

The influence of calorie ending presentation on consumption behaviour

The effect of odd-ending versus rounding ending calorie presentation on healthy and unhealthy snacks



99 Versus 100 calories



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Abstract

This study investigated the effect of calorie ending presentation on the consumption of healthy and unhealthy snacks. Calorie ending presentation is the way how calories are presented on food products, for example as an even number or an odd number. Moreover this study investigated the moderating effect of dietary restraint and the mediating effect of anticipated consumption guilt on consumption.

A questionnaire was conducted among 288 respondents who were presented with either three healthy snacks or three unhealthy snacks that were labelled as 99 calories or 100 calories, therefore four groups were distinguished. The respondents were asked to write down their consumption intentions and their anticipated consumption guilt regarding the products. Moreover, their level of dietary restraint was measured.

Results show that calorie ending presentation has a strong significant effect on consumption intentions for healthy snacks, in contrast to the effect of calorie ending presentation on unhealthy snacks, which was not found significant. Furthermore, it was found that respondents who are high in dietary restraint perceive more anticipated guilt from calorie ending presentation in comparison to people who are low in dietary restraint. Lastly, results show that anticipated consumption guilt is a good predictor for consumption intentions of unhealthy snacks, whereas anticipated consumption guilt had no significant effect on consumption intentions for healthy snacks.

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1. Introduction

Non-communicable diseases (NCD's) such as cardiovascular disease, cancer, chronic respiratory disease, and type 2 diabetes are reaching epidemic proportions worldwide as they affect people of all ages, nationalities and classes (Blundell and Hine, 2018). By estimation of the World Health Organization (2018), 71% of the global deaths in 2016 were caused by NCDs. Likewise, obesity, often part of the underlying cause of NCD's, (World Health Organization, 2014; Romieu et al., 2017) has increased over the years. In the United States, obesity rates have increased from 11.9% in 1975 to 36.2% in 2016 (WHO, 2017). In the Netherlands, the number of overweight people has risen from 27.4% to 43.9% over the last 38 years, while the number of obese people in the Netherlands has almost tripled to 13% (CBS, 2019). In recent years, more than half of the Dutch population could formally be classified as overweight (RIVM, 2018).

One of the causes of this increase in body weight is the increase in daily energy intake (Romieu et al., 2017). Habitual over-intake of energy seems to be driven partly by changes in the modern food sector, which is supplying more cheap, attractive, energy-dense foods to make food more accessible and convenient (Swinburn et al., 2011; Smith et al., 2019). Examples of such cheap, attractive and energy-dense foods are sugar sweetened drinks, processed fast food like hamburgers and pizza.

Two of the main suppliers of such products are supermarkets and restaurants. In these environments consumers are confronted with unhealthy food products, reminding them of the pleasure of eating those “highly rewarding”, but energy-dense food products (Papies et al., 2014). In this context, 'highly rewarding' means: food cues that are caused by food products that trigger strong hedonic and reward processes in the reward areas of the brain (Papies et al., 2014). Most people are unfamiliar with the fact that a lot of these food products could contain trans fats, and high amounts of sugar and salt (Khodaei et al., 2015) and therefore lead to unhealthier eating habits (Kearny, 2010).

Another factor that increases daily energy intake is the more persuasive and omnipresent food marketing (Swinburn et al., 2011). Prior research has shown that food marketing endeavours that reduce guilt can lead to overconsumption (Belei et al. 2012). Aydinoglu and Krishna (2011) found that small size labels on products affect actual and perceived consumption of food. Large portions that are labelled as small make people feel as if they have not consumed too much, resulting in unintended and uninformed overconsumption. However, consumers who are more concerned about their nutrition intake are less likely to be affected by the size of labels (Aydinoglu and Krishna, 2011).

In much the same way, a study by Mohr et al. (2012) has shown that using health frames on products, such as showing nutritional information on its packaging, reduces anticipated guilt of consumption, hereby increasing purchase intentions. Health framing is a method that manufacturers use to create different serving sizes and present it on the front of a food package, which leads to different levels of calories, claiming that the product consists of less calories than it actually does.

Since December 2016, manufacturers are obligated to provide nutritional information on food packaging (European Commission, n.d.). This nutritional information provides the energy value and the amounts of carbohydrates, saturated fats, sugars, protein and salt of the food, which must be presented in a legible format on the packaging of the food product.

Over the last years, extensive research has been done to examine whether nutritional information on products and the presence or absence of calorie labelling have an influence on buying and eating behaviour (Swartz, Braxton & Viera, 2011; Parker, & Lehmann, 2014; Borgmeier & Westenhoefer, 2009). Outcomes of such studies have shown mixed results.

Recently, Choi, Li, & Samper (2019) investigated the effect of the calorie content in the product itself, by investigating the health motivation of consumers and the effect of the so called “left-digit” or “level effect” on calories per serving of indulgent products. The “left-digit” or “level effect” is a phenomenon which describes how people tend to over credit the leftmost digit of a number and thereby tend to underestimate just-below and nine-ending prices (Stiving and Winer, 1997; Macé, 2012).

The research of Choi, Li, & Samper (2019) has shown that the way calories per portion are communicated matters. Particularly, there is a significant interaction of consumers' health motivation and calorie ending products in that consumers that are highly health-motivated prefer just-below calorie relative to round-ending calorie indulgent foods. This indicates that health-motivated consumers are more likely to focus on the leftmost digit in perceiving their calorie information, hence the left-digit effect. Consumers are more likely to consume chocolates labelled as having 199 versus 200 calories per serving, and end up consuming significantly more calories than the one calorie difference on the nutrition label.

However, this study of Choi, Li, & Samper (2019) only showed the effect on indulgent foods, such as chocolates and beer. Therefore, knowledge regarding this level- and left-digit effect of just-below calorie and round-ending calorie presentation and if it is applicable to healthy food products as well, is currently lacking. The current study will expand on the work of Choi, Li, & Samper (2019), and cover the knowledge gap by investigating this effect on other products than indulgent food products. This study will set out to investigate if calorie-ending presentation has an effect on consumption of low calorie food products (e.g. between 99 and 100 calories) that are eaten as a snack.

Moreover, this study will attempt to investigate whether the significant interaction that Choi, Li, & Samper (2019) found between health motivation and calorie ending products is generalizable to the Netherlands, which has thus far not been investigated. In contrast to the study of Choi, Li, & Samper (2019), this study will focus on the effect of dietary restraint instead of health motivation. Comparable to the research of Choi, Li, & Samper (2019), this study will use an experimental design, measuring the effect of just-below and round-end calorie presentation per serving on consumers consumption intentions, who differ in dietary restraint. Dietary restraint consumers can be identified as "those who are concerned with their weight and use dieting behaviours in an attempt, though not always successful, to maintain an "ideal weight"" (Bublitz et al., 2010. P. 240). The study of Choi, Li, & Samper (2019) only used indulgent food. This study will focus on healthy products as well.

In this study, consumers will be exposed to calorie labels on food products. These labels will be manipulated in that they either are exposed to odd-ending calorie presentation (e.g. 99 calories) or to round-ending calorie presentation (e.g. 100 calories). The key dependent variable is consumption intentions. First, it is expected that just below calorie ending on food products will increase the consumption intentions of that product, as compared to round calorie ending that will decrease the consumption intentions. The underlying phenomenon could be the left-digit/level effect causing consumers to underestimate or overestimate the calorie content of the food product that influence guilt (Stiving and Winer, 1997; Macé, 2012). Second it is expected that consumers with high health motivation are more likely to be influenced by this effect.

The purpose of this study is to contribute to the knowledge of the effect of calorie labelling on packaging of food products. This knowledge is important to adequately inform consumers, retailers and policy makers that aim for a healthier society.

2. Theoretical background

To study the effect of calorie ending presentation, it is important to understand the variables that influence and predict consumption intentions. Therefore, this chapter will outline the theoretical context surrounding this topic. It starts by explaining the effect of calorie labelling that is closely related to calorie ending presentation. Secondly, the underlying mechanism of calorie ending presentation is explained to understand the possible effect of this independent variable. Then, the mediators calorie magnitude perceptions and anticipated consumption guilt and the moderator dietary restraint are explained that influence the effect of calorie ending presentation on consumption intentions. Lastly, the conceptual framework, including hypotheses will be presented to provide a better understanding of the relation between the discussed variables.

2.1.1. Calorie labelling on restaurant menu

Calorie ending presentation is closely related to calorie labelling, which has been studied extensively in a restaurant setting. In order to help consumers make better decisions about their nutritional intake, The Food and Drug Administration (FDA) obliged all restaurants in the U.S. to provide calorie information about their dishes (FDA, 2018). The menu labelling policy should be a tool to battle overweight and obesity in the U.S., yet evidence to support this tool seems to be less robust (Harnack & French, 2008; Swartz, Braxton and Viera, 2011).

Harnack & French (2008) conducted a review of six studies regarding the effect of point-of-purchase calorie labelling on restaurant and cafeteria food choices and reported some evidence that calorie information may influence food choices in a cafeteria or restaurant setting. The results from five of the six studies that were included in the review showed that calorie information of food products have little positive influence, meaning lesser calories purchased or consumed, on their food choices within a cafeteria or restaurant setting. For example, one of the studies within this review is the study of Milich et al. (1976) who investigated the effect of calorie labelling by using an experimental design. The experiment evaluated the effect of calorie labelling on food choice among 450 women at a hospital cafeteria. Over a two-week baseline period, calorie labels were placed close to food items that were sold in the cafeteria. During this period, the average calories that were consumed decreased from 507 calories to 459 calories per meal. More of the same, results of the study of Balfour et al. (1996) indicated that by showing consumers' the nutritional intake of their meal for choice, approximately 15% of the consumers choose to change their meal, which results in a significantly lower calorie intake. In contrast to these studies, one of the six studies show no results on this effect. Mayer et al. (1987) conducted an experiment to investigate the effect of calorie labelling in a cafeteria of a large company. During a four-week period the calorie content of all food items were listed on index cards placed near the food, yet did not have any effect on the number of calories consumed. Harnack & French (2008) concluded in their review that the effect of point-of-purchase calorie labelling on food choices to be weak and inconsistent, and also noted some methodological flaws.

In addition, Swartz, Braxton and Viera (2011) updated the findings of Harnack & French (2008) by conducting a systemic review by adding more recent evidence. In this systematic review Swartz, Braxton and Viera (2011) reviewed studies that used an experimental or quasi-experiment design comparing a calorie-labelled menu compared to a no-calorie menu dated from August 2006 and 2011. The studies that were included in this review consists of five studies in a real world and experimental setting and two studies in a laboratory setting. All these studies measured purchasing or consumption behaviour of ready-to-eat meals. The overview of the seven papers can be found in figure 1.

The systematic review by Swartz, Braxton and Viera (2011) did not find any strong or robust evidence for the effect of calorie labelling on consumer purchasing and eating behaviour, because of contrasting results. To illustrate, two of these seven studies show that calorie menu labels reduced

the actual calories purchased and one study reported significant reductions in calories purchased at some restaurant's chains.

In contrast to these findings, three studies of the review showed no effect on calories purchased, whereas one study reported even a slight increase in calories purchased. Studies that were conducted in a laboratory setting, focussed on measuring both calories ordered as calories consumed, yet there were no significant differences found measure calorie ordered as calories consumed (Harnack et al. 2008; Roberto et al. 2010).

Moreover, from an experiment in a real world setting, Dumanavosky et al. (2011) collected survey and purchase data before calorie labelling in fast food chain restaurants and nine months after the implementation of calorie labelling in these fast food chain restaurants. They found a reduction in mean calories purchased for three fast food chains in New York City but no difference in calories purchased for the other seven chains in the study. The last chain that was measured in the study even showed an increase in calories purchased. To the contrary, the study by Finkelstein et al. (2011) did even observe a small significant increase in calorie purchased per transaction after the calorie labelling were added to menus. Customers purchased more calories after the calorie labels were introduced either inside restaurants and on drive-through menus. In addition, this study found no difference in their sales volume either, Finklestein et al. (2011) found no differences in the amount of ordered healthy or unhealthy items before and after the calorie labelling.

Reference	Design and Presence of Comparison Group	Intervention/Measures	Setting	Number of Subjects/Restaurants	Result
Real world setting					
Elbel et al. (2011) [12]	Natural experiment, pre/post intervention comparison and with matched community	Calorie labels added to chain restaurant labels in New York City. Survey administered outside fast food restaurants.	New York City and Newark, NJ (as comparator), Fast food restaurants in low-income neighborhoods	349 children and adolescents	Mean calories purchased in NYC pre and post labeling 643 v 652 (p = 0.82), Newark 611 v 673 (p = 0.37).
Elbel et al. (2009) [18]	Natural experiment, pre/post intervention comparison and with matched community	Calorie labels added to chain restaurant labels in New York City. Survey administered outside fast food restaurants.	New York City and Newark, NJ (as comparator), Fast food restaurants in low-income neighborhoods	1156 adults over 18	Regression-Adjusted nutrient content in NYC and Newark before and after with 95% CI. NYC: 825 (779, 870) post 846 (758, 889). Newark 823 (802, 890) post 826 (746, 906).
Finkelstein et al. (2011) [19]	Natural experiment, pre/post intervention comparison with matched communities	Calorie labels added to chain restaurant labels in King County, WA, then drive-thru lanes. Total monthly transactions and calories per transaction.	King County, WA and several stores from surrounding area	21 randomly selected Taco Time locations and 7 locations outside King County	Calories per transaction King County pre-period: 1,211 v post-period 1: 1,217 v post-period 2: 1,214. Calories per transaction Control pre-period: 1,391 v. post-period 1: 1,392 v post-period 2: 1,376.
Chu et al. (2009) [6]	Quasi-experimental, single group interrupted time series	Calorie labels added to entrees in college dining hall. Used electronic sales data to track calories of entrees sold.	Dining hall, Ohio State University	NA	Calories per entrée sold at pre 645.5, First day of tx period -12.4 (p = 0.007), decreased of 0.298 calories/day, post treatment increases 1.512/day
Dumanovsky et al. (2011) [16]	Cross sectional surveys pre/post calorie menu label implementation	Calorie labels added to chain restaurant labels in New York City. Survey administered outside fast food restaurants.	New York City fast food chains	7309 adult customers in 2007 and 8489 in 2009, 168 locations of 11 fast food chains	No change in mean calories purchased overall chains from 2007 to 2009, 828 v 846 kcal (p = 0.22). Three chains show reduction in mean calories per purchase: McDonalds (829 v 786, p < 0.02), Au Bon Pain (555 v 475, p < 0.001), KFC (927 v 882 kcal, p < 0.001). One chain significant increase: Subway (749 v 882, p < 0.001).
Laboratory setting					
Harnack et al. (2008) [20]	Non-blinded randomized controlled trial	Order from 4 menu labeling conditions, control that lists items with standard pricing, Item + Calorie menu, Item + Non-value menu pricing, Calorie + Non-Value menu pricing. Measured calories ordered and calories consumed	Conference room of suburban hotel and church basement in Minneapolis St. Paul, MN	594 adolescents and adults 16 or older	Mean calories ordered: Calorie 873.6, Price 881.7, Calorie+Price 842.3, Control 827.5 (p = 0.62); Mean calories consumed: Calorie 804.7 Price 813.3 Calorie+Price 761.0 Control 739.0 (p = 0.25)
Roberto et al. (2010) [21]	Non-blinded randomized controlled trial	Participants order from 3 menu labeling conditions, one that lists the items, one that lists items and calories, one that lists items, calories and daily guideline calories. Measured calories ordered and calories consumed	Laboratory in New Haven, CT	303 adults 18 and older	Mean calories ordered: Control 2189, label condition 1862 (p = 0.03), label + info condition (1860, p = 0.03), no significant difference between two label conditions. No significant difference in calories consumed overall (p = 0.12).

Figure 1: Overview of included studies, in systematic review by Swartz, Braxton and Viera (2011).

2.1.2 Front of food package labelling

In line with calorie labelling on restaurant menus, front of food package labelling is a tool to help consumers' make healthier food choices. In contrary to calorie ending presentation, front of pack labelling has been broadly investigated.

Front of pack labelling on food products like the traffic light label (figure 2) or the GDA label (figure 3) should help consumers' make better decisions about their choice of food. In some front of pack labels calories are included, such as the GDA and some versions of traffic light labels. The studies on the front of pack labelling on food choice and consumption show mixed results. Borgmeister and Westenhoefer (2009) have investigated different front of pack labels and found that front of package labelling helps consumers to identify healthier food better than un-labelled food, yet this doesn't necessarily lead to healthier food consumption. One could argue that the traffic light label is the most effective label when it comes to increase the consumers' awareness of healthy food products. Kelly et al. (2009) conducted a research proving that traffic light labels (figure 2) is the most effective system of assisting consumers' in identifying healthy food products. In their study they compared the traffic light system with three other systems like the "Percentage Daily Intake System", that displays the proportion of the daily nutrient contribution that a serve of food provides, at three product categories. In addition, a study Sonnenberg et al. (2013) shows that traffic light food labelling truly increased consumers' awareness and even led to an increase of sales of healthy food products.

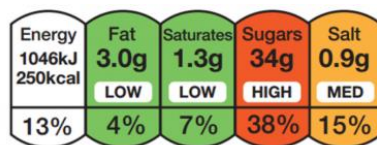


Figure 2. Traffic light label (British Nutrition Foundation, 2018)

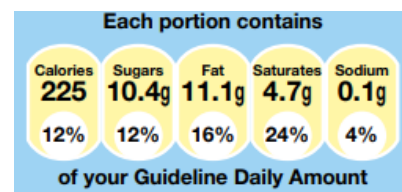


Figure 3. GDA label (GDAfacts.eu, 2008)

Another study that shows the effectiveness of front of pack labelling is the study by Mohr et al. (2012). Mohr and his colleagues (2012) found that consumers' respond to health framing of nutritional label information on food products. Health framing is a method that manufacturers use to create different serving sizes on the front of a food package, which leads to different levels of calories, claiming that the product consists of less calories than it actually does. According to their study, health framing reduces the anticipated guilt of consuming a product for both healthy (vegetable soup) and unhealthy (pizza) products, and therefore increase purchase intentions. Specifically, in the study of Mohr et al. (2012), the serving size of food products were manipulated, resulting in lower reported calories, fat and sugars per serving, which influenced the anticipated guilt of consumption and purchase intentions. The effect of health framing on anticipated guilt was moderated by a consumers' concern about the nutrition and calories in the product. Consumers who are concerned about these numbers tend to be influenced more by the health framing (e.g. lower calories) of the product. This has to do with the fact that health framing decreases the anticipated guilt associating with consuming calories, therefore leading people who are more concerned about their health being affected stronger. Opposing to that effect, Mohr et al. (2012) found that people who are low in their dietary concern, health frame had little effect on their anticipated guilt and therefore little impact on their purchase intentions.

2.2.1 Just-below calorie ending presentation

Since calorie ending presentation is a new field of enquiry, only two series of studies demonstrated a significant effect of just-below calorie ending presentation on consumption (table 1 and 2). One of the series of studies is the research of Choi, Li, & Samper (2019), which exists out of 4 studies measured the effect of just-below calorie ending presentation of indulgent food products on consumption intentions, purchase intentions and anticipated guilt.

The study of Choi, Li, & Samper (2019) measured consumption of chocolates by manipulating an ad appeal illustrating as having nine- or round-ending calories per serving on people who differ in health motivation. The results of the survey among 284 university students showed that participants consumed more chocolates after the 199 calorie ad in contrast to the 200 calorie ad. In addition, participants under high health motivation consumed 18 calories more than participants under low health motivation during the experiment.

Moreover, it was found in a study among 474 Amazon mechanical Turk participants that consumers who are health motivated have higher purchase intentions for beer depicted as 93 or 99 calories in contrast to the 100 calories. This was found in the study by Choi, Li, & Samper (2019) investigating purchase intentions of Corona beer depicted as 93, 99 or 100 calories, by asking how likely they deem the chance of buying a six-pack of Corona Light is, based on nine-point Likert scale.

Furthermore Choi, Li, & Samper (2019) performed a study, that investigated the underlying preferences for nine-ending food under health motivation, perceived calorie magnitude and guilt. In this study 296 participants were shown a cinnamon and sugar donut with either 199 or 200 calories. Firstly, participants have to rate their consumption intentions for the donut using a three-point Likert scale. Secondly to rate their magnitude perceptions, the participants had to rate the calorie amount of the donut compared to other foods: "How would you compare the dessert you saw to other types of desserts?" (1= it has relatively lower calories, 7= it has relative more calories). Thirdly, to assess consumption guilt, the participants were asked: "How guilty/regretful/hesitant/resultant/sorry would you feel about ordering this dessert?". The results of this study revealed that people under high health motivation saw the donut with 199 calories as relatively lower in calories. Moreover, the donut with depicted calories of 199 resulted in less anticipated guilt for health motivated participants. Concluding that participants who are high in health motivation have increased consumption intentions for the nine-ending condition.

To summarize the most important findings of the study by Choi, Li, & Samper (2019): just-below calorie ending presentation demonstrated a significant effect on real consumption behaviour, consumption- and purchase intentions and anticipated guilt. But this effect only holds for people who are high on health motivation and on indulgent foods.

Minton, Liu and Lee (2018) conducted a research to investigate the effect of numerical food portion cues (e.g. calorie information) on product packaging on consumer evaluations. In this between-subject experiment, 134 participants were assigned to three different caloric conditions (99,100,101 calories). The participants were presented with a realistic packaging front of a new fictional brand of chocolate chip cookies. The caloric conditions on this packaging were manipulated by presenting either 99, 100 or 101 calories. Using three nine-point bipolar scales, purchase intentions and overall attitude was measured. The results of this study showed that the overall attitude towards the cookies with 99 calories were more favourable than the 100 calories cookies, but there was no difference between the 99 calories and the 101 calories cookies. Moreover, the participants were more likely to purchase cookies with 99 or 101 calories rather than cookies with 100 calories (Minton, Liu and Lee, 2018).

Table 1: Studies reported in Choi, Li & Samper (2019) of research done at effect of just-below calorie ending presentation

Participants	Study design	Manipulation	Results
Study 1 (N=281) public university students	Between-subject experiment	Ad appeal of chocolates depicted as having nine- or round-ending calories per serving among people who vary on health motivation	Participants under high health motivation consumed more chocolates after 199 calorie ad vs 200 calorie ad
Study 2 (N=474) Amazon Mechanical Turk participants	Filler survey	Ad of Corona Light beer depicted as having 93, 99 or 100 calories per serving among people who vary on health motivation	Participants under high health motivation had higher purchase intentions for the 93/99 (vs. 100) calorie beer
Study 3 (N=296) Amazon Mechanical Turk participants	Between-subject experiment	Showing picture of a cinnamon sugar donut portrayed as having 199 or 200 calories who vary on health motivation	The donut portrayed as 199 calories (vs 200.) obtained higher consumption intentions under health motivation
Study 4 (N=767) Amazon Mechanical Turk participants	Between-subject experiment	Intervention in a restaurant web page context with higher calorie magnitude (799/800) and an integrated health prime (40% of recommended calories) + ad of a sponsor of the restaurant either a concert or a running marathon	The marathon ad made participants more motivated to be healthy than the concert ad.

Table 2: Studies reported in Minton, Liu and Lee (2018) of research done at effect of numerical portion cues

Participants	Study design	Manipulation	Results
Study 1 134 Amazon Mechanical Turk participants	Between-subject experiment between different numerical cues (99,100,101 calories)	The participants were presented with a packaging front of a new fictional brand of chocolate chip cookies with manipulated caloric conditions. Overall attitude and purchase intentions were measured	Participants were more likely to purchase cookies with 99 or 101 calories rather than cookies with 100 calories
Study 2 139 Amazon Mechanical Turk participants	Between-subject experiment between different numerical cues (99,100,101 calories) and verbal cues (bite, king-size)	The participants were presented with a packaging front of a new fictional brand of brownies with manipulated caloric conditions and manipulated verbal cues (bite, king-size). Perceived flavour was measure.	Participants exposed to a 101 calories package perceive a higher degree of flavour for brownie bites and king size in comparison to those in the 100 calorie condition.

2.3.1 Left-digit / level effect in pricing research

In this study, calorie ending presentation is defined as the visible presence of the calorie content of a food product, ending as a nine versus a zero. The underlying mechanism of ending presentation is extensively in the field of product pricing and is called the left-digit or level effect.

Multiple studies can be found that support this mechanism for the effectiveness of odd-pricing or nine-ending overall. This is a commonly used strategy for increasing demand of products (Stiving & Winer, 1997; Manning & Sprott, 2009). Odd prices can be defined as *“prices that are a few cents (or one cent) below their round-ending counterparts”* (Choi, Li, & Samper, 2014. p. 546). For example, an odd-ending price of €1.95 or €1.99 is just below the round-ending price of €2.00.

The left-digit or level effect is a phenomenon that is widely studied in behavioural economics, and refers to the observation that uses a nine ending versus a zero ending. An example in the study by Thomas & Morwitz (2005) who studied the effect of the left-digit effect by investigating the effect of price endings of pens on price magnitude perception. The study consists of showing participants pens with manipulated price endings (\$2.99 vs. \$3.00) and telling them that the brands of the pens are being sold online and that they should compare these brands within each product category. Yet, the pens hold similar characteristics but have a manipulated price. Participants were asked to report their price magnitude perception for each brand on five-point Likert scales. The results of this study showed that the mean magnitude perception of the price was lower when the price had a nine (i.e. \$2.99) rather than a zero ending (i.e. \$3.00), which is just a one cent drop in price, but found to have a significant effect on the perception of the price as a whole

Another example to support the effectiveness of the left digit effect is the study of Schindler and Kibarian (1996), who investigated the left-digit effect in a different setting. Schindler and Kibarian (1996) investigated the left digit effect by randomly mailing 90.000 women's clothing catalogues to costumers, among which 30.000 consists of 88-ending price, 30.000 of 99-ending prices and 30.000 of 00-ending prices. The catalogues were mailed in December and the sales response data was measured in June. The 90.000 catalogues led to 2812 customers placing one or more orders, which most of them are generated by the 99-ending catalogue. Schindler and Kibarian (1996) found that customers who receive the 99-ending catalogue were more likely to place an order. Moreover, the customers who received the 99-ending catalogue are not just more likely to place an order, but are also placing orders with larger amounts, in contrast to the customer who received the 00-ending catalogue. As a result, the clothing company increase its revenue by eight percent by sending out 99-ending catalogues.

To nuance these findings about the effectiveness of odd-ending pricing, there are studies that show situations where odd-ending prices have less effect. For instance, Thomas & Morwitz (2005) found that odd-ending pricing has less impact on price perception when the rightmost digit does not change the leftmost digit, for example €11.99 versus €12.00 is less effective than €19.99 versus €20.00. Furthermore, results of a laboratory experimental study among 442 students show that by assigning different combinations of price endings (e.g. \$2.00 and \$2.99 vs \$1.99 and \$3.00 vs \$2.00 and \$3.00) can lead to preference towards the odd-ending price as to the round-ending price (Manning and Sprott, 2009). In this study, the participants were randomly assigned to one of four different price conditions and were simultaneously shown two similar pens with associated descriptions but with a manipulated price. After, the participants were asked which pen they would buy. The results of this study show, that the participants prefer an odd-ending price when it was the lowered-price alternative (\$1.99), but preferred a round-ending price for the higher-priced alternative (\$3.00).

There are several explanations for underestimating an odd price. One of them is that due to odd-pricing consumers tend to ignore the rightmost digits and fill their places with different numbers, for example a consumer may think of €5.98 as “around five euros” (Schindler & Warren, 1988). Another explanation is that most consumers do not consider the whole price of a product, but often use some heuristic to simplify complicated calculations of the task of reading the price (Stiving & Winer, 1997). They showed this in a study using scanner data for previously purchased products (tuna and yoghurt).

Another suggested explanation of this effect is the left-to-right comparison (Thomas & Morwitz, 2005), meaning that consumers compare one price with another, for example two prices displayed at shelves at a supermarket. Consumers tend to compare two numbers by considering the digits from left to right. This is evident in the following example by Thomas & Morwitz (2005): if there are two pairs of prices, (€0.89, €0.75) and (€0.93, €0.79), most consumers tend to believe that the price of €0.79 is the best deal, focussing mostly on the left digit. Consumers may compare the left digits, the 8 and the 7 of the first pair of prices and the 9 and the 7 of the second pair of prices, and not go any further. Consumers tend to estimate the price difference by subtracting left hand digits when they are different and subtract right hand digits when the left hand digits are similar, reasoning that $8 - 7 = 1$ is less of a deal than $9 - 7 = 2$, when in fact both deals have the same price difference of €0.14.

Brenner and Brenner (1982) explains the level effect based on people’s limited memory capacity. Consumers that are confronted with a lot of information including prices and other numbers, they most likely to remember only the first digits of a price. Put simple, people only recall the 2 of a €2.99 price. In addition, consumers are likely to evaluate price information through their recognition memory (thinking about whether or not they had seen the price before), rather than going back and recall the exact price of the product, resulting in guessing the price of the product (Schindler and Wiman, 1989). When consumers remember the left-hand digit of the price by evaluating the information through their recognition memory, consumers may guess the right-handed price. In other words, when the real price is €2.99 and the consumer only remembers the left-hand digit (the 2), all the guesses of the right-hand digit that is lower than 99 is an underestimation of the real price (Schindler and Wiman, 1989)

Additionally, left-hand digits tend to be more frequently recalled accurately than right-hand digits, and that consumers tend to underestimate a price that end in a digit other than 9, which often comes from consumers guessing a lower price number and therefore thinking the price is lower than the actual price (Schindler & Kibarian, 1993).

2.3.2 Effects of odd pricing on product and quality perceptions

Besides the left-digit or level effect, it is found that price endings can be further explained as an “image effect”, which is widely researched (Stiving & Winer, 1997; Schindler, 2006; Schindler and Kibarian, 1996; Macé, 2012). The image effect is made up of two components: price image and quality image (Stiving & Winer, 1997). Price image refers to the fact that consumers tend to attach different meanings to prices that end with the numbers 99. For instance, that the products is on sale, the price of the product has been reduced and/or that the price of the product is the lowest around (Schindler & Kibarian, 1996). This could be explained by the study of Schindler (2006) that shows a clear relation between the use of 99-ending and low-price appeal. These results were found two samples of retail advertising in newspapers. The first sample of 1258 prices of U.S. newspapers among 43 states show that 99-ending prices were used 65% more often in ads with low-price cues than in ads without these cues. In the second sample among 1034 prices, it was found that 99-ending occurred almost twice as often in the retail advertisements that made low-price appeals. On the other hand, there is quality image, which means that consumers assume that odd prices indicate low-quality merchandise and even prices imply high quality, to illustrate: the digit 0 signals high quality and the digit 9 signals low quality (Stiving & Winer, 1997).

This image effect could also affect calorie-ending perceptions, all be it through a different way of reasoning. Choi, Li, & Samper (2019) found that consumers could perceive food products as diet-friendly or lacking in taste, due to the image effect of the calorie-ending presentation.

Table 3 presents an overview of relevant studies on the level and image effect. These studies were selected from merely top journals in the field of retailing, marketing and consumer behaviour and are peer reviewed. Taken together consumers tend to respond differently to price endings. Most notably, 99-ending often increase purchasing intentions due to low-price appeal.

Table 3: Some illustrative studies on left-digit and image effect

Authors	Research group	Study design	Intervention / measures	Results
(Macé, 2012)	83 stores of Dominick's Finer food grocery chain	Empirical analysis of store-level scanner data on different food products	An empirical analysis of scanner data of 399 weeks across 83 stores to investigate the influence of brand, category, store and store area on the nine-ending effect	Nine-ending prices increase sales for smaller brands but decrease sales for premium brands
Manning and Sprott (2009)	442 undergraduate business students	Lab experiment	Participants were simultaneously shown two pens with manipulated price endings. Survey was completed electronically	Participants prefer a just below price (i.e. \$1.99) for a lower priced alternative and prefer a round price (i.e. \$3.00) for higher prices alternatives.
(Schindler, 2006)	1258 and 1034 samples prices of newspaper of U.S. newspapers	Empirical analysis of price advertisements	Two large samples were taken from U.S. newspapers among 43 states	The analysis of the newspapers shows an strong and robust correlation between the use of 99 price ending and the presence of low-price appeal
(Thomas and Morwitz, 2005)	52 undergraduate students	Between subject experiment between nine ending and zero ending prices on pens	Participants were shown pens with manipulated price endings of either a nine or a zero and reported their price magnitude perceptions on a five point Likert scale	Participants perceive nine-ending prices to be smaller than prices with one cent higher, this only occurs when the leftmost digits on the prices differ (e.g. \$2.99 vs \$3.00)
Schindler and Kibarian (1996)	90.000 randomly selected customers	Field experiment testing sales effect of retail price endings	Participants received one of three women's clothing catalogues with manipulated prices. The sales volume, number of purchases, response rate and mean dollars were measured.	The results of the experiment indicated that 99 price endings led to increase consumer purchasing
Choi et al. (2014)	54 students	Between-subject experiment	Participants were shown two functional identical laptops but with a different visual attractiveness (hedonic vs utilitarian) and different	Participants chose the hedonic option over an utilitarian option when it had an odd-ending price than when it had a round-ending price.

			price-endings (i.e. \$599, \$600 and \$530).	
Schindler and Wiman (1989)	145 undergraduate business students	Field experiment	Three sets of cards of 20 products that differ in price-ending divided over three groups of participants. Two days later participants were asked to recall the prices of the products on the cards	The participants are more likely to accurately recall leftmost digits of a price than rightmost digits of a price

2.4 Anticipated consumption guilt as a mediator explaining calorie labelling effect

A product with an odd calorie label (e.g. 99 calories) may lead to less anticipated consumption guilt than a product with even calorie label (e.g. 100 calories), since odd labels lowers calorie magnitude judgements in contrast to even labels (Choi, Li, & Samper, 2019;). In addition, it is evident that anticipated consumption guilt has a direct effect on purchase intentions and consumption behaviour (Mohr et al. 2012; Choi, Li, & Samper 2019).

2.4.1 Consumption guilt

When consumers have to decide about buying a certain food product, they often struggle between the utilitarian (functional) benefits of nutritional intake and staying healthy or the hedonic (indulgent) side of taste, enjoyment and pleasure-seeking (Keinan and Kivetz, 2008). For example: consuming utilitarian food products (e.g. a healthy food item such as a salad) that is considered restrained and farsighted, or following the hedonic temptations (e.g. eating a chocolate cake) that is viewed as impulsive, careless and short-sighted. These decisions about certain food products is at the heart of self-control conflicts and can cause two important emotions in healthy food consumption: guilt and pleasure (Baumeister et al., 1994; Wansink and Chandon, 2006; Dhar and Simonson, 1999).

Guilt can be described as an “unpleasant emotional state associated with possible objections to his or her actions, inactions, circumstances, or intentions” (Baumeister et al. 1994, p. 245). Food-related guilt is one of the most dominant anticipatory consumption emotion for consumers and is often caused by consuming hedonic food products (Mohr et al., 2012; Rozin et al. 1999), impulsive buying, like choosing hedonic features over function features (Rook, 1987) and overbuying (Kivetz and Simonson, 2002). The amount of unhealthy nutrients in a food product that is being consumed influences the level of guilt generated by a consumer. Even considered consumption of hedonic food products like a chocolate cake influences the level of anticipated guilt from consuming the product (Strahilevitz and Meyers, 1998).

For example, the results of a study by King, Herman and Polivy (1987) among 96 participants have shown that that guilt was associated with poor nutritional qualities of food. This effect was measured by asking participants to group 57 randomly-selected foods according to similarities and differences, in addition they had to put provided labels (e.g. sweet foods, food I don’t allow myself to eat, foods I don’t feel guilty about eating) on the food groups. Moreover, people who are more concerned about their diet felt more guilt about high calorie diet-breaking foods, whereas food groups that were labelled in the study as sweet, caused guilt for all participants despite the dietary concern.

In a comprehensive literature review on guilt, Baumeister et al. (1994) repeatedly found evidence of guilt being an important and pervasive factor influencing decisions, feelings and actions. In addition, guilt is also caused as an outcome of failing self-regulation (Keinan and Kivetz, 2008; Zemack-Rugar et al., 2012) and could be a motivation for consumers to control their consumption behaviour (Baumeister et al., 1995).

The emotional state caused by guilt influenced the preferences of consumers for certain aspects of a product, for instance: a consumer would prefer an affordable price (feasibility) over a product that the consumer really wants (desirability), when selecting a product (Han et al., 2014). This was found in a study by Han et al. (2014) examining how guilt influences decision-making, by generating the feeling of guilt among 171 participants and asking about their decision behaviour concerning desirability (liking) and feasibility (price) of products.

Consuming food product does not necessarily lead to either pleasure or guilt, but there are many situations of food consumption where consumers' experience both pleasure and guilt. Where pleasure is often caused by the consumption of a food product, guilt is regularly caused by the perception of being unable to resist the temptation of eating a food product (Antonetti and Baines, 2014; Mishra and Mishra, 2011; Mohr et al., 2012; Rozin et al., 1999).

To give an example, a study by Goldsmith et al. (2012) showed that pleasure and guilt are not just two ends of a continuum, but that the association between guilt and pleasure is quite strong. It was found that consumers' that are primed with guilt, the amount of pleasure is affected. Consistent with their formulated hypothesis, the results of two studies with 103 participants show that a guilt prime (inducing a feeling of guilt) significantly increase the pleasure from consuming a hedonic food product (Goldsmith et al. 2012).

2.4.2 Anticipated consumption guilt

There are two different types of guilt, anticipatory guilt and reactive guilt (Antonetti and Baines, 2014). Anticipatory guilt is a feeling that consumers experience when thinking about the potential negative outcomes of a decision, for example: feeling guilty by considering of eating an entire chocolate cake (Mohr et al., 2012). On the other hand, reactive guilt is a negative feeling that consumers' experience in response to contradicting their moral standard that happened in the past (e.g. feeling guilty about eaten an entire chocolate cake) (Rawlings, 1970).

A large body of literature has been carried out regarding guilt and Antonetti and Baines (2015) conducted a review on existing literature by examining 88 papers investigating guilt in a marketing context. According to their review, guilt regulates many consumption processes and behaviour. Firstly, in the review it is argued that to a constant exposure of ads, creating a negative emotion like guilt, can lead to an aversion of certain consumption situations or products. An example is anticipated guilt. When consumers' have feelings of anticipated guilt, they tend to reduce their consumption of unhealthy foods and prefer healthier alternatives. Moreover, when people consume guilt-inducing products like chocolate cake, which results in negative feedback, their consumption intentions are decreased (Saintives and Lunardo, 2016).

Furthermore, the emotion of anticipated guilt tends to have a longer duration than the actual feeling of guilt (Baumeister et al., 2007). It could therefore be argued that anticipated guilt is more important than the actual feeling of guilt, since anticipated guilt affects consumption behaviour. For example: consumers anticipate on the degree of guilt they feel when they consider different food products, when consumers feel guilty, they want to reduce their feeling of guilt by making a better decision of taking corrective action (Dahl et al., 2003).

In contrast, guilt does not always necessarily lead to adoptive or motivational behaviour (Kuijer and Boyce, 2014). Goldsmith et al. (2012) found that due to the cognitive associations of consumers between the feeling of guilt and pleasure that is experienced from hedonic consumption (e.g. eating a chocolate cake) increases the consumption of these hedonic products. In other words, due to the association between guilt and pleasure, consumers could even experience more pleasure from consuming a hedonic product, whenever they feel guilty (i.e. a guilty pleasure). To illustrate: consumers who associate a chocolate cake with guilt, have weaker intentions to eat healthy, as compared to consumers who associated chocolate cake with celebration or a birthday (Kuijer and

Boyce, 2014). In summary, results of studies regarding guilt in relation to food, who that feeling of guilt with hedonic food may in some cases actually increase the indulgence of those items, in contrast what one might expect.

2.5 Calorie magnitude perceptions as a mediator

When consumers estimate the calorie content of a food product, they often rely on their judgement, evaluating food products as being either healthy (e.g. fruit) or being unhealthy (e.g. a chocolate cake), which generally results in imprecise estimations (Chernev, 2011). To illustrate, healthier meals are regularly perceived to be less likely to increase weight gain, where unhealthy meals do. In a study, Chernev (2011) found that people tend to believe that when adding a healthy option (e.g. vegetables) to an unhealthy option (e.g. pizza) it decreases in calorie content of the combined meal by 13.5% for weight conscious consumers and 3.8% for consumers who were less concerned with their weight.

One of the causes of this “poor” judgement of consumers are brands and labels of products that influences the assessment of food products (Chernev & Chandon, 2010). Brands and labels could bias the judgement of consumers by creating positive or negative cues about the food product, which could lead consumers to assume that the food product has an increase or decrease in the calorie content. An example are the low-fat labels on food products. It is found in a study among 274 participants that low-fat labels have a significant effect on the consumers’ judgement of the calorie content of a food product (Fernan, Schuldt and Niedereppe, 2018). Even food products that are labelled as organic or fair trade that does not speak of any nutritional content can also influence consumers’ perceptions.

Moreover, consumers’ judgement on products is often based on incomplete or limited knowledge of the relevant information on a product. Therefore, consumers tend to consider food products high or low on calorie content by comparing it to similar food products (Kardes, Posavac & Cronley, 2004), which often leads to failure in their estimation.

Another example of inaccurate judgements on calorie content is the study of Schuldt and Schwarz (2010) that investigated calorie judgement of Oreo cookies among 114 participants. The participants were shown a nutritional label from a package of Oreo cookies, showing serving size and calorie content and claims that the cookies were made from organic flour and sugar. After showing these labels and claims, the participants were asked to compare the (organic) cookies with other brands on calorie content (1= having fewer calories, 7= having more calories), furthermore the consumption recommendation is asked. Even though the participants saw the calorie content beforehand, the organic cookies received lower calorie judgements than other brands.

2.6 Dietary restraint as a moderator

2.6.1 Dietary restraint

A personality trait potentially moderating the effect between calorie ending presentation and consumption guilt is dietary restraint. Dietary restraint has been widely studied (Raghunathan et al. 2006; Coelho do Vale, Pieters and Zeelenberg 2008; Scott et al. 2008; Payne et al. 2014). High dietary restraint consumers can be identified as “those who are concerned with their weight and use dieting behaviours in an attempt, though not always successful, to maintain an “ideal weight”” (Bublitz et al., 2010. P. 240).

Many researchers found that dietary restraint affects consumers’ eating behaviour and their overall health (Coelho do Vale, Pieters, and Zeelenberg 2008; Payne, Niculescu, and Barney 2014; Scott et al. 2008). For example, consumers that are high in dietary restraint often think that tasty foods are less healthy than less tasty food (Raghunathan et al. 2006), even when the calorie content and the nutritional information is known. Moreover, high dietary restraint consumers may think that food labelled as “healthy” will cause less weight gain than foods branded without these messages (Oakes and Slotterback 2005).

On the other hand, consumers who are low on dietary restraint do not react the same way on those food labels and have different eating behaviour. In contrast to high dietary restraint consumers, the consumption of low dietary restraint consumers mostly focusses on pleasure and taste, rather than utilitarian considerations, such as costs (Payne et al., 2014). To illustrate, healthier snacks will be preferred by consumers high in dietary restraint, whereas less healthy snacks will be preferred by consumers low in dietary restraint (Niculescu et al., 2018).

Payne and his colleagues (2014) found that the more-dietary-restrained consumers are, the more they intend to consume, when provided with healthy food, if high dietary consumers are confronted with front of package labels that highlight “lower calories” they tend to eat more. In support, health cues on food products lead to an increase in taste rating and actual consumption, for high dietary restrained consumers but not for those who are low on dietary restrains (Irmak et al., 2011). One could argue that in this way, the consumption intentions by those consumers who are high dietary restrained and focus on maintaining the ideal weight, could result in more instead of less total calories consumed.

It is evident that consumers who differ in dietary restraint respond differently to front of pack labelling, and therefore often used as moderator between front of pack labelling and consumption. Sonnenberg et al. (2012) found that front of pack labelling significantly increase healthy purchasing patterns of consumption of food products, but also found that this effect is moderated by health-consciousness. This is supported by Gallicano et al. (2012) by concluding that consumers who require nutritional information, use the nutritional labels on packaging in their decision-making process, assuming that consumers who have the intention to eat healthy, prefer consuming food with a nutrition logo. Dietary restrained consumers may perceive healthier snack packaging as healthier in terms in food content rather than the caloric quantity. Dietary restrained consumers often prefer smaller snack packages or smaller portions with health cues over less healthy foods (Finklestein and Fishbach, 2010), which results dietary restrained consumers to consumer 24% more of a snack than consumers who are low on dietary restraint (Scott et al., 2008).

To conclude, consumers that are high on dietary restraint are more vulnerable to front of pack labelling and tend to experience emotional responses to food, including negative effects (Fletcher et al., 2007) and guilt about eating unhealthy food (King et al., 1987). These emotional responses influence their behaviour to choose and therefore consume less healthful alternatives. In contrast, consumers that are low on dietary restraint tend to focus on internal cues (e.g. taste) as an indicator and therefore respond differently to food products.

2.7 Conceptual framework and hypotheses

Based on the theoretical findings regarding the relations between calorie ending presentation, calorie magnitude perceptions, anticipated consumption guilt and consumption intentions, a conceptual framework with hypotheses was developed. The conceptual framework presented in figure 4, serves as a basis for the empirical research and aims to provide a better understanding of the influence of calorie ending presentation on consumption intentions, mediated by calorie magnitude perceptions and anticipated consumption guilt. The effect of calorie magnitude perceptions is moderated by dietary restraint, which can strengthen or weaken the effect. The conceptual framework demonstrates how the variables are linked together. According to the conceptual framework, the relations and mechanisms will be discussed, based on formulated hypotheses.

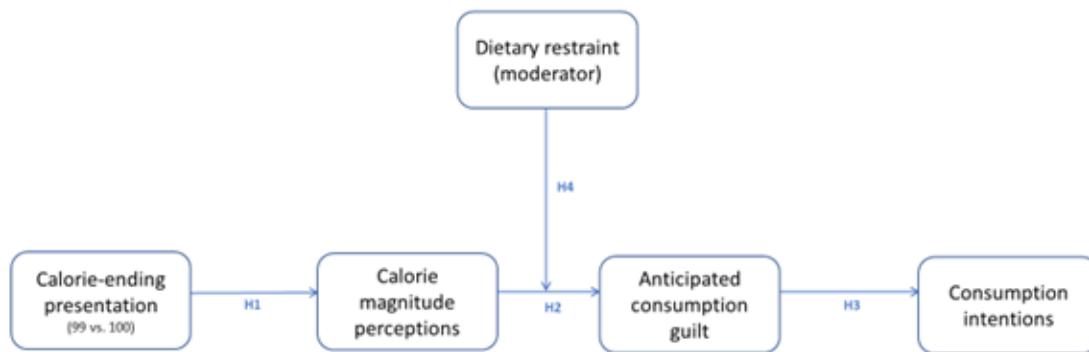


Figure 4. Conceptual framework

This study will investigate the effect of calorie ending presentation at food products on consumption intentions. Based on the theoretical background (Choi et al., 2014; Minton, Liu and Lee, 2018; Choi et al., 2019), the hypotheses are proposed showing the general relationship between independent variable “calorie ending presentation” and the dependent variable “consumption intentions”. It is expected that consumers respond differently to calorie ending presentation that ends with an odd number or a round number. According to previous discussed literature (Stiving & Winer, 1997; Manning & Spratt, 2009; Choi et al., 2019), prices and calories that end with an odd number affect consumption intentions positively, as compared to round prices and calories ending that will decrease consumption intentions. therefore, the following hypotheses are suggested:

H1: Compared to a snack presented with a rounded calorie label (i.e. 100 calories), a snack presented with an odd calorie label (i.e. 99 calories) leads to lower calorie magnitude perceptions.

It is evident that consumers respond differently to healthy (hedonic) food and unhealthy (utilitarian) food, the one could result in guilt where the other wouldn't (Mohr et al., 2012; Wansink and Chandon, 2007; Antonetti and Baines, 2014; Mishra and Mishra, 2011; Mohr et al., 2012; Rozin et al., 1999), due to the fact that healthy products are often perceived as low in calorie content compared to unhealthy products (Chernev, 2011). Moreover, people tend to feel more guilty about eating high calorie foods (King, Herman and Polivy, 1987) and less guilty with lower calorie magnitude judgments (Choi et al. 2019). It can therefore be concluded that calorie magnitude perceptions affect the interaction of calorie ending presentation on anticipated consumption guilt, which results in the following hypotheses:

H2: The higher the perceived calorie magnitude the more anticipated consumption guilt.

The relation between guilt and consumption has been widely studied and demonstrated a clear relation between guilt and consumption intentions (Agrawal and Duhachek, 2010; Dahl et al., 2005; Duhacheck et al., 2012), presenting that less guilt results in higher consumption intentions (Mohr et al. 2012; Wansink and Chandon, 2006; Saintives, and Lunardo, 2016).

According to the previous discussed literature it is suggested that consumption guilt negatively affect consumption intentions and results in the following hypotheses:

H3: The higher the anticipated consumption guilt, the lower the consumption intentions

According to previously discussed literature, consumers' who differ in dietary restraint respond differently to front of package labelling, nutritional information and health cues which results in different consumption behaviour (Coelho do Vale, Pieters and Zeelenberg 2008; Payne, Niculescu, and Barney 2014; Scott et al. 2008). Consumers' that are high on dietary restraint are more focussed on being healthy and maintaining their "ideal weight" (Bublitz et al., 2010) while low dietary restraint consumers' are more focussed on taste and pleasure (Payne et al., 2014).

Both a tendency to avoid unhealthy food and a desire to perceive calorie amounts as lower should influence how dietary restrained consumers evaluate food products. On the other hand, people who are low on dietary constraint will focus less on food labels, since they are more focussed on taste and pleasure. Therefore, in this study it is suggested that dietary restraint moderates the effect of calorie magnitude perceptions on consumption guilt, which results in the following hypothesis:

H4: The effect of calorie magnitude perceptions on anticipated consumption guilt is moderated by individual differences in dietary constraint. Compared with (a) people with low dietary restraint, (b) people with high dietary constraint are more positively affected by calorie magnitude perceptions on anticipated consumption guilt.

3. Methodology

This study investigates the effect of nine-ending calorie presentation on consumption intentions under dietary restraint and anticipated guilt. If consumers focus on the leftmost digit, they should perceive the magnitude of a nine-ending vs a round ending calorie food product as relatively lower which results in lower anticipated guilt and increased consumption intentions, hence the level effect (Choi, Li and Semper, 2019).

3.1 Study design

In order to investigate the effect of calorie ending presentation on consumption intentions an experimental study was conducted. In addition, the consequences regarding the dietary restraint and the anticipated guilt were investigated. In this experiment the calorie ending presentation (odd-ending vs round-ending) were manipulated. To make the experiment more robust, the effect of calorie ending presentation on consumption intentions was checked over either three healthy snacks or three unhealthy. Since it is evident that consumers respond differently to healthy (hedonic) food and unhealthy (utilitarian) food, where the one could result in guilt where the other wouldn't (Mohr et al., 2012; Wansink and Chandon, 2007; Antonetti and Baines, 2014; Mishra and Mishra, 2011; Mohr et al., 2012; Rozin et al., 1999), due to the fact that healthy products are often perceived as low in calorie content compared to unhealthy products (Chernev, 2011).

The snacks that were chosen are a banana, an apple and a "Snelle Jelle Zero Kruidkoek" as a healthy snack. According to the "Schijf van Vijf" of "The Netherlands Nutrition Centre" (Voedingcentrum), a banana and an apple are considered to be a healthy alternative (Voedingcentrum, n.d.) and a "Snelle Jelle Zero Kruidkoek" has the highest Nutri-score (A) according to the Dutch consumer organization (De Consumentenbond). Nutri-score is a nutrition label that is used in the Netherlands, the Nutri-score converts the nutritional value of products into a code ranging from A (highest) to E (lowest) score. The calculated Nutri-score is based on a scientific algorithm and it takes account the nutrients to avoid (energy value, sugars, saturated fats and salt) and the positive nutrients like fibres, protein and fruit (Consumentenbond, 2019).

The three alternatives that were used as an unhealthy snack are a small bag of crisps, two "Oreo" cookies and yoghurt rice crackers. The three unhealthy snacks have a low Nutri-score (E) and are not included in the Schijf van Vijf, the snacks can therefore can be classified as unhealthy (Voedingcentrum, n.d.; Consumentenbond, 2019).

Furthermore, all the six snacks are chosen because of their calorie content being around 100 calories, which makes the experiment more realistic.

The experiment was conducted using the online survey program Qualtrics. The participants were randomly assigned across four conditions (99 vs. 100 caloric condition) and (healthy vs. unhealthy snack). Therefore, four different conditions can be distinguished as can be seen in table 4.

Table 4. Overview of experimental conditions.

	<i>99 calories</i>	<i>100 calories</i>
<i>Three healthy snacks</i>	(1) Healthy + odd ending	(2) Healthy + round ending
<i>Three unhealthy snacks</i>	(3) Unhealthy + odd ending	(4) Unhealthy + round ending

The first condition is demonstrated in figure 5, 6 and 7, three healthy snacks with odd ending calorie presentation.



Figure 5. Healthy snack #1 with odd ending calorie presentation



Figure 6. Healthy snack #2 with odd ending calorie presentation



Figure 7. Healthy Snack #3 with odd ending calorie presentation.

The second condition is the same as condition one, but with a round ending calorie presentation of 100 calories. The third condition is demonstrated in figure 8, 9 and 10. Also the four condition is similar to condition three but with round ending calorie presentation (100 calories) instead of odd ending (99 calories).



Figure 8. Unhealthy Snack #1 with odd ending calorie presentation



Figure 9. Unhealthy Snack #2 with odd ending calorie presentation



Figure 10. Unhealthy Snack #3 with odd ending calorie presentation

3.2 Participants

This study was focused on the Dutch population and therefore, the target group consisted only of Dutch speaking people who were 16 years old and older. To create a realistic setting for these participants, the language of the experimental survey was in Dutch. The aim was to reach at least 200 participants; 50 participants per condition. There was no reward for participating in the study. The survey was conducted from week 48 of 2019 to week 2 of 2020. The survey was distributed via social media channels, mailing lists and advertising at Wageningen University.

In total 406 people participated in the research. Out of these responses 106 people did not finish the survey and 12 people have allergies. Therefore, N=288 (73,89%) respondents were used for the analysis of which 76 filled in the survey for the healthy snack with the odd calorie labelling, 75 for the healthy snack with the even calorie labelling, 66 for the unhealthy snack with the odd calorie labelling, and lastly 81 respondents completed the questionnaire for the unhealthy snack with the even calorie labelling.

3.3 Procedure

Participants of the current research started the online survey on the questionnaire programme Qualtrics. Once the participant clicked the link to Qualtrics, an introduction with a short explanation about the questionnaire was given. This short explanation participants were told that the study consists of consumer interests in popular snacks in the Netherlands and how the participants might feel about eating a snack. Also in the introduction, it was stated that the participants would remain anonymously and that their answers will be treated confidentially, furthermore the participants were informed that there were no “right” or “wrong” answers and were thanked in advance for their participation (informed consent)

After the introduction, the participants were randomly assigned in different groups with one of the four conditions. In each group the participants were presented with three pictures of either a healthy snack or an unhealthy snack, with a calorie ending presentation of 99 or 100 calories. The pictures of snacks were shown separately and for every picture the participants were asked questions about their consumption intentions after they have seen the picture. After reporting their consumption intentions, the participants were asked how they would compare the calorie content of the snack on the picture in comparison to other snacks. Thirdly, the participants were asked to report their perceptions of the snacks they just saw in terms of guilt. Lastly, the participants were asked ten questions about restrained eating, to measure their dietary restraint.

The last part of the questionnaire was regarding gender, age and allergies about food products. These questions will help to exclude any participants who are too young to participate or can't eat the snacks on the pictures due to allergies. Finally, a concluding page thanked the participants again for their participation.

3.4 Measurements

The variables that are used in the conceptual framework were measured using different scales. The questions were initially prepared in English and then translated to Dutch. To avoid any misinterpretation due to possible language barriers, both the English and the Dutch questions are shown in the tables of each variable's measurement scale.

3.4.1 Consumption intentions (Dependent variable)

The items to measure consumption intentions are adapted from Mackenzie et al. (1986), using three nine-point scales: unlikely/likely, definitely would not/definitely would, not probable/probable. After averaging these three items over all three products to create the consumption intentions scale ($M = 4.05$, $SD = 0.85$) a Cronbach's α was found of 0.63 ($N=9$). According to a Pearson correlation matrix (appendix 2) question three "very improbable / very probable" has a low correlation score. Therefore, the decision is made to average the first two items over all three products and leave out "very improbable / very probable". After averaging these two items over three products to create the consumption intentions scale ($M = 4.02$, $SD = 1.51$) a Cronbach's α was found of 0.81 ($N=6$).

Table 5. Consumption intentions.

<i>Consumption intentions</i>	
<i>If you were going to get a snack, the chance of you consuming this snack is:</i>	<i>Als u een snack gaat eten, de kans dat u deze snack eet is:</i>
1. Very unlikely (1) / Very likely (7)	1. Erg onwaarschijnlijk (1) / Zeer waarschijnlijk (7)
2. Very impossible (1) / Very possible (7)	2. Onmogelijk (1) / Mogelijk (7)
3. Very improbable (1) / Very probable (7)	3. Erg onaannemelijk (1) / Erg aannemelijk (7)

3.4.2 Calorie magnitude perceptions (Mediator)

To capture the subjective nature of calorie magnitude perceptions, participants have to rate the calorie amount relative to other snacks. This scale is used to measure calorie magnitude perceptions by Choi, Li and Semper (2019). “How would you compare the snack you just saw to other types of snacks”? (1= It has relatively fewer calories, 7= It has relatively more calories). This item was averaged over all three products and used to measure the calorie magnitude perceptions. (M= 3.58, SD = 1.46) with a Cronbach’s α of 0.68 (N=3)

Table 6. Calorie magnitude perceptions.

<i>Calorie magnitude perceptions</i>	
<i>How would you compare the snack you just saw to other types of snacks?:</i>	<i>Hoe zou u de snacks vergelijken met andere soorten snacks?</i>
1. “This snack has relatively few calories” (1) “This snack has relatively a lot of calories” (9)	1. “Deze snack bevat relatief weinig calorieën” (1) “Deze snack bevat relatief veel calorieën” (9)

3.4.3 Anticipated consumption guilt (Mediator)

To measure anticipated consumption guilt, most studies in consumer research used scales adapted to their specific context (Kivetz and Simonson, 2002). One scale that is used to measure consumption guilt is the scale of Lee-Wingate & Corfman, (2010), that is also used by Choi, Li and Samper (2019) using the following adjectives: guilty, sorry, regretful, uneasy, hesitant and reluctant. To assess the anticipated consumption guilt in this study, the participants are asked: “How guilty/sorry/regretful/uneasy/hesitant would you feel about eating this banana/chocolate bar as a snack? (1= Not at all, 7= Extremely). The six items were averaged over all three products to create the anticipated consumption guilt scale (M= 2.365, SD = 1.22) with a Cronbach’s α of 0.94 (N=18)

Table 7. Anticipated consumption guilt.

<i>Anticipated consumption guilt</i>	
<i>Please indicate to which extent you agree or disagree with the following statements: (1= Not at all, 7= Extremely)</i>	<i>Geef aan in hoeverre u het eens bent met de volgende stellingen: (1= Helemaal niet, 7= Heel erg)</i>
1. “I feel regretful about eating this snack” 2. “I feel guilty about eating this snack” 3. “I feel sorry about eating this snack” 4. “I feel uneasy about eating this snack” 5. “I feel hesitant about eating this snack” 6. “I feel reluctant about eating this snack”	1. “Ik heb een schuldgevoel bij het eten van deze snack” 2. “Ik voel mij schuldig bij het eten van deze snack” 3. “Ik heb medelijden met mijzelf bij het eten van deze snack” 4. “Ik voel mij ongemakkelijk bij het eten van deze snack” 5. “Ik voel mij huiverig bij het eten van deze snack” 6. “Ik voel mij aarzelend bij het eten van deze snack”

3.4.4 Dietary restraint (Moderator)

The scale to measure dietary restraint is the restrained eating scale by van Strien (1986). The participants were asked to respond to ten statements on five-point Likert scales. (1= Never, 2= Rarely, 3= Occasionally, 4= Often, 5= Very often) The ten items were averaged to create dietary restraint scale (M= 2.45, SD = 0.69) with a Cronbach's α of 0.87 (N=10)

Table 8. Dietary restraint.

<i>Dietary restraint</i>	
<i>Please indicate how often the following statements apply to you: (1= Never, 2= Rarely, 3= Occasionally, 4= Often, 5= Very often)</i>	<i>Geef aan hoe vaak de onderstaande stellingen bij u van toepassing zijn: (1= Nooit, 2= Zelden, 3= Soms, 4= Vaak, 5= Heel vaak)</i>
1. "When you gain a little weight, do you eat less than you usually do?"	1. "Wanneer je iets zwaarder bent geworden, eet je dan minder als je dat je gewoonlijk doet?"
2. "Do you try to eat less during meals than you actually want?"	2. "Probeer je minder te eten tijdens maaltijden dan dat je eigenlijk zou willen?"
3. "How often do you refuse to eat or drink because you are afraid that you will become heavier?"	3. "Hoe vaak weiger je eten of drinken omdat je bang bent dat je zwaarder wordt?"
4. "Do you keep track exactly what you eat?"	4. "Houd je exact bij wat je eet?"
5. "Do you intentionally eat products from which you lose weight?"	5. "Eet je opzettelijk producten waarvan je afvalt?"
6. "If you eaten too much, do you eat less the upcoming days?"	6. "Wanneer je teveel hebt gegeten, eet je dan de daarop volgende dagen minder?"
7. "Do you intentionally eat less to prevent in getting heavier?"	7. "Eet je opzettelijk minder om te voorkomen dat je zwaarder wordt?"
8. "How often do you try to not take snacks because you pay attention to your weight?"	8. "Hoe vaak probeer je geen tussendoortjes te nemen omdat je op je gewicht let?"
9. "How often do you try to not eat at night because you pay attention to your weight?"	9. "Hoe vaak probeer je 's avonds niet te eten omdat je op je gewicht let?"
10. "Do you take your weight into account when you eat?"	10. "Houd je rekening met je gewicht wanneer je eet?"

3.4.5 Background questions

Demographic information was gathered through three background questions regarding an open question about age, a multiple-choice question regarding gender and an open question regarding food allergies.

Table 9. Background questions

<i>Background questions</i>	
<i>Please answer the following questions:</i>	<i>Beantwoord de volgende vragen:</i>
1. "What is your age?"	1. "Wat is je leeftijd?"
2. "What is your gender?"	2. "Wat is je geslacht?"
3. "Do you have any food allergies?"	3. "Heb jij voedsel allergieën?"

3.5 Data analysis

The gathered data of this study was analysed performing several statistical analyses using the statistical program IBM SPSS Statistics 26. To measure the reliability of the constructs, a Cronbach's Alpha was used. Firstly, descriptive statistics were used to extract means, percentages and standard deviations from the data. The dataset was explored by checking for outliers and participants with an allergy for one or more of the products in the survey were removed from the dataset. As a randomization check, a one-way ANOVA and a chi-square test were used to check if age and dietary restraint were equally divided across the four conditions. A p-value of <0.05 is maintained to check whether the statistical results are found significant.

A one-way ANOVA was used to test for statistically significant differences in the effects of calorie ending presentation on calorie magnitude perceptions (H1). A simple linear regression analysis was used to test the effect of calorie magnitude perceptions on anticipated consumption guilt (H2). For the third hypothesis (H3), a linear regression analysis was used to analyse the relationship between anticipated consumption guilt and consumption intentions. To test the moderation interaction effect of dietary restraint on the relation between calorie magnitude perceptions and anticipated consumption guilt, a multiple linear regression has been used (H4). Prior to the multiple regression analysis, a new moderator interaction variable was created by multiplying dietary restraint with calorie magnitude perceptions. Lastly, one-way ANOVA's were used to test the direct effect of calorie ending presentation on anticipated consumption guilt and consumption intentions.

4. Results

4.1 Descriptive statistics & randomization check

Among the 288 respondents, 81 (28.1%) were male and 207 (71.9%) were female. A chi-square test was performed to determine whether gender was equally divided across the conditions. This test showed no significant effect, which indicates that males and females are equally distributed across the four different conditions $\chi^2 (1) = 2.467$ ($p = 0.116$). Respondents were between 16 and 82 years old with an average age of 38 ($SD=18.85$), the age and mean dietary restraint can be seen in table 10. A randomization check was used to check if age and dietary restraint were randomly distributed among the four conditions. This was done by conducting a one-way ANOVA to compare age and dietary restraint among the four different conditions. The test showed also that age $F (56, 52) = 1.058$, $p = 0.420$ and dietary restraint $F (31, 52) = 0.827$, $p = 0.711$ did not significantly differ between the four conditions.

Table 10: Participant characteristic per condition ($N = 288$).

	Healthy Snack	Healthy Snack	Unhealthy Snack	Unhealthy Snack
	99 Calories Condition ($N=74$)	100 Calories Condition ($N=72$)	99 Calories Condition ($N=63$)	100 Calories Condition ($N=79$)
	Mean (SD) or Number (%)	Mean (SD) or Number (%)	Mean (SD) or Number (%)	Mean (SD) or Number (%)
Age (years)	38.09 (18.11)	36.78 (19.05)	38.65 (19.16)	38.89 (19.32)
Dietary restraint	2.44 (0.72)	2.48 (0.66)	2.52 (0.66)	2.34 (0.73)

4.2 Main analyses of hypotheses.

A one-way ANOVA was used to test the effect of calorie ending presentation on consumption intentions, anticipated consumption guilt and calorie magnitude perceptions. An overview of the means, standard deviations and statistical results can be found in table 11 below.

	99 Calories Condition	100 Calories Condition	Test statistic	p-value	η^2
	Mean (SD)	Mean (SD)			
Consumption intentions					
Consumption intentions healthy snacks	5.19 (0.89)	2.67 (1.62)	$F (1, 144) = 136.316$	<0.001	0.486
Consumption intentions unhealthy snacks	4.08 (1.18)	4.14 (1.04)	$F (1, 142) = 0.127$	0.722	0.001
Consumption intentions all snacks	4.68 (1.17)	3.44 (1.54)	$F (1, 286) = 58.180$	<0.001	0.169
Anticipated consumption guilt					
Anticipated consumption guilt healthy snacks	1.73 (0.67)	2.72 (1.58)	$F (1, 144) = 24.461$	<0.001	0.145
Anticipated consumption guilt unhealthy snacks	2.62 (1.20)	2.41 (1.02)	$F (1, 142) = 1.356$	0.246	0.01
Anticipated consumption guilt all snacks	2.14 (1.05)	2.55 (1.32)	$F (1, 286) = 8.520$	0.004	0.29
Calorie magnitude perceptions					
Calorie magnitude perceptions healthy snacks	2.96 (1.11)	2.74 (1.75)	$F (1, 144) = 0.853$	0.357	0.006
Calorie magnitude perception unhealthy snacks	4.14 (1.06)	4.45 (0.95)	$F (1, 140) = 3.537$	0.062	0.25
Calorie magnitude perception all snacks	3.50 (1.23)	3.63 (1.63)	$F (1, 286) = 0.613$	0.434	0.002

Table 11: Means, standard deviations and test statistics per condition ($N = 288$).

4.2.1 Calorie magnitude perceptions

It was hypothesized that a snack with a rounded calorie label (i.e. 100 calories) leads to higher calorie magnitude perceptions compared to a snack with an odd calorie label (i.e. 99 calories). To test this hypothesis, a one-way ANOVA was conducted. Results from the one-way ANOVA (table 11) showed no significant effects for calorie ending presentation on calorie magnitude perception of healthy snacks, unhealthy or all snacks, since all the p-values are found insignificant ($p = 0.357 / 0.062 / 0.434$). Therefore, $H1$ is rejected.

4.2.2 Anticipated consumption guilt

To test the direct effect of calorie ending presentation on anticipated consumption guilt, again a one-way ANOVA was used. Results from a one-way ANOVA (Table 11) showed a significant effect of calorie ending presentation on anticipated consumption guilt for either healthy snacks $F(1, 144) = 24.461$, $p < 0.001$ and for all snacks $F(1, 286) = 8.520$, $p = 0.004$. In contrast, the one-way ANOVA did not show a significant effect of calorie ending presentation on unhealthy snacks $F(1, 142) = 1.356$, $p = 0.246$. As can be seen in figure 11, respondents perceive noticeably higher anticipated consumption guilt for healthy snacks presented as 100 calories compared to healthy snacks presented as 99 calories.

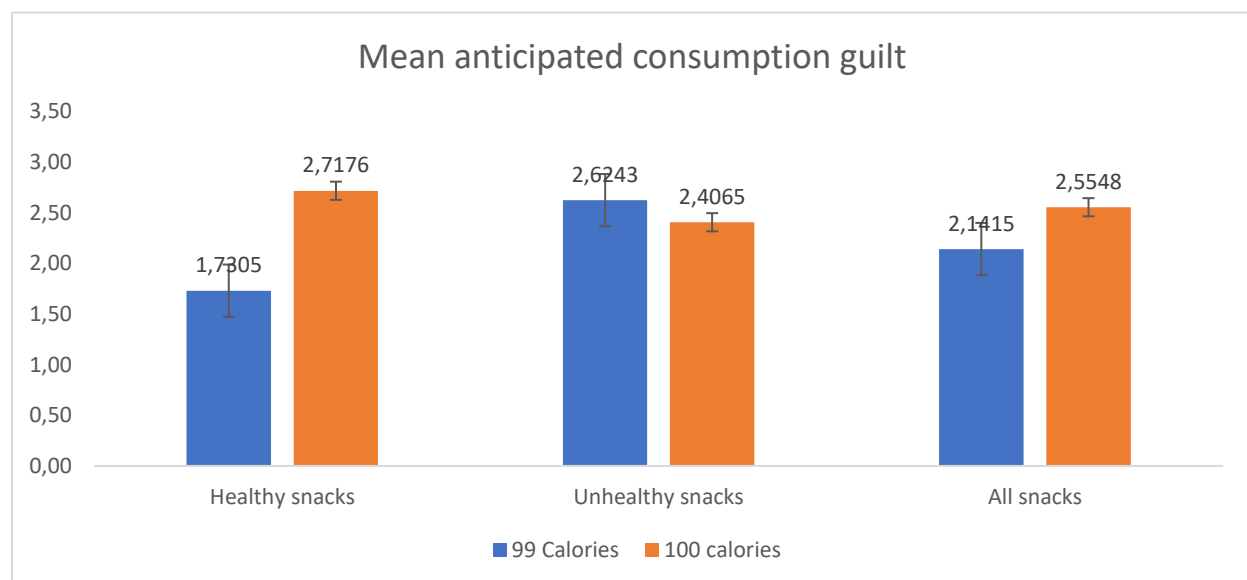


Figure 11: Mean anticipated consumption guilt by calorie ending presentation. Error bars represent standard errors.

Secondly, a linear regression analysis was used to test the direct effect of calorie magnitude perceptions on anticipated consumption guilt. The results of the linear regression showed that the model explained 25.1% of the variance ($R^2 = 0.251$), $F(1, 286) = 95.811$, $p < 0.001$. Calorie magnitude perceptions were found to be a significant predictor of anticipated consumption guilt ($\beta = 0.501$, $p < 0.001$). As can be seen in figure 12, the higher the calorie magnitude is perceived by the respondents, the more anticipated consumption guilt they feel. These results support $H2$.

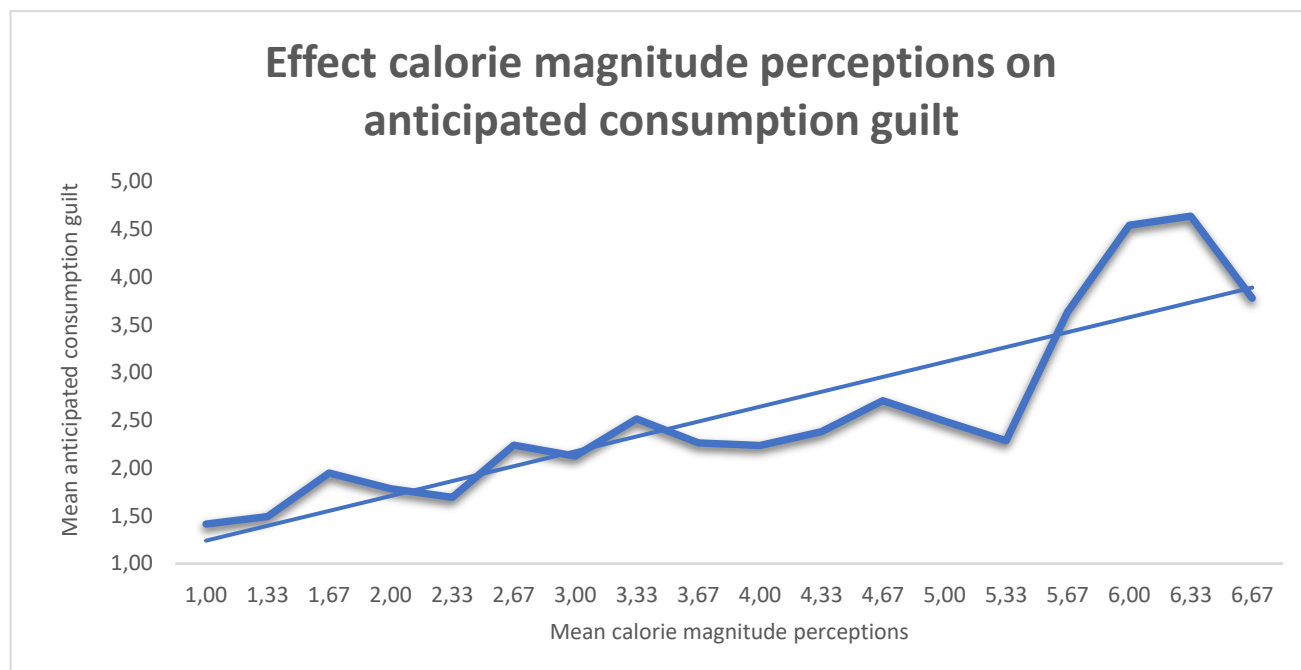


Figure 11: Effect calorie magnitude perceptions on anticipated consumption guilt.

4.2.3 Consumption intentions

As can be seen in figure 12 the mean consumption intentions for healthy snacks are considerably higher with a calorie ending presentation of 99 calories (5.19) compared to a calorie ending presentation of 100 calories (2.67). This effect is also found significant in a one-way ANOVA $F(1, 144) = 136.316$, $p < 0.001$. (Table 12) In contrast to healthy snacks, the consumption intentions for unhealthy snacks with a calorie ending presentation of 100 shows a slight increase compared to a 99 calorie ending presentation. An ANOVA of calorie ending presentation on unhealthy snacks, showed no significant effect $F(1, 142) = 0.127$, $p = 0.722$. Lastly, consumption intentions for all snacks are higher for snacks labelled as 99 calories (4.68) compared to 100 calories (3.44), which is mostly driven by the healthy snacks. A one-way ANOVA was conducted to test whether this difference in mean consumption intentions for all snacks between 99 and 100 calories is found significant. The test showed a significant main effect of calorie ending presentation on all snacks $F(1, 286) = 58.180$, $p < 0.001$.

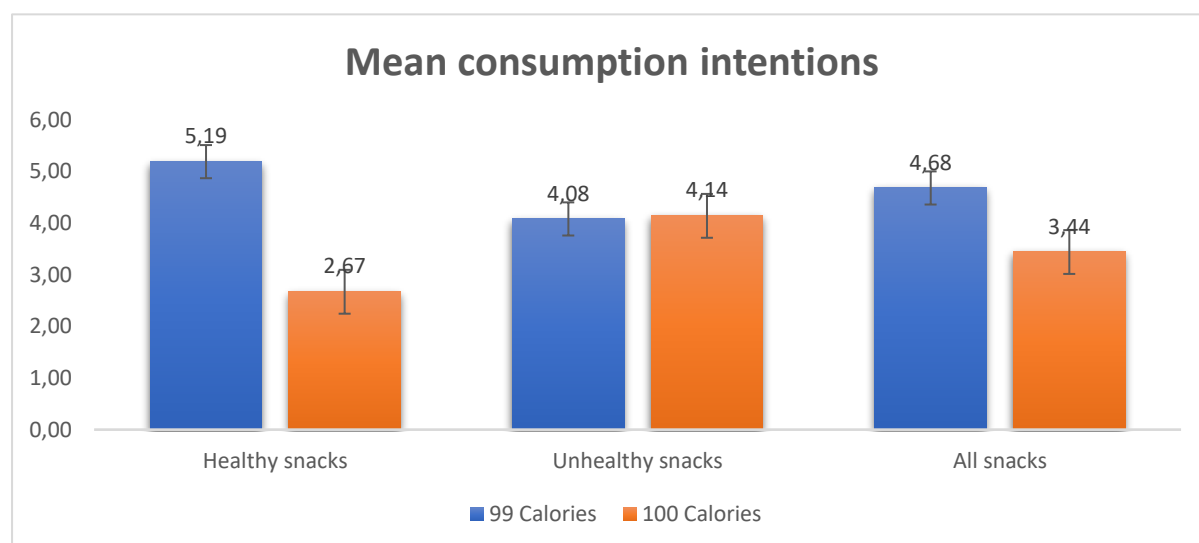


Figure 12: Mean consumption intentions by calorie ending presentation. Error bars represent standard errors.

To test whether anticipated consumption guilt is a significant predictor of consumption intentions, a simple linear regression was used. The results of the model indicated that anticipated consumption guilt did not explain any variance for all snacks ($R^2 = 0.000$), $F(1, 286) = 0.114$, $p = 0.735$. Anticipated consumption guilt was not found to be a significant predictor of consumption intentions ($\beta = -0.20$, $p = 0.735$). It was hypothesized that the more anticipated consumption guilt is perceived, the lower the consumption intentions will be. Since no statistic values are found to be significant for all snacks, $H3$ is rejected. For healthy snacks only, anticipated consumption guilt was found to explain 2.3% of the variance ($R^2 = 0.023$) $F(1, 144) = 3.420$, $p = 0.066$ but was not found to be a significant ($\beta = 0.152$, $p = 0.066$).

Interestingly, anticipated consumption guilt does seem to be a significant predictor of consumption intentions for unhealthy snacks only ($\beta = -0.382$, $p < 0.001$), and explained 14.6% of the variance ($R^2 = 0.146$), $F(1, 140) = 23.927$, $p < 0.001$. As can be seen in figure 13 the more anticipated consumption guilt the respondents perceive for unhealthy snacks the lower their consumption intentions are.

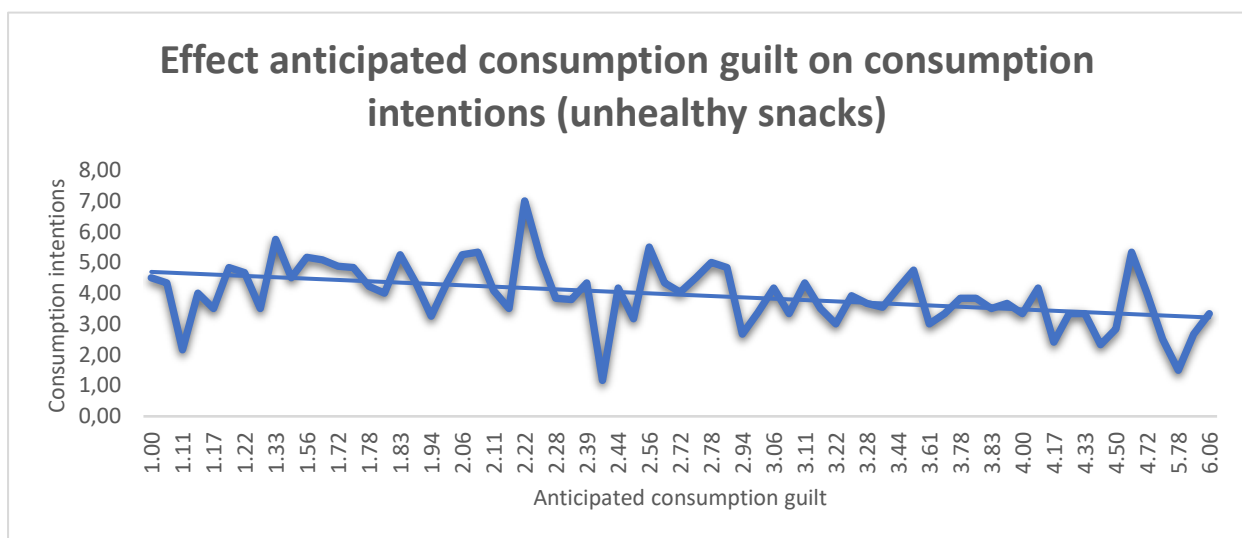


Figure 13: Effect anticipated consumption guilt on consumption intentions (unhealthy snacks)

4.2.4 Dietary restraint

The moderating effect of dietary restraint on the relationship between calorie magnitude perceptions and anticipated consumption was tested using a multiple linear regression analysis. The results show that the model explained 94% of the variance ($R^2 = 0.940$), $F(3, 284) = 1488.70$, $p < 0.001$. The main effect of calorie magnitude perceptions is found insignificant with $\beta = 0.26$, $p = 0.126$, whereas the main effect of dietary restraint is found significant $\beta = -0.444$, $p < 0.001$. The construct dietary restraint does significantly influence the effect of calorie magnitude perceptions on anticipated guilt, as the interaction variable show a regression coefficient of $\beta = 1.155$ and a p-value of < 0.001 . Consequently, the data does support $H4$.

To provide a division of two groups of dietary restraint, those who are low and those who are high on dietary restraint, a median split was used, with a median of 2.5 and a standard deviation is 0.7. Respondents with an average score of dietary restraint of 1.8 and below are distinguished as low dietary restraint, as respondents with an average dietary restraint of 3.2 or higher are distinguished as high dietary restraint. As can be seen in figure 14, respondents who are low on dietary restraint (1 standard deviation below median) have less anticipated consumption guilt for snacks labelled as 99 or 100 calories compared to respondents who are high in dietary restraint (1 standard deviation above median).

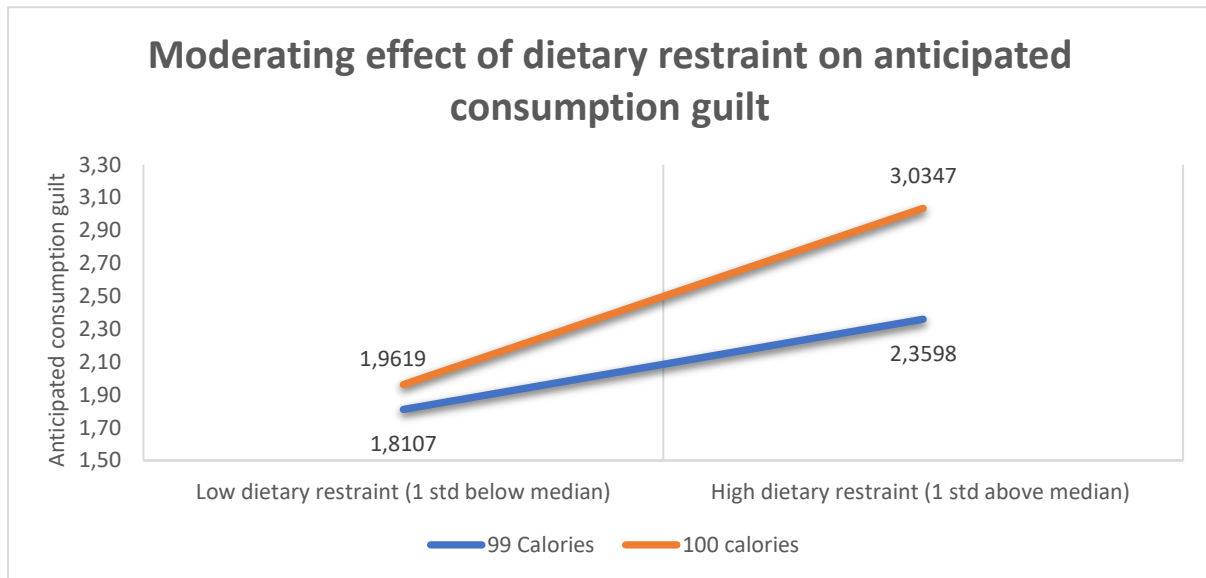


Figure 14: Moderating effect of dietary restraint on anticipated consumption guilt.

4.3. Overview of main findings

The conceptual model below (figure 15) provides an overview of the main results of the data analysis. Significant results (p -value < 0.005) are highlighted in green, while the insignificant results (p -value > 0.005) are highlighted in red.

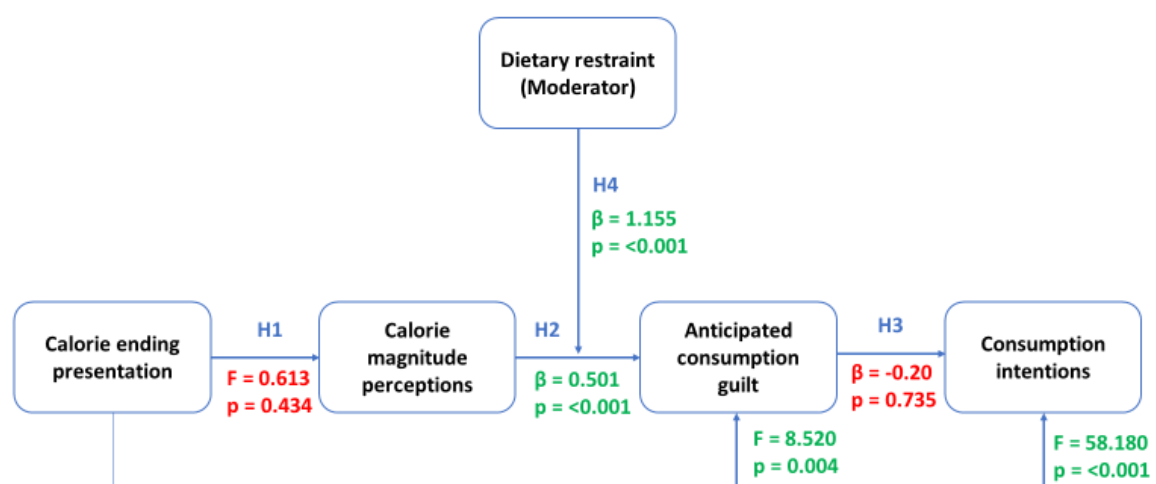


Figure 15: Overview of main findings

5. Discussion

The purpose of this study was to investigate the effects of calorie ending presentation on calorie magnitude perceptions, anticipated consumption guilt and consumption intentions. This was tested with the use of an experimental design where respondents were exposed to calorie labels on either healthy or unhealthy snacks labelled as 99 calories or 100 calories.

Remarkable results were found for the effects of calorie ending presentation on consumption intentions. It was expected that calorie ending presentation would significantly affect the consumption intentions for unhealthy snacks, as it is found twice before by Minton, Liu and Lee (2018) and Choi, Li & Samper (2019). In contrast, consumption intentions slightly increased under a 100 calorie condition compared to the 99 calorie condition for unhealthy snacks. Although, the consumption intentions for healthy snacks are considerably lower with a 100 calorie presentation compared to a 99 calorie presentation and was found significant. This effect was also found significant for all snacks, mostly driven by healthy snacks. It could be argued that consumers who prefer a healthy snack, assume that the snack is low on calories (<100) and therefore a “smart” choice. But when the healthy snack is labelled as 100 calories, it is not seen as a “smart” snack anymore which leads to lower consumption intentions.

Another unexpected result was found in the relation between anticipated consumption guilt and consumption intentions. It was hypothesized that the more anticipated consumption guilt respondents perceive, the lower their consumption intentions will be as in line with prior research (Mohr et al. 2012; Wansink and Chandon, 2006; Saintives, and Lunardo, 2016). Nevertheless, this effect was only found for unhealthy snacks. Although respondents perceive more anticipated guilt when exposed to a 100 calorie label compared to a 99 calorie label, the level of anticipated guilt did not affect their consumption intentions for healthy snacks. It could therefore be argued that even though a snack has more calories, the “healthy” part weighs stronger, which makes the amount of calories negligible. Further research could investigate why calorie ending presentation does affect both anticipated consumption guilt and consumption intentions for healthy snacks separately, but anticipated consumption does affect the consumption of healthy snacks. One could speculate that anticipated consumption guilt is not a good predictor for consumption of healthy products and therefore a better predictor should be investigated.

It was expected that the respondents respond differently to calorie ending presentation that ends with an odd number compared a round number (Stiving & Winer, 1997; Manning & Sprott, 2009; Choi et al., 2019). For that reason, it was hypothesized that snacks with an odd calorie label (e.g. 99 calories) leads to lower calorie magnitude perceptions than snacks with a rounded calorie label (e.g. 100 calories). However, in contrast to these expectations, no evidence is found that calorie ending presentation significantly affect calorie magnitude perceptions. In addition, it was hypothesized that the higher the perceived calorie magnitude the more anticipated consumption guilt the respondents feel, since people tend to feel more guilty about eating food that is high in calorie, compared to low calorie food due to calorie magnitude judgements (King, Herman and Polivy, 1987; Choi et al. 2019). The study confirmed this hypothesis since calorie magnitude perceptions significantly affect anticipated consumption guilt. Interestingly, calorie ending presentation did have a significant effect on anticipated consumption guilt for healthy snacks, where the mean anticipated consumption guilt is moderately higher for 100 calories compared to 99 calories. In contrast, there is found no evidence for this effect on unhealthy snacks, where the guilt is lower on 100 calories compared to 99 calories and not find significant.

As expected, respondents who differ in their dietary restraint, respond differently to calorie ending presentation. Dietary restraint can be defined as a pattern of mindful attempts to control calorie intake either to lose weight or to prevent weight gain (Stunkard and Messick, 1985). In this study it is found that dietary restraint strongly moderates the relationship between calorie magnitude perceptions and anticipated consumption guilt.

In sum, this study has shown some conflicting and unexpected results. On the one hand, the study shows some strong significant effects for calorie ending presentation on anticipated consumption guilt and consumption, particularly driving by healthy snacks. Whereas it was expected to find these results for unhealthy snacks. A possible explanation could be that the respondents are more focussed on taste than on calories for unhealthy snacks. Another explanation could be that consumers sometimes even prefer a higher amount of calories. This could be interesting to examine in future research. Furthermore, it could be interesting to investigate the effect of calorie ending presentation on food products that are high in calorie content (e.g. 699 or 700 calories).

This study contains some limitations. Firstly, the questions about calorie magnitude perceptions of the products had a relatively low score on reliability ($\alpha = 0.67$), which indicated that the statements were acceptable for the study but could be improved in future research. Secondly, this study measured anticipated guilt and consumption intentions over different food products. In the survey no question was asked regarding food preference on these products. Therefore, food preference was not taken into account but could have influenced the consumption intentions or anticipated consumption guilt. Thirdly, the underlying mechanism, hence the level- or image effect has not been fully identified. Even though a significant effect is found between calorie ending presentation and consumption intentions, it is not proven that this result relies on the level- or image effect or due to a different explanation. This could be further investigated with an eye tracker research to gain more precise information on the effect of this phenomenon, as done in psychological pricing research. Lastly, this study is done in a hypothesized setting, which influences the external validity of the results. Therefore, it is suggested to investigate the effect of calorie ending presentation in a more realistic setting in the future to increase the external validity and the robustness of the findings.

As far as the researcher knows, calorie ending presentation is a newly known phenomenon which has been barely researched. Only two series of studies were conducted, one by Choi, Li & Samper (2019) and one by Minton, Liu and Lee (2018) who were merely focused on unhealthy products. Therefore, this research provides a valuable contribution to this new field of enquiry, while also researching the effect of calorie ending presentation on healthy products. Overall, this study proves evidence for the relationship between calorie ending presentation and consumption intentions. In contrast to the study of Choi, Li & Samper (2019) that only measure the effect of indulgent (unhealthy) foods, this study measured the effect of calorie ending presentation on both unhealthy and healthy foods. Therefore, this study enlarges the body of evidence of the relation between perceptions of calorie magnitude and the related consumption guilt. In line with the findings of Choi, Li & Samper (2019), a difference of just one calorie can have a significant impact on either a consumers' guilt level as their consumption intentions. Also the effect of dietary restraint that is found significant contributes to the knowledge in the way consumers differ in their interpretation of calorie labelling and therefore be more or less vulnerable to these cues.

To summarize, this study deepens the understanding of the effect of calorie ending presentation, resulting in implications for consumers, retailers and policy makers that aim for a healthier society. For example, in this study it is found that respondents have significantly lower consumption intentions for healthy snacks labelled as 100 calories compared to 99 calories. So, by labelling healthy snacks with odd ending calorie labels (e.g. 99, 199) one could persuade consumers to consume healthy snacks instead of an unhealthy snack. Moreover, this study showed that calorie ending presentation does affect the level of guilt perceived by a consumer, but that it does not affect consumption intentions for healthy snacks. It could therefore be argued that guilt isn't a good predictor to influence healthy consumption behaviour.

6. Bibliography:

Agrawal, N. and Duhachek, A. (2010), "Emotional compatibility and the effectiveness of anti-drinking messages", *Journal of Marketing Research* , 47(2) . 263-273.

Antonetti, P. and Baines, P. (2015), "Guilt in marketing research: an elicitation–consumption perspective and research agenda", *International Journal of Management Reviews* , 17(3). 333-355.

Aydinoğlu, N. Z., & Krishna, A. (2010). Guiltless gluttony: The asymmetric effect of size labels on size perceptions and consumption. *Journal of Consumer Research*, 37(6), 1095-1112.

Baumeister, R.F. , Stillwell, A.M. and Heatherton, T.F. (1995), "Personal narratives about guilt: role in action control and interpersonal relationships", *Basic and Applied Social Psychology* , 17(1/2). 173-198.

Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current directions in psychological science*, 16(6), 351-355.

Baumeister, R.F., Stillwell, A.M. and Heatherton, T.F. (1994). Guilt: an interpersonal approach. *Psychological Bulletin*, 115. 243– 267.

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.

Blundell, H. J., & Hine, P. (2018). Non-communicable diseases: ditch the label and recapture public awareness. *International health*, 11(1), 5-6.

Borgmeier, I., & Westenhoefer, J. (2009). Impact of different food label formats on healthiness evaluation and food choice of consumers: a randomized-controlled study. *BMC public health*, 9(1), 184.

Brenner, G. A., & Brenner, R. (1982). Memory and markets, or why are you paying €2.99 for a widget?. *Journal of Business*, 147-158.

British Nutrition Foundation, 2018. Helping you eat well. Retrieved from <https://www.nutrition.org.uk/healthyliving/helpingyoueatwell/324-labels.html?start=3> on October 10th, 2019

Bublitz, M. G., Peracchio, L. A., & Block, L. G. (2010). Why did I eat that? Perspectives on food decision making and dietary restraint. *Journal of Consumer Psychology*, 20(3), 239-258.

CBS. Retrieved from <https://opendata.cbs.nl/statline/#/CBS/nl/dataset/81565NED/table?fromstatweb> on September 10th . 2019

Chernev, A. (2011). The dieter's paradox. *Journal of Consumer Psychology*, 21(2), 178-183.

Chernev, A., & Chandon, P. (2015). Calorie estimation biases in consumer choice. *Leveraging Consumer Psychology for Effective Health Communication*, 104-121.

Choi, J., Jessica Li, Y., & Samper, A. (2019). The Influence of Health Motivation and Calorie Ending on Preferences for Indulgent Foods. *Journal of Consumer Research*.

Choi, J., Li, Y. J., Rangan, P., Chatterjee, P., & Singh, S. N. (2014). The odd-ending price justification effect: the influence of price-endings on hedonic and utilitarian consumption. *Journal of the Academy of Marketing Science*, 42(5), 545-557.

Coelho do Vale, R., Pieters, R. & Zeelenberg, M. (2008) Flying under the radar: perverse package size effects on consumption self-regulation. *Journal of Consumer Research*, 35, 380– 390.

Consumentenbond, (2019). Retrieved from <https://www.consumentenbond.nl/gezond-eten/ontbijt-koek-langs-de-nutriscore-meetlat> On November 5th. 2019

Dahl, Darren, W., Heather Honea, and Rajesh v. Manchanda (2003), "The Nature of Self-Reported Guilt in Consumption Contexts," The Nature of Self-Reported Guilt in Consumption Contexts," *Marketing Letters*, 14(3), 159-171.

Dahl, D.W. , Honea, H. and Manchanda, R.J. (2005), "Three Rs of interpersonal consumer guilt: relationship, reciprocity, reparation", *Journal of Consumer Psychology* , 15(4). 307-315.

Dhar, R., & Simonson, I. (1999). Making complementary choices in consumption episodes: Highlighting versus balancing. *Journal of Marketing Research*, 36(1). 29-44.

Duhachek, A. , Agrawal, N. and Han, D. (2012), "Guilt versus shame: coping, fluency, and framing in the effectiveness of responsible drinking messages", *Journal of Marketing Research* , Vol. 49 No. 6. 928-941.

European Commission, (n.d.). Nutrition labelling. Retrieved from: https://ec.europa.eu/food/safety/labelling_nutrition/labelling_legislation/nutrition-labelling_en on February 19th. 2020

Fernan, C., Schuldt, J. P., & Niederdeppe, J. (2018). Health halo effects from product titles and nutrient content claims in the context of "protein" bars. *Health communication*, 33(12), 1425-1433.

Fletcher, Ben, Karen J. Pine, Zoe Woodbridge, and Avril Nash (2007), "How Visual Images of Chocolate Affect the Craving and Guilt of Female Dieters," *Appetite*, 48 (2), 211–17

Finkelstein, S.R. & Fishbach, A. (2010) When healthy food makes you hungry. *Journal of Consumer Research*, 37, 357– 367.

Food and Drug Administration, (2018). Questions and Answers on the Menu and Vending Machines Nutrition Labelling Requirements. Retrieved from: <https://www.fda.gov/food/food-labeling-nutrition/questions-and-answers-menu-and-vending-machines-nutrition-labeling-requirements> on October 13th, 2019

Gallicano, R., Blomme, R. J., & Van Rheede, A. (2012). "Consumer Response to Nutrition Information Menu Labeling in Full-Service Restaurants: Making the Healthy Choice", Joseph S. Chen in (ed.). *Advances in Hospitality and Leisure*, 8(1), 109-125

GDAfacts.eu, 2008. GDAs: Guideline Daily Amounts. Retrieved from [https://www.fooddrinkeurope.eu/uploads/publications_documents/GDAs - Guideline Daily Amounts.pdf](https://www.fooddrinkeurope.eu/uploads/publications_documents/GDAs_-_Guideline_Daily_Amounts.pdf) on October 10th, 2019

Goldsmith, K., Cho, E.K. and Dhar, R. (2012). When guilt begets pleasure: the positive effect of a negative emotion. *Journal of Marketing Research*, 49, 872– 881.

Han, D., Duhachek, A., & Agrawal, N. (2014). Emotions shape decisions through construal level: The case of guilt and shame. *Journal of Consumer Research*, 41(4), 1047-1064.

Harnack, L. J., & French, S. A. (2008). Effect of point-of-purchase calorie labeling on restaurant and cafeteria food choices: a review of the literature. *International Journal of Behavioral Nutrition and Physical Activity*, 5(1), 51.

Harnack, L. J., French, S. A., Oakes, J. M., Story, M. T., Jeffery, R. W., & Rydell, S. A. (2008). Effects of calorie labeling and value size pricing on fast food meal choices: results from an experimental trial. *International Journal of Behavioral Nutrition and Physical Activity*, 5(1), 63.

Irmak, C., Vallen, B. & Robinson, S.R. (2011) The impact of product name on dieters' and nondieters' food evaluations and consumption. *Journal of Consumer Research*, **38**, 390– 405.

Kardes, F. R., Posavac, S. S., & Cronley, M. L. (2004). Consumer inference: A review of processes, bases, and judgment contexts. *Journal of Consumer Psychology*, 14(3), 230-256.

Keinan, A. and Kivetz, R. (2008), “*Remedying hyperopia: the effects of self-control regret on consumer behavior*”, *Journal of Marketing Research* , 45(6). 676-689.

Kelly, B., Hughes, C., Chapman, K., Louie, J. C. Y., Dixon, H., Crawford, J., ... & Slevin, T. (2009). Consumer testing of the acceptability and effectiveness of front-of-pack food labelling systems for the Australian grocery market. *Health promotion international*, 24(2), 120-129.

Khodaei, G. H., Emami Moghadam, Z., Khademi, G., & Saeidi, M. (2015). Healthy Diet in Children: Facts and Keys. *International Journal of Pediatrics*, 3(6.2), 1183-1194.

King, Gillian A., C. Peter Herman, and Janet Polivy (1987), “Food Perception in Dieters and Non-dieters,” *Appetite*, 8 (2), 147–58.

Kuijter, R. G., & Boyce, J. A. (2014). Chocolate cake. Guilt or celebration? Associations with healthy eating attitudes, perceived behavioural control, intentions and weight-loss. *Appetite*, 74, 48-54.

Lee-Wingate, S. N., & Corfman, K. P. (2010). A little something for me and maybe for you, too: promotions that relieve guilt. *Marketing Letters*, 21(4), 385-395.

Macé, S. (2012). The impact and determinants of nine-ending pricing in grocery retailing. *Journal of Retailing*, 88(1), 115-130.

MacKenzie, S. B., Lutz, R. J., & Belch, G. E. (1986). The role of attitude toward the ad as a mediator of advertising effectiveness: A test of competing explanations. *Journal of marketing research*, 23(2), 130-143.

Manning, K. C., & Sprott, D. E. (2009). Price endings, left-digit effects, and choice. *Journal of Consumer Research*, 36(2), 328-335..

- Minton, E. A., Liu, R. L., & Lee, C. T. (2018). The 101 calorie mini pack: the interaction between numerical and verbal marketing cues. *Marketing Letters*, 29(2), 225-239.
- Mishra, A., & Mishra, H. (2011). The influence of price discount versus bonus pack on the preference for virtue and vice foods. *Journal of Marketing Research*, 48(1), 196-206.
- Mohr, G. S., Lichtenstein, D. R., & Janiszewski, C. (2012). The effect of marketer-suggested serving size on consumer responses: the unintended consequences of consumer attention to calorie information. *Journal of Marketing*, 76(1), 59-75.
- Niculescu, M., Leonhardt, J. M., Payne, C. R., & Barney, C. (2018). Dietary Restraint and Consumer Consumption Intentions for Low-Calorie Snacks. *Journal of Consumer Affairs*, 52(2), 466-479.
- Oakes, Michael E. and Carole S. Slotterback. 2005. Too Good to Be True: Dose Insensitivity and Stereotypical Thinking of Foods' Capacity to Promote Weight Gain. *Food Quality and Preference*, 16 (8): 675– 681.
- Parker, J. R., & Lehmann, D. R. (2014). How and when grouping low-calorie options reduces the benefits of providing dish-specific calorie information. *Journal of Consumer Research*, 41(1), 213-235.
- Payne, C. R., Niculescu, M., & Barney, C. E. (2014). Consumer consumption intentions of smaller packaged snack variants. *International journal of consumer studies*, 38(3), 238-242.
- Papies, E. K., & Veling, H. (2013). Healthy dining. Subtle diet reminders at the point of purchase increase low-calorie food choices among both chronic and current dieters. *Appetite*, 61, 1-7.
- Papies, E. K., Potjes, I., Keesman, M., Schwinghammer, S., & Van Koningsbruggen, G. M. (2014). Using health primes to reduce unhealthy snack purchases among overweight consumers in a grocery store. *International Journal of Obesity*, 38(4), 597.
- RIVM. (2019, June 7). Gezond gewicht bij personen van 4 jaar en ouder in 2017. Retrieved from: <https://www.rivm.nl/leefstijlmonitor/gezond-gewicht> on September 24th. 2019
- Romieu, I., Dossus, L., Barquera, S., Blottière, H. M., Franks, P. W., Gunter, M., ... & Nishida, C. (2017). Energy balance and obesity: what are the main drivers?. *Cancer Causes & Control*, 28(3),
- Raghunathan, Rajagopal, Rebecca W. Naylor, and Wayne D. Hoyer. 2006. The Unhealthy = Tasty Intuition and Its Effects on Taste Inferences, Enjoyment, and Choice of Food Products. *Journal of Marketing*, 70 (October): 170– 184.
- Rook, D. W. (1987). The buying impulse. *Journal of consumer Research*, 14, 189-199.
- Rozin, Paul, Claude Fischler, Sumiō Imada, Alison Sarubin, and Amy Wrzesniewski (1999), "Attitudes to Food and the Role of Food in Life in the U.S.A., Japan, Flemish Belgium and France: Possible Implications for the Diet-Health Debate," *Appetite* , 33 (October), 163-8
- Saintives, C., & Lunardo, R. (2016). How guilt affects consumption intention: the role of rumination, emotional support and shame. *Journal of Consumer Marketing*, 33(1), 41-51.
- Schindler, R. M., & Warren, L. S. (1988). Effect of odd pricing on choice of items from a menu. *ACR North American Advances*.

- Schindler, R. M. (2006). The 99 price ending as a signal of a low-price appeal. *Journal of Retailing*, 82(1), 71-77.
- Schindler, R. M., & Kibarian, T. (1993). Testing for perceptual underestimation of 9-ending prices. *ACR North American Advances*.
- Schindler, R. M., & Kibarian, T. M. (1996). Increased consumer sales response though use of 99-ending prices. *Journal of Retailing*, 72(2), 187-199.
- Schindler, R. M., & Wiman, A. R. (1989). Effects of odd pricing on price recall. *Journal of Business Research*, 19(3), 165-177.
- Schindler, R. M., & Kirby, P. N. (1997). Patterns of rightmost digits used in advertised prices: implications for nine-ending effects. *Journal of Consumer Research*, 24(2), 192-201.
- Schindler, R. M. (1991). Symbolic meanings of a price ending. *ACR North American Advances*.
- Schuldt, J. P., & Schwarz, N. (2010). The "organic" path to obesity? Organic claims influence calorie judgments and exercise recommendations. *Judgment and Decision making*, 5(3), 144.
- Scott, Maura L., Stephen M. Nowlis, Naomi Mandel, and Andrea C. Morales. 2008. The Effects of Reduced Food Size and Package Size on the Consumption Behavior of Restrained and Unrestrained Eaters. *Journal of Consumer Research*, 35(3): 391– 405.
- Stunkard, A. J., & Messick, S. (1985). The three-factor eating questionnaire to measure dietary restraint, disinhibition and hunger. *Journal of psychosomatic research*, 29(1), 71-83.
- Smith, R., Kelly, B., Yeatman, H., & Boyland, E. (2019). Food Marketing Influences Children's Attitudes, Preferences and Consumption: A Systematic Critical Review. *Nutrients*, 11(4), 875.
- Sonnenberg, L., Gelsomin, E., Levy, D. E., Riis, J., Barraclough, S., & Thorndike, A. N. (2013). A traffic light food labeling intervention increases consumer awareness of health and healthy choices at the point-of-purchase. *Preventive Medicine*, 57(4), 253-257.
- Stiving, M., & Winer, R. S. (1997). An empirical analysis of price endings with scanner data. *Journal of Consumer Research*, 24(1), 57-67.
- Strahilevitz, Michal and John G. Meyers (1998), "Donations to Charity as Purchase Incentives: How Well They Work May Depend on What You Are Trying to Sell," *Journal of Consumer Research* , 24 (March), 434-4
- Swartz, J. J., Braxton, D., & Viera, A. J. (2011). Calorie menu labeling on quick-service restaurant menus: an updated systematic review of the literature. *International Journal of Behavioral Nutrition and Physical Activity*, 8(1), 135.
- Swinburn, B. A., Sacks, G., Hall, K. D., McPherson, K., Finegood, D. T., Moodie, M. L., & Gortmaker, S. L. (2011). The global obesity pandemic: shaped by global drivers and local environments. *The Lancet*, 378(9793), 804-814.
- Tangney, J. P., Stuewig, J., & Mashek, D. J. (2007). Moral emotions and moral behavior. *Annu. Rev. Psychol.*, 58, 345-372.
- Tangney, J.P. and Dearing, R.L. (2002), *Shame and Guilt* , Guilford, New York, NY.

Thomas, M., & Morwitz, V. (2005). Penny wise and pound foolish: the left-digit effect in price cognition. *Journal of Consumer Research*, 32(1), 54-64.

Voedingscentrum. Retrieved from <https://www.voedingscentrum.nl/encyclopedie/wet-voedselinformatie.aspx> On September 24th. 2019

Voedingscentrum. Retrieved from <https://www.voedingscentrum.nl/nl/gezond-eten-met-de-schijf-van-vijf.aspx> on November 13th. 2019

Wansink, B. and Chandon, P. (2006), "Can 'low-fat' nutrition labels lead to obesity?", *Journal of Marketing Research*, 43(4). 605-617.

World Health Organization (2014) Global status report on noncommunicable diseases: World Health Organization, Geneva. http://apps.who.int/iris/bitstream/10665/148114/1/9789241564854_eng.pdf?ua=1247-258.

World Health Organisation, 2018. World Health Statistics 2018: monitoring health for the SDGs, sustainable development goals. Retrieved from https://www.who.int/gho/publications/world_health_statistics/2018/en/ on September 10th, 2019.

World Health Organisation, 2017. Global Health Observatory (GHO) data. Retrieved from https://www.who.int/gho/ncd/risk_factors/overweight_obesity/obesity_adults/en/ on September 10th, 2019

Zemack-Rugar, Y. , Corus, C. and Brinberg, D. (2012), "The 'response-to-failure' scale: predicting behavior following initial self-control failure", *Journal of Marketing Research* , 49(6). 996-1014

7.1 Appendix 1 : Questionnaire

 **WAGENINGENUR**
For quality of life

Fijn dat u mee wilt doen aan dit onderzoek van Wageningen Universiteit! Deze vragenlijst gaat over uw voorkeur voor verschillende populaire snacks.

Het invullen van de vragenlijst zal ongeveer 7 minuten duren. Als deelnemer aan dit onderzoek blijft u geheel anoniem.

Er zijn geen risico's of voordelen verbonden aan het invullen van de vragenlijst. U kunt op ieder moment beslissen om te stoppen met invullen. Voor eventuele vragen kunt je contact opnemen met Joost Alves (Joost.alves@wur.nl).

Door op 'ja' te klikken geeft u aan dat u bovenstaande heeft gelezen en ermee instemt:

☐ **ja**, ik doe mee aan dit onderzoek

→

Survey Powered By [Qualtrics](#)

 **WAGENINGENUR**
For quality of life

De volgende vragen hebben betrekking op uw indrukken van de snacks die aan u worden gepresenteerd.

→

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Stelt u zich voor dat u een snack gaat eten. De kans dat u deze snack eet is dan....

Erg onwaarschijnlijk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Zeer waarschijnlijk
Onmogelijk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Mogelijk
Erg aannemelijk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Erg onaannemelijk



Hoe zou u deze snack vergelijken met andere soorten snacks?

Deze snack bevat
relatief weinig
calorieën



Deze snack bevat
relatief veel
calorieën





Geef aan in hoeverre u het eens bent met de volgende stellingen

Ik heb een schuldgevoel bij het eten van deze snack

Helemaal niet



Heel erg



Ik voel mij schuldig bij het eten van deze snack

Helemaal niet



Heel erg



Ik heb medelijden met mijzelf bij het eten van deze snack

Helemaal niet



Heel erg



Ik voel mij ongemakkelijk bij het eten van deze snack

Helemaal niet



Heel erg



Ik voel mij huiverig bij het eten van deze snack

Helemaal niet



Heel erg



Ik aarzel bij het eten van deze snack

Helemaal niet



Heel erg



Snelle Jelle Zero 99 Kcal



Stelt u zich voor dat u een snack gaat eten. De kans dat u deze snack eet is dan....

Erg onwaarschijnlijk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Zeer waarschijnlijk
Onmogelijk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Mogelijk
Erg aannemelijk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Erg onaannemelijk



Survey Powered By [Qualtrics](#)

Hoe zou u deze snack vergelijken met andere soorten snacks?

Deze snack bevat relatief weinig calorieën	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Deze snack bevat relatief veel calorieën
--	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	--



Survey Powered By [Qualtrics](#)

Geef aan in hoeverre u het eens bent met de volgende stellingen

Ik heb een schuldgevoel bij het eten van deze snack

Helemaal niet



Heel erg



Ik voel mij schuldig bij het eten van deze snack

Helemaal niet



Heel erg



Ik heb medelijden met mijzelf bij het eten van deze snack

Helemaal niet



Heel erg



Ik voel mij ongemakkelijk bij het eten van deze snack

Helemaal niet



Heel erg



Ik voel mij huiverig bij het eten van deze snack

Helemaal niet



Heel erg



Ik aarzel bij het eten van deze snack

Helemaal niet



Heel erg



Banaan
*99 calorieën per portie**



*1 portie = 1 banaan

Stelt u zich voor dat u een snack gaat eten. De kans dat u deze snack eet is dan....

Erg
onwaarschijnlijk

Zeer waarschijnlijk

Onmogelijk

Mogelijk

Erg aangeneemelijk

Erg onaangeneemelijk



Hoe zou u deze snack vergelijken met andere soorten snacks?

Deze snack bevat
relatief weinig
calorieën



Deze snack bevat
relatief veel
calorieën



Survey Powered By [Qualtrics](#)

Geef aan in hoeverre u het eens bent met de volgende stellingen

Ik heb een schuldgevoel bij het eten van deze snack

Helemaal niet



Heel erg

Ik voel mij schuldig bij het eten van deze snack

Helemaal niet



Heel erg

Ik heb medelijden met mijzelf bij het eten van deze snack

Helemaal niet



Heel erg

Ik voel mij ongemakkelijk bij het eten van deze snack

Helemaal niet



Heel erg

Ik voel mij huiverig bij het eten van deze snack

Helemaal niet



Heel erg

Ik aarzel bij het eten van deze snack

Helemaal niet



Heel erg



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Geef aan hoe vaak de onderstaande stellingen bij u van toepassing zijn:

Wanneer u iets zwaarder bent geworden, eet u dan minder dan dat u gewoonlijk doet?

Nooit Zelden Soms Vaak Heel vaak

☐ ☐ ☐ ☐ ☐

Probeert u minder te eten tijdens maaltijden dan dat u eigenlijk zou willen?

Nooit Zelden Soms Vaak Heel vaak

☐ ☐ ☐ ☐ ☐

Hoe vaak weigert u eten of drinken omdat u bang bent dat u zwaarder wordt?

Nooit Zelden Soms Vaak Heel vaak

☐ ☐ ☐ ☐ ☐

Houdt u exact bij wat u eet?

Nooit Zelden Soms Vaak Heel vaak

☐ ☐ ☐ ☐ ☐

Eet u opzettelijk producten waarvan u afvalt?

Nooit Zelden Soms Vaak Heel vaak

☐ ☐ ☐ ☐ ☐

Wanneer u teveel heeft gegeten, eet u dan de daarop volgende dagen minder?

Nooit Zelden Soms Vaak Heel vaak

☐ ☐ ☐ ☐ ☐

Eet u opzettelijk minder om te voorkomen dat u zwaarder wordt?

Nooit Zelden Soms Vaak Heel vaak

☐ ☐ ☐ ☐ ☐

Hoe vaak probeert u geen tussendoortjes te nemen omdat u op uw gewicht let?

Nooit Zelden Soms Vaak Heel vaak

☐ ☐ ☐ ☐ ☐

Hoe vaak probeert u 's avonds niet te eten omdat u op uw gewicht let?

Nooit Zelden Soms Vaak Heel vaak

☐ ☐ ☐ ☐ ☐

Houdt u rekening met uw gewicht wanneer u eet?

Nooit Zelden Soms Vaak Heel vaak

☐ ☐ ☐ ☐ ☐



Beantwoord de volgende vragen

Wat is uw leeftijd?

16 24 33 41 50 58 66 75 83 92 100

Leeftijd

Wat is uw geslacht?

- ☐ Man
☐ Vrouw

Heeft u een allergie of intolerantie voor de producten die u net gezien heeft? Zo ja, voor welke?

- ☐ Nee
☐ Ja

Aan Wageningen Universiteit worden vaker studies verricht waarvoor wij op zoek zijn naar deelnemers. Mogen wij u hiervoor af en toe (maximaal 1 keer per maand) benaderen per e-mail?

Zo ja, schrijf hieronder uw e-mailadres (niet nodig als u al op deze lijst staat):

Als u nog opmerkingen hebt voor de onderzoekers, schrijf deze dan hieronder:

Bedankt voor uw bijdrage aan het onderzoek!

Klik op het pijltje naar rechts om de vragenlijst in te sturen.



We thank you for your time spent taking this survey.
Your response has been recorded.

Survey Powered By [Qualtrics](#)

Appendix 7.2: Pearson correlation matrix

Correlations									
De kans dat u deze snack eet is:	Erg onwaarschijnlijk / Waarschijnlijk	Onmogelijk / Mogelijk	Erg aannemelijk / Erg onaannemelijk	Erg onwaarschijnlijk / Waarschijnlijk	Onmogelijk / Mogelijk	Erg aannemelijk / Erg onaannemelijk	Erg onwaarschijnlijk / Waarschijnlijk	Onmogelijk / Mogelijk	Erg aannemelijk / Erg onaannemelijk
Erg onwaarschijnlijk / Waarschijnlijk	1								
Onmogelijk / Mogelijk	.690**	1							
Erg aannemelijk / Erg	.227**	0.075	1						
Erg onwaarschijnlijk / Waarschijnlijk	.129*	.238**	-.175**	1					
Onmogelijk / Mogelijk	.321**	.481**	-.200**	.594**	1				
Erg aannemelijk / Erg onaannemelijk	-.223**	-.260**	.196**	.163**	-0.015	1			
Erg onwaarschijnlijk / Waarschijnlijk	.389**	.426**	-.134*	.246**	.310**	-.270**	1		
Onmogelijk / Mogelijk	.360**	.500**	-.174**	.206**	.444**	-.284**	.765**	1	
Erg aannemelijk / Erg onaannemelijk	-0.088	-0.087	.306**	-.208**	-.207**	.208**	.220**	.197**	1

**Correlation is significant at $p = <0.001$

* Correlation is significant at $p = <0.005$