p = < .05$).

As shown in in Table 4, purchase intentions for the cupcake were significantly higher in the no claim condition (M = 7,09; SE = 0,28) than in the ENC condition (M = 5,34; SE = 0,29) (a).

However, there was no significant difference between the RNC condition (M = 6,38; SE = 0,30) and the no claim condition (M = 7,09; SE = 0,28). This differs from the hypothetical assumption (b).

As hypothesized, there was a significant difference between the ENC condition (M = 5,34; SE = 0,29) and the RNC condition (M = 6,38; SE = 0,30) (c).

Also, purchase intention in the no claim condition for the cupcake (M = 7,09; SE = 0,28) was significantly higher than in the cupcake condition where both claims were present at the same time (M = 5,81 ; SE=0,32), as hypothesized (d).
Furthermore, purchase intentions for cupcakes with an RNC (M = 6,38; SE = 0,30) were not significantly higher than purchase intentions for cupcakes with ENC&RNC (M = 5,81 ; SE=0,32). This differs from what was hypothesized (d).
Summarizing, except for the part that there were no significant differences between the RNC condition and no claim condition of the cupcake (b) and no significant differences between cupcakes with an RNC and cupcakes with an ENC&RNC (d), all other remaining assumptions of hypothesis 3 can be confirmed. Therefore, hypothesis 3 can be partially accepted.

# 4 Discussion

In this section, the findings of this report are discussed. Existing limitations are addressed and recommendations for future research, marketing-practices and governmental health campaigns are provided.

## 4.1 Discussion of hypothesis 1 and 2

In order to systematically analyze the results of the experiment, they were compared with the hypotheses and the theoretical framework of this report.

Considering hypothesis 1, purchase intentions for the cupcake and for the muesli-bar were significantly different from each other, which confirmed the basic assumptions of this thesis, stating that highly tempting products would evoke higher purchase intentions than low tempting products. Results showed that respondents were more likely to buy the highly tempting cupcake than the lower tempting muesli-bar.

Considering hypothesis 2, hypothetical assumptions were confirmed, as for the highly tempting product, the purchase intentions for a product with a RNC were significantly higher than the purchase intentions for a product with ENC. Hereby, the findings of Belei, Geyskens et al. (2012) were confirmed and replicated.
A possible explanation for the increased purchase intention of low fat nutrition claims for cupcakes compared to cupcakes with antioxidants claims is that low fat claims accentuate the pleasure aspects of enjoying food (Wansink & Chandon, 2006) and direct attention to the hedonic qualities of the food (Belei, Geyskens et al. 2012) by signalizing people, that the product may be even more enjoyable, because it appears to be less harmful to a health goal.
A low fat claim activates a health goal to a much lower extent than claims featuring functional attributes (Belei, Geyskens et al. 2012), due to the effect of "primacy of affirmation (Jung-Grant et al., 2004), as explained earlier (see 1.1.3). Furthermore, antioxidants claims decrease purchase intentions for highly tempting products compared to a nutrition claim free version, as hypothesized, as they trigger high levels of health-goal accessibility, due to health-related associations with the word antioxidants (Belei, Geyskens et al., 2012).
The possibility of respondents´ being unfamiliar with the term antioxidants is discussed in 4.5.

It can be concluded that for highly tempting products, low fat claims are a suitable tool for the food industry to let highly tempting products appear healthier than a nutrition claim free version. Additionally, low fat claims evoke higher purchase intentions than antioxidants claims, even if both claims still evoke lower purchase intentions than a nutrition claim-free version of a highly tempting product. From the perspective of a governmental health campaign, low fat claims in highly tempting products can be described as a potential risk, as their levels of purchase intention, combined with the tendency of overeating (Wansink & Chandon, 2006) may negatively affect the health of the consumer. Also, the aspect that low fat products may still not be healthy products, as they still can contain a high amount of sugar for example, may get overlooked by the consumer.

A possible explanation for the non-existent difference in purchase intention of low tempting products between additional nutrition claims is that a muesli-bar is already perceived as a relatively healthy, utilitarian product, which is primarily consumed for reasons of health and less because of its taste (Wansink & Chandon, 2006; Mahanna, Moskowitz, & Lee, 2009). Consumers generally perceive the enrichment of non-healthy foods as more justified than enrichment of foods which are already recognized as being healthy (Bech-Larsen & Grunert, 2003). Considering this argument, it becomes clear that a muesli-bar's healthiness cannot be improved as much as nutrition claims do for highly tempting products. By examining the interaction of carrier product and health claims in functional foods, Williams, Ridges, Batterham, Ripper and Hung (2008) showed that the carrier product is a much more important predictor for purchase intention than the added claim, when people had the goal to eat healthy. Barreiro-Hurle et al. (2010) argue that if a claim provides information widely known by consumers, the impact of it becomes non-significant. As people are generally aware of the fact that muesli-bars have a low fat content (Mahanna et al. 2009), this is a plausible explanation for the non-significant effect of nutrition claims (e.g. low fat claims) on purchase intention for muesli-bars.

Furthermore, comparison of differences in purchase intention between highly and low tempting products with the same nutrition claim (e.g. cupcake with ENC vs muesli-bar with ENC; see Table 3) revealed that no significant differences exist between the ENC, the RNC and the ENC&RNC condition of cupcakes compared to muesli-bars, except for the no claim conditions. In the no claim condition, purchase intentions for the cupcake were significantly higher than for the muesli-bar. Previously, it could be demonstrated that nutrition claims

decrease purchase intentions of a cupcake, compared to a cupcake without a nutrition claim, while at the same time, nutrition claims did not alter purchase intentions for a muesli-bar, compared to a muesli-bar without a claim.

Direct comparison of highly and low tempting products with the same nutrition claim shows that nutrition claims decrease purchase intentions of highly tempting products in such a way, that they are drawn close to the level of purchase intentions of a muesli-bar, which features the same nutrition claim. This results in non-significantly different levels of purchase intention between them. There is only a significant difference in purchase intentions between a muesli-bar and a cupcake, when no nutrition claim is added.
In fact, while nutrition claims make a cupcake appear healthier, they also significantly reduce its purchase intentions in a way that a highly tempting product with a nutrition claim does not evoke significantly higher purchase intentions than a muesli-bar with the same nutrition claim. Implications of this finding and its effects on consumer preferences are discussed in 4.3.

Another finding worth mentioning is that the control variable perceived quality was significantly related to purchase intention. This demonstrates, that ultimately, the product quality is a significant predictor of purchase intention. Future research could consider this aspect, as for identical products with the same nutrition claims, additional factors like brand-equity. As brand equity is related to the quality perception of a product (Lassar, Mittal, Sharma, 1995), it could lead to different effects of the nutrition claim on purchase intention than a product without a brand attached to it.

## *4.2 Discussion of hypothesis 3*

Hypothesis 3 stated: For highly tempting products, the purchase intention for products with no nutrition claim will be higher than the purchase intention for products with a ENC (a), also the purchase intention for products a RNC will be higher than “both”, products with no nutrition claim (b) or products with ENC´s (c), whereas this effect disappears for low tempting products. The combination of both claims in a cupcake will not have a significantly different effect on purchase intention than a cupcake with a single ENC. The significant differences in purchase intention that are expected for cupcakes with an ENC compared to other nutrition-claim condition, will also be expected for cupcakes with ENC&RNC(d).

In hypothesis 3, the significant differences in purchase intention that were expected for cupcakes with an ENC compared to other nutrition-claim conditions with a cupcake, were also expected to be present for cupcakes with ENC&RNC. This means that besides for a cupcake with ENC, it was also expected that purchase intentions for cupcakes with ENC&RNC would be significantly lower in purchase intention than cupcakes with no nutrition claim. Both assumptions could be confirmed. This demonstrates that any nutrition claim added to a highly tempting product instantly decreases its purchase intentions, while this is not the case for low tempting products. When developing new food products and campaigns, this is an aspect to be reckoned with.
Moreover, it was also assumed that purchase intention for a cupcake with a RNC will be significantly higher than for a cupcake with ENC&RNC. This could not be confirmed. RNC claims for highly tempting products did not evoke purchase intentions which were as high as expected. Rather, purchase intentions for cupcakes with an RNC were low, as they were neither significantly different from cupcakes with an ENC&RNC, nor from cupcakes without a nutrition claim.

In this study, the combination of both nutrition claims in one product (ENC&RNC) may have triggered hedonic motivations to consume a snack (which are evoked by a low fat claim) as well as health related motivations (which are evoked by functional additives like extra antioxidants) at the same time.
Considering this aspect, Belei, Geyskens et al. (2012) mention that "promoting low-fat products explicitly as a healthful alternative might backfire for marketers because any health cue present in the environment introduces a conflict leading to decreased consumption amounts" (p.906), which explains that an antioxidants claim added to a low-fat claim, decreases the hedonic intention to consume a product, as it reminds people of their health goal. Whereas the low fat claim on its own may not remind people of their health goal, an additional extra antioxidants claim will. Therefore, both conflicting claims united in one product compensate each other and cause a level of purchase intention which is in between the level of purchase intention caused by each claim individually.

According to hypothesis 3, it was expected that highly tempting products with a RNC would evoke the highest purchase intentions ensued by highly tempting products with no nutrition claims. Results did not confirm this hypothesis, as there was no significant difference in purchase intention between a cupcake with an RNC and a cupcake with no nutrition claim.

It is therefore an unexpected finding that for the cupcake, the RNC condition was not significantly higher in purchase intention compared to the no claim condition.
This finding illustrates that a cupcake as a highly tempting product may not be an ideal carrier for nutrition claims, as a RNC does not evoke significantly higher purchase intentions than a cupcake with no nutrition claim. However, RNC claims did also not evoke significantly lower levels of purchase intention compared to a cupcake without a nutrition claim. All other nutrition claims (ENC and ENC&RNC) combined with a cupcake did evoke significantly lower levels of purchase intention than a cupcake without a nutrition claim.
Therefore, it can be concluded, that there is not an ideal, but a "good" carrier-ingredient fit between a cupcake and a low fat claim, as the low fat claim does neither increase nor decrease purchase intentions compared to a cupcake without a nutrition claim. On the other side, there is not a good carrier ingredient fit between a cupcake and a ENC claim or ENC&RNC, as these claims significantly reduce purchase intention.

Furthermore, purchase intentions for cupcakes which feature a nutrition claim are not significantly higher compared to a muesli-bar which features the same nutrition claim. This leads to the conclusion that a cupcake with an added nutrition claim is not a more attractive alternative for consumers compared to a muesli-bar with the same nutrition claim, as its level of purchase intention is not significantly higher than the purchase intention of a muesli-bar with the same nutrition claim. Even though a cupcake with a nutrition claim represents a compromise between taste and health related aspects, this compromise does not translate back into purchase intentions, as there are no significant differences between a cupcake with any nutrition claim (ENC or RNC or ENC&RNC) compared to a muesli-bar which features the same nutrition claim than the cupcake. To consider a cupcake with a nutrition claim as a compromise between health and taste aspects, one would have expected a level of purchase intention which is significantly higher than the purchase intention of a muesli-bar with the same nutrition claim, but yet lower than purchase intentions for a cupcake without a nutrition claim.

It has to be mentioned that possible effects of the ENC&RNC claim condition of the cupcake on purchase intentions could be partially attributed to the nationality distribution of Dutch and German participants in this condition. In comparison to the distribution of the other claim conditions, the distribution of nationality is different in the ENC&RNC condition, as a majority of participants was German present here (see table 2). All other claim conditions had

a Dutch majority. With respect to national differences, German participants could have reacted differently to products with a ENC&RNC claim here than Dutch participants.
This could be a possible explanation for the fact, that cupcakes with an RNC did not evoke significantly higher levels of purchase intention, as assumed in hypothesis 3. The aspect of national taste preferences could have affected the level of purchase intention, besides the effects which were found when the hypotheses were tested.

## 4.3 Individual taste preferences ultimately determine the choice

Considering the consumer target segment for healthy ingredients, which is looking for a combination of health and taste aspects in a product, preferences for a cupcake with a nutrition claim or a muesli-bar depend on the individual taste and health preference of the consumer. Consumers who have the main goal to buy tasty foods and to whom health aspects are of peripheral importance, may prefer a cupcake with a nutrition claim instead of a muesli-bar with the same nutrition claim, as it still represents a tastier alternative.
According to Krystallis and Chrysochou (2012) consumers who appreciate healthful indulgences value the enhanced healthy profile, but at the same time also have positive perceptions about the tastiness aspect of snacks. Results of this report show that there were no significant differences in purchase intention between a cupcake and a muesli-bar, when both featured the same nutrition claim. Nonetheless, as taste is a predominant aspect when it comes to food choice for functional products (Krutulyte et al., 2011; Verbeke, 2006), healthful indulgences might just be a slightly more attractive alternative for consumers, compared to other healthy but less tempting products, in real life purchase situations.

## 4.4 Purchase intention and hypothetical vs. actual choices

A possible explanation for the finding of this report that a RNC for a cupcake does not evoke higher purchase intentions than a cupcake without nutrition claims, as in the experiments of Belei, Geyskens et al. (2012) and Wansink and Chandon (2006), is the aspect of temptation actionability (Geyskens et al., 2008).
"Geyskens, DeWitte, Pandalaere and Warlop (2008) showed that prior exposure to so called actionable temptations (i.e., real candies allowing for actual consumption) prevented the activation of the hedonic eating goal [… ]whereas non-actionable temptations (i.e., pictures of candies) did not, presumably because self-regulation mechanisms were activated in the former

but not in the latter case." Kroese et al. 2012 (p. 32). Consequently, non-actionable temptations are perceived to be weaker temptations than actionable temptations (Kroese et al., 2011).

The fact that the present study used photos of food products (non-actionable temptations) instead of actionable temptations may have led to different levels of temptation strength, then when the same products had been actionable temptations. In the experiment of Kroese et al. (2011), counteractive control effects were only present for actionable temptations, but not for non-actionable temptations as these did not exceed the temptation strength threshold to cause self-regulatory behavior.

In the experiment of this report, the threat to a health goal may not have been as tangible here as it would have been with actionable temptations, due to the hypothetical nature of the experiment. For example, as weight watching is not as important in a hypothetical choice with actual consumption, any nutrition claim will make a non-actionable appear less attractive due to the unhealthy = tasty intuition (Raghunathan et al., 2006), not significantly increase the critical level for the product to be perceived as a threat to a health goal, and therefore, diminish reported purchase intentions.

## 4. 5 Limitations

Several limitations threaten the generalizability of this study.
First, in the nutrition claim-condition, where both claims were present ("this product features extra antioxidants and is a low fat product"), the claim could have been used in the opposite order too. In the experiment of this report, product photos were presented to participants in a counterbalanced way, but for nutrition claims in the ENC&RNC condition, the order of both claims was not counterbalanced. In the sentence under each product in the ENC&RNC condition, antioxidants were mentioned first and the low fat nutrition claim was mentioned second. In an opposite order, first the low fat claim and then the antioxidants claim would have been mentioned. By not having applied this second option, a primacy effect (Asch, 1946) of the term "extra antioxidants" may have occurred. A primacy effect is caused by first event in a series of events which creates the strongest impression, is better remembered and influences the observer the most. Through this, the second claim ("low fat") might have been overlooked and forgotten when participants were asked to evaluate the product, as the first claim "extra antioxidants" may have had a stronger impact.

Second, instead of showing food product photos, the experimental setup could have been adapted and real food products could have been used in the experiment. Hereby, more realistic answers in relation to purchase intentions or temptation strength could have been gathered. The aspect of temptation actionability (Geyskens et al. 2008) should be carefully considered in future research, as answers considering self-regulatory behavior may be more realistic, if participants are confronted with real choices, instead of hypothetical choices.

Third, visibility of the different nutrition claims might have been low. It is possible, that respondents did not carefully examine the pictures of the food products including their nutrition claims. It is possible, that the effects of the nutrition claims were attenuated and did not have the intended effect. In future studies, two control questions should be included in the questionnaire: 1. ”Did you see a nutrition claim?” and 2. “What was the nutrition claim?”.

Fourth, it was not examined if participants were familiar with the applied nutrition claims. Especially for the extra antioxidants claim, participants knowledge of the nature of antioxidants was not measured. Therefore, they may have been unfamiliar with the ingredient. Krutulyte et al. (2011) mention that familiarity of food ingredients or of the ingredient/carrier combination has been suggested to increase acceptance of functional foods. As the familiarity with the concept of antioxidants was not measured, unfamiliarity with the nutrition claim may have affected product evaluations.

Fifth, there were male and female respondents included in the experiment.
Other experiments only used female respondents, because they are much more sensible for the effects of foods. Results could have been more pinpointed if only female respondents had participated, but it would have been very difficult to realize. Although, by including males, a broader population sample could be analyzed.

## 4.6 Implications for future research

In future experiments, it will be interesting to consider the use of actual labels on a food package, instead of applying plain text under a product photo without packaging. In the present experiment, labels with a corporate design style, as well as branded packaging design, would have been deceiving components, which would have distracted from the actual experimental purpose. However, for future experiments, which could also include factors like

brand equity, labels and packaging design, the findings of this study could be used as a foundation for further experiments which include factors like packaging- and label design.

Furthermore, future experiments could consider repeating the setup of this experiment in a controlled laboratory setting, with actual food products (actionable temptations) instead of non-actionable temptations. It would be interesting to check for other significant differences between products and nutrition claim conditions than those which were found in the experiment of this report, by presenting participants with real food products.
Due to the large amount of participants needed, a web based questionnaire with non-actionable temptations was the most economical solution for this experiment.

In future experiments, it should be examined, whether positive attitudes towards foods with ENC´s and RNC´s actually reflected real consumer behavior.
Vermeir and Verbeke (2006) discovered a significant discrepancy between attitudes towards functional foods and actually buying them, called the attitude-behavioral intention gap. This gap is based on factors as perceived availability, attitude towards sustainability and peer pressure. The discrepancy would be especially interesting to examine for highly tempting foods with different nutrition claims.
In order to investigate differences between reported opinions and actual purchase behavior, real food products should be presented to the participants. Hereby, it is possible to validate high reported purchase intentions for functional food products by comparing them to actual food consumption.

## 4.7 Implications for marketing- and governmental health-campaigns

From a marketing point-of-view, a strategy to increase purchase intentions would be to sample food in the supermarket and other points of purchase, which is framed as healthy.
In the context of actionable food temptations (Geyskens et al., 2008), Finkelstein and Fishbach (2010) found that consumers who sampled foods that were framed as healthy later reported an increased feeling of hunger and an increased motive to consume tasty foods in order to fulfill their appetite. This was the case, because once their health goal was sufficiently met by consuming foods framed as healthy, consumers were craving to fulfill their hedonic hunger (Lowe & Butryn, 2007). Consumers who previously sampled a product framed as healthy should be presented with a healthful indulgence product by the salesperson

at the point of purchase afterwards. As snacks with healthy attributes are generally well accepted by consumers, if they sufficiently express their hedonic qualities (their taste attributes) while still possessing healthy attributes (Krystallis & Chrysochou, 2012), consumers will have a high willingness to purchase products which unite both attributes. Food samples framed as healthy could therefore be a method to push the sales of healthful indulgences.

Healthful indulgences can be used as a suitable marketing-tool to reach consumer segments who are craving for both, health- and taste-attributes, united in a single product. Therefore, marketing communication should put emphasis on both aspects in order to point out both beneficial aspects. Furthermore, while Belei, Geyskens et al (2012) mention that promoting low fat products as a healthy alternative maybe counterproductive as any health cue may remind consumers of their health goal, leading to reduced purchase intentions, it has to be pointed out that healthful indulgences target an audience who´s main intention is to purchase healthy foods. As those consumers generally restrain themselves from entirely unhealthy but tasty products but have difficulties to resist food temptations at the same time (Van Koningsbruggen et al., 2012), healthful indulgences represent an attractive compromise for them, as their consumption of potentially unhealthy foods can be excused by the aspect that the product is also beneficial for their health (Krystallis & Chrysochou, 2012).

From a governmental health campaign point of view, this study points out that nutrition claims have little effect for promoting the healthiness of low tempting, but healthy food products. It becomes obvious that nutrition claims can manipulate consumers into believing that tasty, unhealthy products are healthy. In order to counteract these threats to population healthiness, health campaigns could focus on the aspect of expressing that these are generally misconceptions and that a nutrition claim like a low fat claim or an antioxidants claim does not necessarily make a product healthy, as a product can still have a high degree of sugar, while carrying a low fat claim for example. Consumers should be made aware of the fact that they should judge a product more carefully based on its whole appearance and not only on a nutrition claim. On the other side, as nutrition claims had little effect for increasing the purchase intentions for healthy foods, health campaigns should focus more on the aspect of emphasizing hedonic dimensions of healthy foods and use claims like “fruit is fun”, as new consumer segments could be reached by emphasizing the hedonic dimension of healthy foods (Lowe & Butryn, 2007).

## References:


Ares, G., & Gambaro, A. (2007). Influence of gender, age and motives underlying foodchoice on perceived healthiness and willingness to try functional foods, *Appetite, 49*(1), 148–158.

Asch, S. E. (1946) Forming impressions of personality, *Journal of Abnormal and Social Psychology, 41*, 258-290.

Barreiro-Hurle, J., Gracia, A., & De-Magistris, T. (2010). The Effects of Multiple Health and Nutrition Labels on Consumer Food Choices. *Journal of Agricultural Economics, 61*(2), 426-443. doi: 10.1111/j.1477-9552.2010.00247.x

Bech-Larsen, T., & Grunert, K. G. (2003). The perceived healthfulness of functional foods. A conjoint study of Danish, Finnish and American consumers' perceptions of functional foods. *Appetite, 40*, 9–14.

Belei, N. (2012). The Best of Both Worlds? Studies on Healthy Indulgences and Their Effects on Food Intake Control. (*Doctoral dissertation*). Retrieved from Repository Radboud University Nijmegen. http://hdl.handle.net/2066/111871

Belei, N., Geyskens, K., Goukens, C., Ramanathan, S., & Lemmink, J. (2012). The Best of Both Worlds? Effects of Attribute-Induced Goal Conflict on Consumption of Healthful Indulgences. *Journal of Marketing Research, 49*(6), 900-909. doi: 10.1509/jmr.10.0155

Dean, M., Lampila, P., Shepherd, R., Arvola, A., Saba, A., Vassallo, M., Claupein, E., Winkelmann, M., & Lähteenmäki, L. (2012). Perceived relevance and foods with health-related claims. *Food Quality and Preference, 24*(1), 129-135. doi: http://dx.doi.org/10.1016/j.foodqual.2011.10.006

De Ridder, D., De Vet, E., Stok, M., Adriaanse, M., & De Wit, J. (2012). Obesity, overconsumption and self-regulation failure: the unsung role of eating appropriateness standards. *Health Psychology Review*, 1-20. doi: 10.1080/17437199.2012.706987

DeVellis, R. F. (2011). *Scale development: Theory and applications* (Vol. 26). Thousand Oaks, CA: Sage.

Dewitte, S., Bruyneel, S., & Geyskens, K. (2009). Self-Regulating Enhances Self-Regulation in Subsequent Consumer Decisions Involving Similar Response Conflicts. *Journal of Consumer Research, 36*(3), 394-405. doi: 10.1086/598615

Dhar, R., & Wertenbroch, K. (2000). Consumer choice between hedonic and utilitarian goods. *Journal of marketing research, 37* (1), 60-71.

European Commission. (2007). Regulation (EC) No 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods. Official Journal of the European Union, L 12/3–L 12/18.

Finkelstein, S. R., & Fishbach, A. (2010). When Healthy Food Makes You Hungry. *Journal of Consumer Research, 37*(3), 357-367. doi: 10.1086/652248

Fishbach, A., & Dhar, R. (2005). Goals as Excuses or Guides: The Liberating Effect of Perceived Goal Progress on Choice. *Journal of Consumer Research, 32*(3), 370-377. doi: 10.1086/497548

Fishbach, A., Friedman, R.S, Kruglanski, A.W. (2003). Leading Us Not Unto Temptation: Momentary Allurements Elicit Overriding Goal Activation. *Journal of Personality and Social Psychology, 84*, 296-309.

Geyskens, K., Dewitte, S., Pandelaere, M., & Warlop, L. (2006). When Temptation Hits You: The Influence of Weak versus Strong Food Temptations. *Advances in Consumer Research, 33*(1), 399-400.

Geyskens, K., Dewitte, S., Pandelaere, M., & Warlop, L. (2008). Tempt Me Just a Little Bit More: The Effect of Prior Food Temptation Actionability on Goal Activation and Consumption. *Journal of Consumer Research, 35*(4), 600-610.

Geyskens, K., Pandelaere, M., Dewitte, S., & Warlop, L. (2005). The backdoor to overconsumption : the effect of associating "light" food with health*, DTEW Research Report 0517,* K.U. Leuven, 1-21.

Gilbert, D. T., Lieberman, M. D., Morewedge, C. K., & Wilson, T. D. (2004). The Peculiar Longevity of Things Not So Bad. *Psychological Science, 15*(1), 14-19. doi: 10.1111/j.0963-7214.2004.01501003.x

Greener, J. Douglas, F., & Van Teijlingen, E. (2010). More of the same? Conflicting perspectives of obesity causation and intervention amongst overweight people, health professionals and policy makers. *Social Science & Medicine,70*(7), 1042-1049.

Hassan, L. M., Shiu, E. M. K., & Michaelidou, N. (2010). The Influence of Nutrition Information on Choice: The Roles of Temptation, Conflict and Self-Control. *Journal of Consumer Affairs, 44*(3), 499-515. doi: 10.1111/j.1745-6606.2010.01180.x

Jack, F. R., O'Neill, J., Piacentini, M. G., & Schröder, M. J. A. (1997). Perception of fruit as a snack: A comparison with manufactured snack foods. *Food Quality and Preference, 8*(3), 175-182. doi: http://dx.doi.org/10.1016/S0950-3293(96)00046-8

Jung-Grant, S., Malaviya, P., & Sternthal, B. (2004). The Influence of Negation on Product Evaluation. *Journal of Consumer Research, 31*(3),583-91.

Juster, F. T. (1966). Consumer Buying Intentions and Purchase Probability: An Experiment in Survey Design. *Journal of the American Statistical Association, 61*(315), 658-696.

Krieger, B., Cappuccio, R., Katz, R., & Moskowitz, H. (2003). Next Generation healthy Soup: An Exploration using Conjoint Analysis. *Journal of Sensory Studies, 18*(3), 249-268. doi: 10.1111/j.1745-459X.2003.tb00388.x

Kroese, F. M., Evers, C., & De Ridder, D. T. D. (2011). Tricky treats: Paradoxical effects of temptation strength on self-regulation processes. *European Journal of Social Psychology, 41*(3), 281-288. doi: 10.1002/ejsp.771

Kroese, F. M., Evers, C., & De Ridder, D. T. D. (2012). If it's good it must be bad. The effects of temptation strength on perceived healthiness and indulgence. *Appetite, 59*(2), 630. doi: http://dx.doi.org/10.1016/j.appet.2012.05.080

Krutulyte, R., Grunert, K. G., Scholderer, J., Lähteenmäki, L., Hagemann, K. S., Elgaard, P. Nielsen, B., & Graverholt, J. P. (2011). Perceived fit of different combinations of carriers and functional ingredients and its effect on purchase intention. *Food Quality and Preference, 22*(1), 11-16. doi: http://dx.doi.org/10.1016/j.foodqual.2010.06.001

Krystallis, A., & Chrysochou, P. (2012). Do Health Claims and Prior Awareness Influence Consumers' Preferences for Unhealthy Foods? The Case of Functional Children's Snacks. *Agribusiness, 28*(1), 86-102. doi: 10.1002/agr.20285

Lassar, W., Mittal,B., Sharma, A. (1995). Measuring customer-based brand equity. *Journal of Consumer Marketing, 12*(4),11 – 19.

Lalor, F., Kennedy, J., Flynn, M. A.T., & Wall, P. G. (2010). A study of nutrition and health claims – a snapshot of what's on the Irish market. *Public Health Nutrition, 13*(5), 704-711. doi:10.1017/S1368980009991613.

Liem, D. G., Miremadi, F., Zandstra, E. H., & Keast, R. S. (2012). Health labelling can influence taste perception and use of table salt for reduced-sodium products. *Public Health Nutrition, 15*(12), 2340-2347. doi: doi:10.1017/S136898001200064X

Liem, D. G., Toraman, A., N., & Zandstra, E. H. (2012). Effects of health labels on expected and actual taste perception of soup. *Food Quality and Preference, 25*(2), 192-197. doi: http://dx.doi.org/10.1016/j.foodqual.2012.02.015

Lowe, M. R., & Butryn, M. L. (2007). Hedonic hunger: A new dimension of appetite? *Physiology & Behavior, 91*(4), 432-439. doi: http://dx.doi.org/10.1016/j.physbeh.2007.04.006

Mahanna, K., Moskowitz, H. R., & Lee, S. Y. (2009). Assessing Consumer Expectations For Food Bars By Conjoint Analysis. *Journal of Sensory Studies, 24*(6), 851-870. doi: 10.1111/j.1745-459X.2009.00241.x

Martina, G. (2011). Het inschatten van verleidingen: het effect van verleidingssterkte op consumptiegedrag. Faculty of Social and Behavioral Theses, University of Utrecht. Master Thesis.

Meyers-Levy, J., & Maheswaran D. (2004). Exploring Message Framing Outcomes When Systematic, Heuristic, or Both Types of Processing Occur. *Journal of Consumer Psychology, 14*(1/2), 159-167.

Mohr, P (2012). Effects on consumer behaviour of fat-free nutrition content claims on high-sugar foods: Rapid evidence assessment. CSIRO, Australia.

Muraven, M., & Baumeister, R.F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological bulletin ,126*(2), 247-259.

O'Connor, E. L., & White, K. M. (2010). Willingness to trial functional foods and vitamin supplements: The role of attitudes, subjective norms, and dread of risks. *Food Quality and Preference, 21*(1), 75-81. doi: http://dx.doi.org/10.1016/j.foodqual.2009.08.004

Okada, E. M. (2005). Justifying the Hedonic and the Effects on Fun versus Practical Consumption, *Journal of Marketing Research, 42* (Feb.1), 43-53.

Papies, E. K., Stroebe, W., & Aarts, H. (2007). Pleasure in the mind: Restrained eating and spontaneous hedonic thoughts about food. *Journal of Experimental Social Psychology, 43*(5), 810–817.

Raghunathan, R., Walker Naylor, R., & Hoyer, W. D. (2006). The Unhealthy = Tasty Intuition and Its Effects on Taste Inferences, Enjoyment, and Choice of Food Products. *Journal of Marketing, 70*(4), 170-184.

Siegrist, M., Stampfli, N., & Kastenholz, H. (2008). Consumers' willingness to buy functional foods. The influence of carrier, benefit and trust. *Appetite, 51*(3), 526-529. doi: http://dx.doi.org/10.1016/j.appet.2008.04.003

Siró, I., Kápolna, E., Kápolna, B., & Lugasi, A.. (2008). Functional food. Product development, marketing and consumer acceptance—A review. *Appetite, 51*(3), 456-467. doi: http://dx.doi.org/10.1016/j.appet.2008.05.060

Trope, Y., & Fishbach, A. (2000). Counteractive self-control in overcoming temptation. *Journal of Personality and Social Psychology, 79*(4), 493-506. doi: 10.1037/0022-3514.79.4.493

Urala, N., Arvola, A., & Lähteenmäki, L. (2003). Strength of health-related claims and their perceived advantage. *International Journal of Food Science & Technology, 38*(7), 815-826. doi: 10.1046/j.1365-2621.2003.00737.x

Van Kleef, E., van Trijp, H. C. M., & Luning, P.. (2005). Functional foods: health claim-food product compatibility and the impact of health claim framing on consumer evaluation. *Appetite, 44*(3), 299-308. doi: http://dx.doi.org/10.1016/j.appet.2005.01.009

Van Koningsbruggen, G. M., Stroebe, W., & Aarts, H. (2012). The Rise and Fall of Self-Control: Temptation-Elicited Goal Activation and Effortful Goal-Directed Behavior. *Social Psychological and Personality Science*. doi: 10.1177/1948550612471061

Van Trijp, H. C. M., & Van der Lans, I. A. (2007). Consumer perceptions of nutrition and health claims. *Appetite, 48*, 305– 324.

Verbeke, W. (2006). Functional foods: Consumer willingness to compromise on taste for health? *Food Quality and Preference, 17*(1–2), 126-131. doi: http://dx.doi.org/10.1016/j.foodqual.2005.03.003

Verbeke, W. Scholderer, J, & Lahteenmaki, L. (2009). Consumer, appeal of nutrition and health claims in three existing product concepts, *Appetite, 52*(3), 684–692.

Vermeir, I., & Verbeke, W. (2006). Sustainable Food Consumption: Exploring the Consumer "Attitude – Behavioral Intention" Gap. *Journal of Agricultural and Environmental Ethics, 19*(2), 169-194. doi: 10.1007/s10806-005-5485-3

Wansink, B., & Chandon, P.. (2006). Can "Low-Fat" Nutrition Labels Lead to Obesity? *Journal of Marketing Research, 43*(4), 605-617.

Wansink, B., van Ittersum, K., & Painter, J. E. (2004). How Diet and Health Labels Influence Taste and Satiation. *Journal of Food Science, 69*(9), 340-S346. doi: 10.1111/j.1365-2621.2004.tb09946.x

Weijzen, P. L. G., de Graaf, C., & Dijksterhuis, G. B. (2009). Predictors of the consistency between healthy snack choice intentions and actual behaviour. *Food Quality and Preference, 20*(2), 110-119. doi: http://dx.doi.org/10.1016/j.foodqual.2007.05.007

Williams, P., Ridges, L., Batterham, M., Ripper, B., & Hung, M. C. (2008). Australian consumer attitudes to health claim – food product compatibility for functional foods. *Food Policy, 33*(6), 640-643. doi: http://dx.doi.org/10.1016/j.foodpol.2008.06.001

# Appendix:

## Example of a questionnaire
## (English version, cupcake first, muesli-bar second, ENC claim condition)

Thank you for your participation in this experiment. The study will only take about 5 minutes of your time. First, there will be some demographic questions, followed by a few questions about 2 food products photos. Please follow the instructions carefully. Please fill in every page completely. Don't go back after you completed a page. All information will be anonymized and treated confidentially. Besides that, you have the chance to win one of 10 Media Markt gift cards (value 15€ per gift card).

What is your gender:
man

☐

woman

☐

How old are you:

☐

What is your nationality:

☐

What is the highest level of education you have participated? If currently enrolled, mark your current educational level.

O High school or equivalent

O Vocational/technical school (2 year)

O Bachelor

O Master (Diploma)

O Doctorate degree

O Other: _____

Now you see a food product. Please look at the product carefully for 20 to 30 seconds and try to remember all its characteristics. Then proceed with the questionnaire. You will be asked questions concerning the product and its characteristics.

**This product contains extra antioxidants.**

| | **question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|---|---|---|---|
| 2 | How attractive is this product to you? 1 (not attractive at all) to 7 (very attractive). | | | | | | | |

| | **question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|---|---|---|---|
| 3 | How tasty do you think is the product? 1 (not tasty at all) to 7 (very tasty) | | | | | | | |

| | **question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|---|---|---|---|
| 4 | How healthy do you perceive the product to be? 1 (very unhealthy) to 7 (very healthy) | | | | | | | |

| | **question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|---|---|---|---|
| 5 | How do you perceive the quality of the product? 1 (very low) to 7 (very high) | | | | | | | |

| | What are your purchase intentions for this product? | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 6 | I would like to buy the product now: 1 (not at all) to 7 (very much) | | | | | | | |
| 7 | I would consider buying the product in the future: 1 (not at all) to 7 (very much) | | | | | | | |

Now you see another food product. Please look at the product carefully for 20 to 30 seconds and try to remember all its characteristics. Then proceed with the questionnaire. You will be asked questions concerning the product and its characteristics.

**This product contains extra antioxidants.**

| | **question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|---|---|---|---|
| 8 | How attractive is this product to you? 1 (not attractive at all) to 7 (very attractive). | | | | | | | |

| | **question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|---|---|---|---|
| 9 | How tasty do you think is the product? 1 (not tasty at all) to 7 (very tasty) | | | | | | | |

| | question | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 10 | How healthy do you perceive the product to be? 1 (very unhealthy) to 7 (very healthy) | | | | | | | |

| | question | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 11 | How do you perceive the quality of the product? 1 (very low) to 7 (very high) | | | | | | | |

| | What are your purchase intentions for this product? | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 12 | I would like to buy the product now: 1 (not at all) to 7 (very much) | | | | | | | |
| 13 | I would consider buying the product in the future: 1 (not at all) to 7 (very much) | | | | | | | |

| | question | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 15 | A question concerning your food consumption: Watching my weight is important to me: 1 (not at all) to 7 (very much) | | | | | | | |

This is the end of the study. If you would like to have a chance to win one of the Media Markt gift card´s, please fill in your e-mail adress.

| |
|---|
| |

Thank you for your participation! If you have any questions or comments considering the experiment, you can contact the experimenter via e-mail: j.e.remberg@student.utwente.nl

**Data of control variables: Perceived Quality**

The mean values of the control variable perceived quality, as a covariate which also significantly affected purchase intention, are described here.

Perceived Quality: Cupcake

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| antiox & low fat | 89 | 3.6292 | 1.49531 | .15850 | 3.3142 | 3.9442 |
| only antiox | 94 | 3.5957 | 1.29780 | .13386 | 3.3299 | 3.8616 |
| only low fat | 92 | 3.7174 | 1.44744 | .15091 | 3.4176 | 4.0171 |
| no claim | 103 | 3.7087 | 1.22579 | .12078 | 3.4692 | 3.9483 |
| Total | 378 | 3.6640 | 1.36101 | .07000 | 3.5264 | 3.8017 |

Furthermore, there were no significant differences between the quality scores of the claim conditions of the cupcake (according to post-hoc analysis: Bonferroni).

Perceived Quality: muesli-bar

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| antiox & low fat | 89 | 3.8652 | 1.44750 | .15343 | 3.5602 | 4.1701 |
| only antiox | 94 | 3.7660 | 1.25660 | .12961 | 3.5086 | 4.0233 |
| only low fat | 92 | 3.8478 | 1.45960 | .15217 | 3.5456 | 4.1501 |
| no claim | 102 | 4.0686 | 1.38778 | .13741 | 3.7960 | 4.3412 |
| Total | 377 | 3.8912 | 1.38815 | .07149 | 3.7507 | 4.0318 |

Furthermore, there were no significant differences between the quality scores of the claim conditions of the muesli-bar (according to post-hoc analysis: Bonferroni).

**Data of control variables: Perceived healthiness**

For the perceived healthiness of a cupcake, there were significant differences between the different claim conditions.

Healthiness cupcake

| | | | | | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | N | Mean | Std. Deviation | Std. Error | Lower Bound | Upper Bound |
| antiox & low fat | 89 | 2.5169 | 1.37438 | .14568 | 2.2273 | 2.8064 |
| only antiox | 94 | 1.9149 | 1.09407 | .11284 | 1.6908 | 2.1390 |
| only low fat | 92 | 1.9891 | 1.12411 | .11720 | 1.7563 | 2.2219 |
| no claim | 103 | 1.9223 | 1.09982 | .10837 | 1.7074 | 2.1373 |
| Total | 378 | 2.0767 | 1.19545 | .06149 | 1.9558 | 2.1976 |

Post-hoc differences Perceived healthiness cupcake

| claims | claims | Mean Difference | Std. Error | Sig. |
|---|---|---|---|---|
| antiox & low fat | only antiox | .60196* | .17371 | .004 |
| | only low fat | .52772* | .17462 | .016 |
| | no claim | .59452* | .16998 | .003 |
| only antiox | antiox & low fat | -.60196* | .17371 | .004 |
| | only low fat | -.07424 | .17225 | 1.000 |
| | no claim | -.00744 | .16753 | 1.000 |
| only low fat | antiox & low fat | -.52772* | .17462 | .016 |
| | only antiox | .07424 | .17225 | 1.000 |
| | no claim | .06680 | .16848 | 1.000 |
| no claim | antiox & low fat | -.59452* | .16998 | .003 |
| | only antiox | .00744 | .16753 | 1.000 |
| | only low fat | -.06680 | .16848 | 1.000 |

For the perceived healthiness of a muesli-bar, there were no significant differences between the different claim conditions.

Perceived Healthiness muesli bar

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| antiox & low fat | 89 | 3.7191 | 1.55935 | .16529 | 3.3906 | 4.0476 |
| only antiox | 94 | 3.6064 | 1.44593 | .14914 | 3.3102 | 3.9025 |
| only low fat | 92 | 3.5761 | 1.56355 | .16301 | 3.2523 | 3.8999 |
| no claim | 103 | 3.5728 | 1.61246 | .15888 | 3.2577 | 3.8880 |
| Total | 378 | 3.6164 | 1.54283 | .07935 | 3.4604 | 3.7724 |

Post hoc test Perceived Healthiness muesli-bar

| claims | claims | Mean Difference | Std. Error | Sig. |
|---|---|---|---|---|
| antiox & low fat | only antiox | .11272 | .22893 | 1.000 |
| | only low fat | .14301 | .23014 | 1.000 |
| | no claim | .14629 | .22401 | 1.000 |
| only antiox | antiox & low fat | -.11272 | .22893 | 1.000 |
| | only low fat | .03030 | .22701 | 1.000 |
| | no claim | .03357 | .22080 | 1.000 |
| only low fat | antiox & low fat | -.14301 | .23014 | 1.000 |
| | only antiox | -.03030 | .22701 | 1.000 |
| | no claim | .00327 | .22205 | 1.000 |
| no claim | antiox & low fat | -.14629 | .22401 | 1.000 |
| | only antiox | -.03357 | .22080 | 1.000 |
| | only low fat | -.00327 | .22205 | 1.000 |

**Data of control variables: Importance of weight watching:**
For the importance of weight watching, there were no significant differences between the participants in the cupcake condition

Weightwatching-importance cupcake

| | | | | | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | N | Mean | Std. Deviation | Std. Error | Lower Bound | Upper Bound |
| antiox & low fat | 89 | 4.36 | 1.625 | .172 | 4.02 | 4.70 |
| only antiox | 94 | 4.07 | 1.615 | .167 | 3.74 | 4.41 |
| only low fat | 92 | 4.09 | 1.764 | .184 | 3.72 | 4.45 |
| no claim | 103 | 4.17 | 1.774 | .175 | 3.83 | 4.52 |
| Total | 378 | 4.17 | 1.696 | .087 | 4.00 | 4.34 |

Post-hoc analysis: weight watching importance in cupcake condition

| claims | claims | Mean Difference | Std. Error | Sig. |
|---|---|---|---|---|
| antiox & low fat | only antiox | .285 | .251 | 1.000 |
| | only low fat | .273 | .253 | 1.000 |
| | no claim | .185 | .246 | 1.000 |
| only antiox | antiox & low fat | -.285 | .251 | 1.000 |
| | only low fat | -.012 | .249 | 1.000 |
| | no claim | -.100 | .242 | 1.000 |
| only low fat | antiox & low fat | -.273 | .253 | 1.000 |
| | only antiox | .012 | .249 | 1.000 |
| | no claim | -.088 | .244 | 1.000 |
| no claim | antiox & low fat | -.185 | .246 | 1.000 |
| | only antiox | .100 | .242 | 1.000 |
| | only low fat | .088 | .244 | 1.000 |

For the muesli-bar condition, there were no significant differences between the claims in importance of weight watching.

Importance of weight watching: in muesli-bar condition

| | | | | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|
| | N | Mean | Std. Deviation | Std. Error | Lower Bound | Upper Bound |
| antiox & low fat | 89 | 4.36 | 1.625 | .172 | 4.02 | 4.70 |
| only antiox | 94 | 4.07 | 1.615 | .167 | 3.74 | 4.41 |
| only low fat | 92 | 4.09 | 1.764 | .184 | 3.72 | 4.45 |
| no claim | 103 | 4.17 | 1.774 | .175 | 3.83 | 4.52 |
| Total | 378 | 4.17 | 1.696 | .087 | 4.00 | 4.34 |

Post hoc analysis: weight watching importance muesli-bar

| claims | claims | Mean Difference | Std. Error | Sig. |
|---|---|---|---|---|
| antiox & low fat | only antiox | .285 | .251 | 1.000 |
| | only low fat | .273 | .253 | 1.000 |
| | no claim | .185 | .246 | 1.000 |
| only antiox | antiox & low fat | -.285 | .251 | 1.000 |
| | only low fat | -.012 | .249 | 1.000 |
| | no claim | -.100 | .242 | 1.000 |
| only low fat | antiox & low fat | -.273 | .253 | 1.000 |
| | only antiox | .012 | .249 | 1.000 |
| | no claim | -.088 | .244 | 1.000 |
| no claim | antiox & low fat | -.185 | .246 | 1.000 |
| | only antiox | .100 | .242 | 1.000 |
| | only low fat | .088 | .244 | 1.000 |

## Translations of educational levels:

In order to make the original English questionnaire list of level of education applicable for Dutch and German participants, the list was translated by independent translators, as it was also the case for the complete questionnaire. When the translations diverged from each other afterwards, a third independent translator decided on the proper translation.

English Original:

- O High school or equivalent
- O Vocational/technical school (2 year)
- O Bachelor
- O Master (Diploma)
- O Doctorate degree
- O Other: _____

Dutch Translation

- O Middelbare School of equivalent
- O Beroepsonderwijs
- O Bachelor
- O Master (Diploma)
- O Doctor
- O Anders: _____

German Translation

- O Sekundarstufe oder gleichwertig (z.B. Haupt-, Real-, Gesamtschule, Gymnasium)
- O Berufsschule, Ausbildung
- O Bachelor
- O Master (Diplom)
- O Doktorat
- O Anders :_____

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