

Nutri-scores on purchase intentions and the moderating effect skepticism on the label

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Abstract

The study examined whether the Nutri-score A, E or the absence of the Nutri-score would influence purchase intentions. In the literature a disparity was found in the results regarding different Nutri-scores on purchase intentions. Therefore, this research tried to fill this gap by examining one relevant moderator: skepticism towards the label. It was expected that consumers with higher perceived levels of skepticism have lower purchase intentions for products with a favorable Nutri-score and higher purchase intentions for products with a less favorable Nutri-score.

An online survey was conducted among 145 respondents, in which respondents got exposed to one of the three conditions: rice cakes without a Nutri-score, with Nutri-score or with Nutri-score E. An ANCOVA was performed reveal the differences in purchase intentions and to test for moderating effects of skepticism, while controlling for the control variables, liking of the specific product and brand attitude.

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Chapter 1: Introduction

1.1: Background

In the contemporary landscape of the food industry, the pursuit of healthier dietary choices has become a central concern for both consumers and organizations (Zeder et al., 2022). As nutritional awareness continues to rise, there is an increasing emphasis on transparent and comprehensible information about the nutritional content of food products. The introduction of Nutri-scores, a front-of-pack labeling system, has garnered attention, among health organization and policymakers, as a potential tool to guide consumers towards healthier choices (Herberg et al., 2021).

Understanding how consumers react to different Nutri-Scores on packaging is of crucial importance for organizations within the food industry due to its potential impact on consumer behavior and market competitiveness. Recent market research indicates that a substantial 83% of consumers consider the nutritional information displayed on packaging as a crucial factor in their purchasing decision (Skretkovicz & Perret, 2023). Notably, an estimated 70% of purchasing decisions transpire at this stage (Nielsen, 2016). This prominence underscores the critical importance of packaging as a tool for guiding consumers towards specific purchases (De Temmerman, 2021). Packaging can powerfully influence (un)healthy food choices. The visual and informational cues embedded in packaging materials possess the capacity to powerfully shape perceptions of the nutritional quality of products, thereby influencing the dichotomy between (un)healthy food choices (Gutjar et al, 2014;Hallez et al., 2020).

Information about consumer responses to different level of the Nutri-Score label on purchase attention, allows organizations to tailor their product offerings and marketing strategies, aligning them with evolving nutritional preferences. In addition, organizations have the autonomy to decide whether to incorporate Nutri-score labels on their product packaging, making it even more intriguing to analyze their effect on purchase intentions (Rijksoverheid, 2024). Therefore, this paper delves into the effect of different levels of Nutri-scores and the presence of the Nutri-score label on purchase intention.

Literature shows a disparity in significant results regards different levels of the Nutri-score and absence of the label on purchase intentions. Some studies found a positive significant relationship, while other found no significant effect (De Temmerman et al., 2021; Egnell et al., 2021; Szabo de Edelenyi et al., 2019; Van den Akker et al., 2022;Folkvord et al., 2021; Zeder et al., 2022). In trying to explain this disparity in the literature, this research tried to find a moderator that significantly explains the difference between in the significant and not significant findings of the Nutri-score on purchase intentions. Recently, the Nutri-score appeared frequently in the news due to receiving various

critiques. Consumers did not trust information on the Nutri-score or did not believe that the Nutri-score was a valuable measure in making healthier food choices (NOS, 2024). Also several studies mentioned the skepticism which consumers held towards the Nutri-score, which could moderate the effect between the different findings between the Nutri-scores and purchase intentions (Ringold, 2021; Mulder, 2024). In the context of the Nutri-score, consumer skepticism can be defined as ‘‘a general tendency to disbelieve information that appears on the front of food packages’’ (Fenko et al., 2015, p. 2). This includes disbelieve in the accuracy, reliability, trust or relevance of the label as a tool for evaluating the nutritional quality of food products (Ringold, 2021).

Investigating whether skepticism serves as a significant moderator is essential for organizations aiming to understand the purchase behavior of their (potential) consumers and effectively respond to diverse consumer reactions. Understanding the role of skepticism can provide organizations with critical insights into how different segments of the market perceive and react to the Nutri-Score. For companies offering products with healthier Nutri-Scores, addressing consumer skepticism is particularly important. Educating consumers who exhibit high levels of skepticism about the reliability and benefits of the Nutri-Score could enhance the label's credibility, thereby positively influencing their purchasing decisions, ultimately increasing sales (Mulder, 2024).

For health institutes, understanding how different consumers react to the Nutri-Score and whether skepticism moderates the relationship between the Nutri-Score and purchase intentions is of significant value. Such insights can inform the development of public health strategies aimed at improving dietary choices among the population. If skepticism is identified as a key moderator, it underscores the importance of educational initiatives designed to enhance consumer trust in the Nutri-Score. This would involve disseminating information about the scientific validity, reliability, and health benefits associated with the label.

1.2: Research gap

Since the introduction of the Nutri-Score label, numerous studies have investigated its impact on various aspects, including purchase intentions and healthier food choices, with a predominant focus on consumer health benefits (Santos et al., 2021; Weetering, 2022; Gassler et al., 2023). Exploring the influence of Nutri-scores on consumer purchase intentions reveals a divergent landscape within the existing literature. Several studies have reported a positive significant relationship between Nutri-scores and purchase intention among customers (De Temmerman et al., 2021; Egnell et al., 2021; Szabo de Edelenyi et al., 2019; Van den Akker et al., 2022). However, conflicting findings are evident, with several investigations indicating no significant relationship between Nutri-scores and purchase intentions (Folkvord et al., 2021; Zeder et al., 2022).

The disparity observed in the literature regarding the impact of Nutri-scores on purchase intentions highlights a critical gap in our understanding of the underlying mechanisms at play. The nutri-score did appear in the news frequently because of several critiques (Radar, 2022; Hercberg, 2023; NOS, 2024). Consumers did not believe that products with healthier Nutri-scores were actually healthier products (NOS, 2024). Other consumers did not trust that the Nutri-score reflects the healthiness of the products (Radar, 2022). Several studies also showed that high(er) levels of skepticism among consumers could influence the relationship between product labels and purchase intentions. Thomas et al. (2022) have shed light on a pervasive lack of awareness regarding Nutri-scores among the population, emphasizing the necessity of widespread education initiatives to familiarize individuals with the concept. Elving & Steenhuis (2014) have shown a significant negative effect from consumer unfamiliarity of certain food labels to heightened skepticism towards such labels. This suggests an interplay between comprehension of Nutri-scores and consumer skepticism, which may serve as a moderator in determining the extent of Nutri-scores' influence on purchase intentions. As such, further research exploring the intricate dynamics between understanding Nutri-scores, purchase intentions and the moderating role of consumer skepticism is warranted to elucidate the underlying mechanisms. The following research question will be addressed:

How do the Nutri-scores effect purchase intention and how does skepticism moderate this effect?

1.3: Research relevance

This research holds significant relevance within the domain of consumer behavior. Understanding the factors influencing consumer decision-making is crucial for organizations seeking to effectively respond to customer needs and preferences (Kardes et al., 2011). The inconsistencies observed in the literature regarding the impact of Nutri-scores on consumer purchase intentions highlight the necessity of uncovering the underlying reasons for these findings.

On the one hand, investigating whether skepticism serves as a significant moderator is essential for organizations aiming to understand the purchase behavior of their (potential) consumers and effectively respond to diverse consumer reactions. Understanding the role of skepticism provides organizations with critical insights into how different market segments perceive and react to the Nutri-Score. For companies offering products with healthier Nutri-Scores, addressing consumer skepticism is particularly important. Educating skeptical consumers about the reliability and benefits of the Nutri-Score can enhance the label's credibility, positively influencing their purchasing decisions and increasing sales of healthier products. By fostering a better understanding of the Nutri-Score among skeptical consumers, organizations can implement targeted marketing campaigns and transparent communication strategies that highlight the scientific basis and effectiveness of the Nutri-Score.

Addressing skepticism not only boosts consumer confidence but also ensures that the Nutri-Score fulfills its intended purpose of guiding consumers towards healthier eating habits. Consequently, comprehending and mitigating skepticism is crucial for organizations to leverage the Nutri-Score effectively, influencing consumer behavior and supporting public health goals.

On the other hand, findings of this research could be valuable for health institutions. For health institutes, understanding how different consumers react to the Nutri-Score and whether skepticism moderates the relationship between the Nutri-Score and purchase intentions could be important because, insights gained from such research can inform public health strategies aimed at improving dietary choices. If skepticism is identified as a significant moderator, it highlights the necessity of educational initiatives to enhance consumer trust in the Nutri-Score. These initiatives might involve public awareness campaigns and transparent communication about the label's scientific basis and health benefits. Addressing skepticism could be crucial in ensuring the Nutri-Score effectively influences consumer behavior. By increasing trust and understanding, health institutes can promote healthier purchasing decisions, contributing to broader public health objectives like reducing diet-related chronic diseases. Therefore, understanding and mitigating skepticism is essential for leveraging the Nutri-Score to its fullest potential in promoting healthier eating habits and achieving long-term public health goals.

Chapter 2: Theoretical background

This chapter provides the theoretical background upon which this research is built, outlining key concepts and their explanations. It begins by introducing the front-of-pack label, then delves into the Nutri-Score, which serves as the central focus of the study. Additionally, it covers topics such as purchase intention and the moderating variable: skepticism towards the label. The chapter also examines the relationship between Nutri-Score and purchase intention, formulating hypotheses accordingly. The chapter concludes with a visual representation of the interconnected concepts and their relationships, presented as the conceptual model.

2.1: Front of pack labels

Since December 2016, European Union regulations mandate that the majority of pre-packaged foods must display a nutrition declaration (European Commission, 2020). Typically this is located on the back of the packaging, this nutritional information aids consumers in making informed and healthier choices. Studies found that this information results in healthier food choices, but also found that many consumers find it challenging to engage with back of the food packaging labels due to their extensive information (Van Kleef et al., 2008).

To address this lack of consumer engagement, front-of-pack (FOP) labels were introduced. Research suggests that FOP labels are more attention-grabbing in comparison to nutritious score on the back of products (Becker et al., 2015). FOP labels are simplified and visually appealing labels providing nutritional information on the front of packaging, complementing the detailed mandatory nutrition information found on the back. Consumers are likely to better process packaging information when exposed to a combination of FOP labels and full nutritional details on BOP labels (Dubois et al., 2020)

Several studies researched the different effects of different FOP labels on healthier food choices and purchase intentions. A variety of studies have shown that Nutri-scores are the most effective way to properly classify the nutritional value of a product and is thus more effective in making healthier food choices compared to other FOP labels (Oeschger, 2019;Ageunaou et al, 2021;Crosetto et al, 2020). Studies also found that Nutri-scores are more easy to understand, use and to make a purchase decisions faster in comparison with other FOP and provides more added value to consumers (Drexler and Freiberger, 2021;Fialon et al, 2022;Liljeber and Krambeer, 2019).

2.2: Nutri-score

This study will focus on the Nutri-Score. As previously mentioned in literature, several studies have underscored the advantages and benefits of this labeling system in comparison to other FOP labels (Oeschger, 2019; Ageunaou et al, 2021; Crosetto et al, 2020). There is a significant difference in perceived healthiness across the presence of a Nutri-score and between Nutri-score categories, which indicates the effect of the label (Temmerman et al., 2021). The Nutri-Score is a front-of-pack nutritional labeling system designed to distill nutritional information into a user-friendly format for consumers. It utilizes color-coded grading, spanning from dark green to red, along with letters A to E to enhance label readability (De Temmerman et al., 2020). This entire scale is prominently displayed on the front of packaging, indicating the nutritional quality of the product. For instance, an A-score signifies the highest nutritional quality, while an E-score represents the lowest. the Nutri-Score serves as a concise tool to assist consumers in comprehending complex nutrition information and making healthier food choices, assisting Back of the Package labels. The Nutri-Score can be applied to most processed products, with some exceptions such as herbs, tea, coffee, and alcohol (Hercberg et al., 2021).



Figure 1. Nutri-Score

The Nutri-Score evaluates the positive and negative attributes of food products (De Temmerman et al., 2020). This assessment is based on the nutritional content per 100 grams of food or 100 milliliters of beverage. Negative elements, including calories, saturated fatty acids, sugar, and salt, are considered in the "N" component, which ranges from 0 to 40. Higher values indicate less healthiness (Hercberg et al., 2021). On the other hand, the "P" component evaluates positive nutrients such as fruits, vegetables, legumes, nuts, vitamins, proteins, and fibers, with scores ranging from 0 to 15. Higher scores mean healthier product. The Nutri-Score is formulated by subtracting the total "P" points from the total "N" points, resulting in a score ranging from -15 to +40, where negative values mean healthier products and positive values indicate less healthy options (Van den Akker, 2022) Specific thresholds are used to assign Nutri-Scores to different food and beverage categories (Dréano-Trécant et al., 2020). Figure 2 provides an overview of these score ranges (A-E) for both food and beverages (Colruyt Group, n.d.).

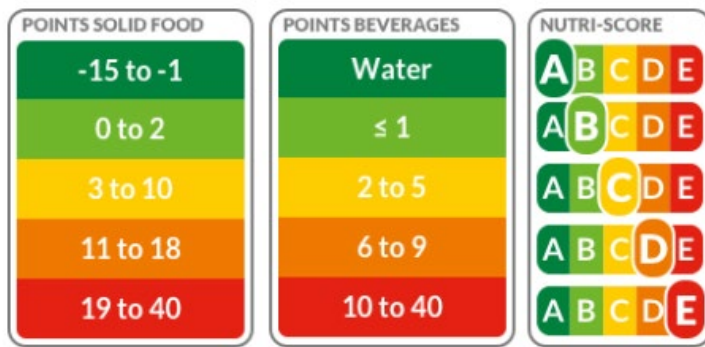


Figure 2: Nutri-Score scale

2.3: Nutri-Score on purchase intention

Previous research has shown the influence of the Nutri-score label on consumers' purchase intentions. Literature reported conflicting results, some authors reported a significant effect of the Nutri-Score on purchase intention (De Temmerman et al., 2021; Egnell et al., 2021; Szabo de Edelenyi et al., 2019; Van den Akker et al., 2022). For the Nutri-score categories A and B significant higher purchase intentions were found in comparison with the absence of the Nutri-score (De Temmerman et al., 2021). Moreover, evidence suggests that the Nutri-Score facilitates the selection of healthier options compared to products without FOP labeling (Gassler et al., 2023). Consumers are more inclined to purchase products with a Nutri-score A in comparison to products with lower scores because of the perceived healthiness and nutritional quality associated with higher-rated products (Gasslet et al., 2023). Consumers are likely to have lower purchase intentions for products displaying an Unhealthy Nutri-Score (E) due to the negative health implications associated with such ratings. Research has shown that front-of-pack labels like the Nutri-Score influence consumer behavior by providing easily interpretable nutritional information (De Temmerman et al., 2021). Therefore, Products with a Nutri-score E are likely to receive lower purchase intentions compared to products with no Nutri-score. Accordingly, it is hypothesized that products with a favorable Nutri-Score (A) will elicit higher purchase intentions compared to those with unfavorable scores (E), as consumers are likely to perceive them as healthier choices (Van den Akker, 2022).

H1: Consumers will have a higher purchase intention for products when it holds a label of a healthy (A) Nutri-score than when it does not hold any Nutri-score.

H2: Consumers will have a lower purchase intention for products when it holds a label of a healthy (E) Nutri-score than when it does not hold any Nutri-score.

H3: Consumers will have a higher purchase intention for products when it holds a label of a healthy (A) Nutri-score than when it holds an unhealthy Nutri-score (E)

2.4: Skepticism

As mentioned, in the context of the Nutri-score, consumer skepticism can be defined as ‘‘a general tendency to disbelieve information that appears on the front of food packages’’ (Fenko et al., 2015, p. 2). This includes disbelieve in the accuracy, reliability, trust or relevance of the label as a tool for evaluating the nutritional quality of food products (Ringold, 2021). Consumers who are skeptical towards the Nutri-Score label often exhibit a lack of trust in its ability to accurately indicate the nutritional quality of products (Goiana-da-silva et al., 2021). Consumers distrust towards the label is therefore part of the broader concept of consumers skepticism towards the Nutri-score label.

Research have shown that in some cases consumers have a good reason to be skeptical. The criteria for awarding food labels can either be very strict or non-existent at all (Fenko et al., 2015). Several studies examined consumers perception of the Nutri-score leading to mixed results. Some studies found that only a small percentage < 10% of their respondents showed to be skeptical or perceive to have low levels of trust towards the Nutri-score (Goiana-da-silva et al., 2021;Jürkenbeck et al., 2023). However, The Nutri-score label also receives criticism and consumers tend to be skeptic about the label (Zander. 2022;Perret & Skretkowicz, 2024,Mulder, 2024). Research done by Perret & Skretkowicz (2024) concluded that two third of the participants of the research stated that they have a medium level of trust to having no trust at all in the label. Zander (2022) found that Almost 40% of the participants reported to having perceived a Nutri-score as very questionable. With given reasons that the score is based on less profound facts and they don’t always believe that the best product also received the highest score (Zander. 2022;Perret & Skretkowicz, 2024). In a comparative study with 4 other front of the package labels, the Nutri-score received the lowest scores on ‘trust’ and ‘being easy to understand’ (Talati et al., 2019)

Several studies have explored how skepticism affects consumer responses to food labels, because of its influence on purchase intentions especially on decision making at the point of sale (Fenko et al., 2015). Studies consistently revealed its negative impact on purchase intentions. Some research has focused on how skepticism influences consumers' willingness to buy "green" products (Rossi & Rivetti, 2023;Cho & Taylor, 2020). Others have examined skepticism in relation to health labels (Mazis & Raymond, 1997;Fenko et al., 2015;Mitra et al., 2019). Consumers' varying levels of skepticism toward health labels can be attributed to their familiarity with and comprehension of the label's content. Previous academic research has demonstrated that the degree of familiarity and understanding of the label significantly impacts the level of skepticism consumers exhibit towards health labels (Pieniak et al., 2010).

Consumers with high levels of skepticism are anticipated to exhibit lower purchase intentions toward products with a Nutri-Score A, as they are more likely to disregard or underutilize the information provided by this label. Skeptical consumers may question the accuracy, reliability, or effectiveness of the Nutri-Score, leading them to discount its value in their decision-making process. Consequently, they may not consider the favorable Nutri-Score A when evaluating their purchase options, resulting in reduced purchase intentions for such products compared to consumers who place trust in the Nutri-Score. In contrast, individuals who value the Nutri-Score are likely to perceive products with a high rating as more desirable, thus showing a stronger preference for these products. As a result, the disparity in purchase intentions between products with a Nutri-Score A and those without a Nutri-Score is expected to diminish among consumers with higher levels of skepticism. This reduction in the perceived advantage of high-rated products reflects the moderating effect of skepticism on the relationship between the Nutri-Score and purchase intentions. Therefore, the following hypothesis is formulated:

H4: Increased levels of skepticism towards the Nutri-Score reduces the difference between purchase intentions of products with a Nutri-score A in comparison to products without a Nutri-score.

On the other hand, consumers exhibiting high levels of skepticism are likely to show increased purchase intentions toward products with a Nutri-Score E, as they tend to disregard or undervalue the implications of this label. When skepticism towards the Nutri-Score is high, these consumers may question the accuracy or significance of the label's negative assessments, thereby diminishing the influence of the Nutri-Score E on their purchasing decisions. This skepticism can lead to a neglect of the label's unfavorable evaluation, making these consumers less deterred by the "bad" score. Consequently, they may exhibit higher purchase intentions for products with a Nutri-Score E compared to consumers who accept the Nutri-Score's validity and are more likely to avoid such products. Therefore, for skeptical consumers, the difference in purchase intentions between products with a Nutri-Score E and those without any Nutri-Score may be reduced, as their disregard for the negative label diminishes its deterrent effect. Therefore, the following hypothesis is formulated:

H5: Increased levels of skepticism towards the Nutri-Score reduces the difference between purchase intentions of products with a Nutri-score E in comparison to products without a Nutri-score.

Lastly, Consumers who exhibit high levels of skepticism are likely to show a diminished difference in their purchase intentions between products with a Nutri-Score E and those with a Nutri-Score A. This reduction occurs because skeptical consumers may question the validity or reliability of the Nutri-Score altogether. As a result, they might not give significant weight to the positive attributes of a Nutri-Score A or the negative implications of a Nutri-Score E. Instead, their skepticism leads them to

perceive both types of products more similarly, regardless of their nutritional ratings. Consequently, for these skeptical consumers, the contrast in purchase intentions between products rated as healthy (Nutri-Score A) and those rated as unhealthy (Nutri-Score E) is less pronounced compared to consumers who fully trust and utilize the Nutri-Score. This effect highlights how skepticism can diminish the perceived effectiveness of the Nutri-Score in differentiating between high and low-rated products.

H6: Increased levels of skepticism towards the Nutri-Score reduce the difference between purchase intentions of products with a Nutri-score E in comparison to products with a Nutri-score A.

2.6: Conceptual model

This study focusses on purchase intention for products with and without various Nutri-scores. The concepts of this research are translated into a conceptual model. The conceptual model in Figure 3 visualizes the earlier mentioned hypotheses. It shows the expected effect that Nutri-scores will have on purchase intention and the moderating role of skepticism towards the label.

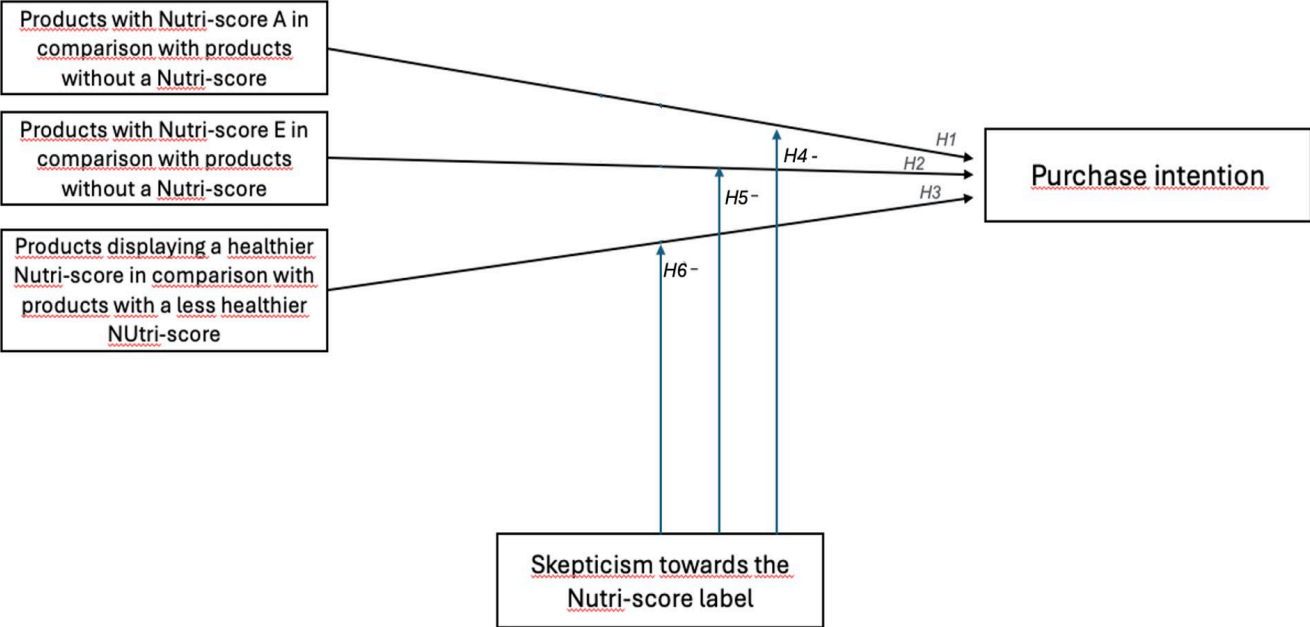


Figure 3. Conceptual model

Chapter 3: Methods

3.1: Research design

The study was conducted from a deductive approach to test the hypotheses. A quantitative research method was used to obtain data. To investigate the causal impact of the Nutri-Score on purchase intention, an online survey experiment with a 3x1 between subject's design was employed, followed by a short survey. The survey was conducted using a self-administered questionnaire (SAQ). SAQs are particularly advantageous for online surveys as they allow respondents to complete the questionnaire at their own pace and convenience (Lavrakas, 2008).

The between-subjects design involved exposing the different groups of participants to 3 different conditions. In this instance, the treatment pertained to BBQ rice cakes with the Nutri-score A, BBQ rice cakes without a Nutri-score and BBQ rice cakes with the Nutri-score E. Participants were randomly assigned to one of these scenarios to enhance external validity. Each group was presented with one of the three products. All respondents were asked about their purchase intentions regarding the product. Thereafter, respondents were asked questions regarding the moderating variable: skepticism towards the label.

Control variables were included in the research to isolate the relationship between the (in)dependent variables and the moderating variables by accounting for potential confounding factors. They will ensure that the observed effects are due to the variables of interest and not influenced by other factors. The first control variable is the actual liking of the product, which is defined as "individual's favorable attitude or predisposition towards a specific product" (Landwehr et al., 2011, p. 4). This variable reflects the degree to which consumers have a favorable or positive attitude towards the product. The last control variable measured is brand attitude. The second control variable is brand attitude and is defined by "A network of interconnected beliefs and lasting opinions towards a brand: an overall brand evaluation" (Nayeem et al., 2019, p. 4). This variable reflects the overall evaluations and feelings towards a brand, encompassing their perceptions, beliefs, and emotional responses.

3.2: Sample

This research was conducted in the Netherlands. To maintain internal validity, measurement scales derived from academic literature were employed. To achieve an adequate sample size, a convenience sampling technique was employed. The decision to use convenience sampling was driven by the absence of specific selection criteria for participants. In this study, individuals aged 18 and above were deemed suitable, as it was assumed that all adults have experience with supermarkets and their products. The quantity of respondents relied upon the voluntary participation of individuals in the

survey. Utilizing convenience sampling offers convenience in data collection, as it allows for the rapid accumulation of a substantial amount of data (Field, 2013). The sampling method consisted of online data collection and was distributed via LinkedIn and WhatsApp, while using the snowball method. With a convenience sample, the researcher lacks control over the representativeness of the sample, making it more sensitive to biases (Field, 2013). The minimum recommended sample size is 40 respondents per condition. The minimum sample size for this study will be $40 \times 3 = 120$ respondents.

3.3: Procedure

At the start of the survey participants had to read an introduction to the survey which briefly explained the aim of the study. Participants were also informed about the approximate duration of the survey and that the results were anonymous. In the survey the different purchase intentions based on product with and without Nutri-score have been examined. Each participant is randomly assigned to one of the experimental conditions, wherein they are presented with 1 product condition. The Nutri-score labelling is prominently displayed on some products, while others serve as control conditions with no Nutri-score present. Participants are then asked about their purchase intention, skepticism, the control variables and afterwards some demographic variables. By manipulating the Nutri-score levels and presence of the label, the effects of the Nutri-score can be isolated, which ensures the validity and generalizability of the research. Both experiments included the same products but with different or no Nutri-score label on the package to exclude potential biases or preferences for certain brands or specific products.

3.4: Measures

The dependent variable purchase intentions was measured with a four-item scale. To measure this variable, measurement scales from prior research have been used to ensure validity and reliability of the study. The scale consists of two items from the study done by Lee & Lee (2015) and two by Frints (2021) who did research on purchase intentions based on different Nutri-scores and the absence of the label. All items were measured on a 7-point likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). variable skepticism was measured on a four-item scale.

The control variables age, gender, brand attitude and liking of the product were used in this research, these variables were included considering that they could affect purchase intentions of consumers (De Temmerman al., 2020).

| Construct | Definition | Original item | Adapted item | Source |
|---------------------------|---|---|---|---------------------|
| Purchase Intention | “Purchase intentions are an individual’s conscious plan to make an effort to purchase a brand.” (spears & Singh, 2004, p6) | I am positive towards buying this product | I am positive towards buying this product | Lee & Lee (2015) |
| | | I think it is a good idea to buy this product | I think it is a good idea to buy this product | Lee & Lee (2015) |
| | | Ik ben van plan dit product te kopen | I intend to buy this product | Frints (2021) |
| | | De volgende keer dat ik een tussendoortje koop, kies ik dit product | Next time I buy a snack, I will choose this product | Frints (2021) |
| Skepticism | “A general tendency to disbelieve information that appears on the front of food packages” (Fenko et al., 2015, p. 2) | I feel like I have been accurately informed after viewing this label | I feel like I have been accurately informed after viewing this label | Fenko et al. (2016) |
| | | This label does not tell much useful information about the product | This label does not tell much useful information about the product | Fenko et al. (2016) |
| | | I can trust this label | I can trust this label | Fenko et al. (2016) |
| | | Products with this health/quality label are healthier/tastier than other products | Products with a higher Nutri score are healthier than those with a lower score. | Fenko et al. (2016) |

| | | | | |
|------------------------------|---|---|---|----------------------|
| Liking of the product | “individual's favorable attitude or predisposition towards a specific product” | I like the taste of the product | I like the taste of the product | Ares & Vidal, (2020) |
| | (Landwehr et al., 2011, p. 4) | I like the appearance of the product | I like the appearance of the product | Ares & Vidal, (2020) |
| | | I like the texture of the product | I like the texture of the product | Ares & Vidal, (2020) |
| Brand attitude | “a network of interconnected beliefs and lasting opinions towards a brand: an overall brand evaluation” | I like the brand [Brand] | I like the brand Snack a Jacks | Nayeem et al. (2019) |
| (Nayeem et al., 2019, p. 4) | | I find [Brand] products very attractive | I find Snack a Jacks products very attractive | Nayeem et al. (2019) |
| | | [Brand] is very desirable | Snack a Jacks brand Is very desirable | Nayeem et al. (2019) |

Table 1 measurement scales

3.5: Data analysis

The survey was created using Qualtrics, which participants could access after receiving a hyperlink. After a sufficient amount of data was collected, the data was exported to IBM SPSS statistics for analysis. After checking the data for missing values and incomplete answers, statistical assumptions were checked. After testing for assumptions, the hypotheses were analyzed. To test the hypothesis 1-3 an ANCOVA was performed to measure whether consumers have significant different purchase intentions for products when it holds a Nutri-score A, E or no label. For testing the other hypothesis regression analysis are performed to test via an interaction effect the moderation effect of skepticism towards the label.

Chapter 4: Results

In this chapter, the results of the survey will be presented and analyzed. First, a description of the sample is provided. Thereafter, the reliability and validity of the used scales are discussed. Finally, the main analyses will be conducted.

4.1 Sample description

the sample of this research consists of respondents who filled in the survey. 148 respondents started the survey, after excluding respondents who didn't finish the survey and missing values, a total of 143 respondents remained. The final sample consisted of 143 respondents.

| Condition | Respondents |
|--------------------------------------|--------------------|
| BBQ rice cakes with Nutri-score A | 49 |
| BBQ rice cakes without a Nutri-score | 49 |
| BBQ rice cakes with Nutri-score E | 45 |

Table 2 respondents per condition

An overview of the sample is given in table 3, of the 143 respondents who fully completed the survey, 61.9% were male, 37.6 were female and .5 filled in other. The mean age of the sample was 21,82 years old, with a range from 18 to 62 years. As can be seen in the table, most of the respondents are in the category of the young adults. Moreover, the majority of the respondents (64.7%) were participants who completed or are currently pursuing a bachelor's degree as highest level of education.

| Demographics | | Percent |
|---------------------|----------------------|----------------|
| Gender | Male | 61.9 |
| | Female | 37.6 |
| | Other | .5 |
| Age | 18-21 | 48.5 |
| | 22-23 | 38.6 |
| | 24 < | 12.9 |
| Education | Secondary education | 1 |
| | Vocational education | 3.5 |
| | Associate degree | 11.9 |
| | Bachelor's degree | 64.7 |
| | Master's degree | 18.9 |

Table 3 Demographics respondents

4.2 Reliability & validity analysis

In the analysis, the items Skep_BBQ_A1, Skep_BBQ_A3, Skep_BBQ_A4, Skep_BBQ_E1, Skep_BBQ_E3 and Skep_BBQ_E4 were identified as reversed items and were consequently reversed in SPSS to ensure consistency in interpretation. This makes sure that higher levels of skepticism aligned with a higher score on the survey, facilitating a more coherent understanding of its relationship with other variables in the study.

First a factor analysis is performed to ensure that all items adequately load on their intended factors, confirming the unidimensionality and internal consistency of the construct. Thereafter, the Cronbach's alpha test was conducted to assess the internal consistency and reliability of the scales used in measuring the construct of interest.

In terms of the factor analysis, Items that score above .4 in the factor matrix demonstrate sufficient correlation with the underlying factor, indicating that they contribute meaningfully to the construct's measurement. In terms of the Cronbach's alpha, when the Cronbach's alpha exceeds the threshold of .7, it indicates a high level of internal consistency among the items in the scale or questionnaire. This implies that the items are closely related to each other and measure the same underlying construct effectively. For both the factor analysis and the reliability analysis the original tables are presented in Appendix C.

all items comprising the purchase intention variable demonstrated strong communalities in the factor matrix ($> .9$) indicating a high degree of association with the underlying factor structure. Additionally, as can be seen in table 4, the scale exhibited excellent internal consistency (Cronbach's alpha = .967), confirming its reliability in measuring purchase intention. These results affirm the robustness and reliability of our measurement approach, enhancing confidence in the validity of our findings.

all items comprising the skepticism of the Nutri-score variable demonstrated strong loadings on the factor matrix (factor loadings $> .7$), indicating a high degree of association with the underlying factor structure. Additionally, the scale exhibited excellent internal consistency (Cronbach's alpha = .977), confirming its reliability in measuring purchase intention. These results affirm the robustness and reliability of our measurement approach, enhancing confidence in the validity of our findings.

all items comprising the liking of the product variable demonstrated loadings on the factor matrix (Factor loadings $> .7$), indicating a high degree of association with the underlying factor structure. Additionally, the scale exhibited high internal consistency (Cronbach's alpha = .837). These results

affirm the robustness and reliability of our measurement approach, enhancing confidence in the validity of the findings.

All items comprising the control variable brand attitude variable demonstrated loadings on the factor matrix (Factor loadings > .7), indicating a high degree of association with the underlying factor structure. Additionally, the scale exhibited high internal consistency (Cronbach’s alpha = .834). These results confirm the robustness and reliability of our measurement approach, enhancing confidence in the validity of the findings

| Construct | N | Cronbach’s Alpha |
|----------------------------|----------|-------------------------|
| Purchase Intentions | 4 | .967 |
| Skepticism | 4 | .977 |
| Liking | 3 | .837 |
| Brand attitude | 3 | .834 |

Table 4 reliability analysis

4.3 Results

After conducting the factor analysis and evaluating the internal consistency and reliability of the measurement scale, a more detailed examination of the results can be undertaken to address each individual hypothesis.

4.3.1 Hypothesis 1

H1: Consumers will have a higher purchase intention for products when it holds a label of a healthy (A) Nutri-score than when it does not hold any Nutri-score.

To test if there are significant differences between products with a Nutri-score A and product with no label, an ANCOVA is performed. This test provides a way to explore whether significant differences exist between groups. First the assumptions of the ANCOVA need to be addressed

The first assumption is that the observations in each group are independent of each other, since the data is collected through random sampling and experimental design this assumption is met. Output for checking the assumption for this hypothesis are all presented in Appendix D. The next assumption to be checked is that the independent variable should follow a normal distribution within each group. As can be seen in the Q-Q plot both conditions score dots closely aligned to the diagonal line and

therefore this assumption is met. The next assumption is homogeneity of variance, to test this Levene's test will be considered and should be non-significant, which is the case (.722) so also this assumption is met.

In the analysis Nutri-score A was designated as the dummy variable, while the no label condition served as the reference category. This set-up allowed for a direct comparison between the presence of Nutri-score A and the absence of the Nutri-score. By using the no label condition as the reference category, the study could effectively measure the impact of Nutri-score A on purchase intention. Based on the ANCOVA results, there is a statistically significant difference in purchase intentions between the two conditions, after controlling for the four covariates ($F(1, 97) = 21.989, p < .001$), as can be seen in table 5. This indicates that the effect of the Nutri-score A condition on purchase intentions is significant in comparison with the reference category, with a p-value well below the conventional alpha level of 0.05, suggesting that the differences observed are unlikely to be due to chance. When comparing the two means of the dummy and the reference category, it can be established that the effect is in the hypothesized direction, as can be seen in Appendix D. Rice cakes with a Nutri-score A had a mean of 4.419 on purchase intentions, whereas rice cakes without a Nutri-score had a mean of 3.627. This difference suggests that the presence of a Nutri-score A positively influences purchase intentions of the product. Therefore, hypothesis 1 is supported.

| | df | Mean square | F | Sig. |
|----------------------|-----------|--------------------|----------|-------------|
| Intercept | 1 | .059 | .090 | .765 |
| Nutri-score A | 1 | 14.485 | 21.989 | <.001 |
| Liking | 1 | 69.133 | 104.945 | <.001 |
| Brand | 1 | 4.090 | 6.209 | .014 |
| Age | 1 | 1.975 | 2.998 | .087 |
| Gender | 1 | .015 | .023 | .880 |

Table 5 tests of between subjects design Nutri-score A (Dummy) vs No label (Reference)

4.3.2 Hypothesis 2

H2: Consumers will have a lower purchase intention for products when it holds a label of a healthy (E) Nutri-score than when it does not hold any Nutri-score.

To test this hypothesis an ANCOVA will be performed. The assumptions: observation in each group are independent of each other, independent variable should follow a normal distribution within each group and homogeneity of variances all have been checked and met as can be seen in Appendix E.

In the analysis the no label condition was designated as the dummy variable, the Nutri-score E condition served as the reference category. Based on the ANCOVA results, there is a statistically significant difference in purchase intentions between the no label condition and Nutri-Score E conditions, after controlling for the four covariates ($F(1, 56) = 4.909, p = .029$), as can be seen in table 6. This indicates that the No label condition has a significant impact on purchase intentions in comparison with the reference category (Nutri-score E), with a p-value below the conventional alpha level of 0.05, suggesting that the observed differences are unlikely to be due to chance. When comparing the means of the two conditions, it can be established whether the direction of the effect aligns with the hypothesis. The analysis shows a mean purchase intention of 3.487 for rice cakes without a Nutri-score and a mean of 3.864 for rice cakes with a Nutri-score E, as can be seen in Appendix E. This indicates that consumers have higher purchase intentions for products with a Nutri-score E compared to those without a Nutri-score. It was hypothesized that respondents would have lower purchase intentions for products with a Nutri-score E, as this represents the lowest and least favorable rating within the Nutri-Score. Since this finding was contrary to the hypothesized effect, it can be concluded that hypothesis 2 is not supported.

The discrepancy between the hypothesis and the findings suggests that consumers may prioritize the availability of nutritional information over its content and transparency when making purchasing decisions. More research is needed to confirm those findings to better understand how consumers interpret and react to different types of nutritional labels and this will be further discussed in the discussion section.

| | df | Mean square | F | Sig. |
|------------------|-----------|--------------------|----------|-------------|
| Intercept | 1 | 2.381 | 3.633 | .060 |
| No label | 1 | 3.217 | 4.909 | .029 |
| Liking | 1 | 29.492 | 45.001 | <.001 |
| Brand | 1 | 10.445 | 15.938 | <.001 |
| Age | 1 | .952 | 1.453 | .231 |
| Gender | 1 | .002 | .003 | .953 |

Table 6 tests of between subjects design No label (Dummy) vs Nutri-score E (Reference)

4.3.3 Hypothesis 3

H3: Consumers will have a higher purchase intention for products when it holds a label of a healthy (A) Nutri-score than when it holds an unhealthy Nutri-score (E)

To test hypothesis 3 an ANCOVA will be performed. First the assumptions for the ANCOVA have been checked and met. Outcomes of the assumption analysis can be checked in appendix F

In the analysis the Nutri-score E condition was designated as the dummy variable, the Nutri-score A condition served as the reference category. Based on the ANCOVA results, there is a statistically significant difference in purchase intentions between the Nutri-Score E condition and the Nutri-Score A condition, after controlling for the four covariates ($F(1, 56) = 8.206, p = .005$), as can be seen in table 7. This significant p-value indicates that the Nutri-Score E label has a significant impact on purchase intentions compared to the Nutri-score A condition. When comparing the means of the two conditions, it can be established whether the direction of the effect aligns with the hypothesis, tables of means can be seen in Appendix F. The analysis shows a mean purchase intention of 4.435 for rice cakes with a Nutri-score A and a mean of 3.864 for rice cakes with a Nutri-score E. The results suggest that the presence of a Nutri-Score E negatively influences purchase intentions in comparison to products with a Nutri-score A, given the lower mean of purchase intentions for products with a Nutri-score E. Therefore, hypothesis 3 is accepted

| | df | Mean square | F | Sig. |
|----------------------|-----------|--------------------|----------|-------------|
| Intercept | 1 | .680 | 1.197 | .277 |
| Nutri score E | 1 | 4.659 | 8.206 | .005 |
| Liking | 1 | 59.765 | 105.268 | <.001 |
| Brand | 1 | .279 | .491 | .485 |
| Age | 1 | .016 | .027 | .869 |
| Gender | 1 | 4.018 | 7.188 | .009 |

Table 7 tests of between subjects design Nutri-score E (Dummy) vs Nutri-score A (Reference)

4.3.4 Hypothesis 4

H4: Increased levels of skepticism towards the Nutri-Score reduces the difference between purchase intentions of products with a Nutri-score A in comparison to products without a Nutri-score.

For this hypothesis, a regression analysis is to be performed to test for the moderating effect of skepticism, while controlling for brand attitude, liking of the product, age and gender.

First the assumptions of regression must be checked and met. First, the relationship between the independent variables and the dependent variable should be linear, as can be seen in the scatterplot in appendix G, this is the case, and the first assumption has been met. All other output for testing assumptions can be found in appendix G. Second, the assumption of independence of residuals must be checked to ensure that the value of one residual is not correlated with the value of another. This is crucial because correlated residuals can indicate that the model's error terms are not independent, which violates the assumptions of regression analysis and can lead to biased estimates. The Durbin-Watson statistic is commonly used to test for autocorrelation in the residuals. Values of the Durbin-Watson statistic close to 2 indicate that there is no significant autocorrelation present. In our analysis, the Durbin-Watson value was found to be 2.092, which is very close to 2. This suggests that the residuals are independent and that there is no significant autocorrelation. Therefore, the assumption of independence of residuals has been satisfactorily met. Third, normality of residuals. The residuals of the regression model should be approximately normally distributed, as can be seen in the histogram in appendix G, this is the case. Fourth. No multicollinearity, the independent variable should not be too highly correlated with each other. A VIF value above 5 is considered multicollinear, as all values are below 5, this assumption has been met. Lastly, to verify the assumption of homoscedasticity, we examined a scatter plot of the standardized residuals versus the standardized predicted values. The plot revealed that the residuals are randomly scattered around the horizontal axis, showing no discernible pattern or systematic structure. This random distribution of residuals indicates that the variance of the residuals remains constant across all levels of the predicted values. Consequently, the assumption of homoscedasticity has been met, confirming that the residuals exhibit equal variance and thus validating the reliability of our regression model.

For all the regression analysis the moderator variable skepticism first was standardized. This was necessary to ensure that the interaction effects could be interpreted more clearly and consistently. Standardization helps reduce multicollinearity, improving the stability of the regression coefficients by centering the variable around a mean of zero.

The hypothesis proposes that consumers' skepticism towards the Nutri-Score moderates the relationship between purchase intentions and the absence of Nutri-Score labeling and for products labeled with a Nutri-Score A. In the analysis Nutri-score A was designated as the dummy variable, while the no label condition served as the reference category. To test the hypothesis, the coefficients table must be examined which can be seen in the table 8, specifically focusing on the interaction effect between skepticism and Nutri-score A

The regression analysis reveals a significant interaction effect between skepticism and Nutri-Score A on purchase intentions ($B = -.653$, $SE = -.249$, $p = .010$). This interaction indicates that higher levels of skepticism reduce the difference in purchase intentions between products with a Nutri-Score A and those without a Nutri-Score. The coefficient of -0.653 for the interaction term means that for each one-unit increase in the standardized measure of skepticism, the effect of Nutri-Score A on purchase intentions decreases by 0.653 units. In other words, as a consumer's skepticism increases by one standard deviation, the positive impact of having a Nutri-Score A label on their purchase intentions is reduced by 0.653 units.

Specifically, while Nutri-Score A generally increases purchase intentions ($B = .998$, $SE = .194$, $p < .001$), this positive effect diminishes among consumers who are more skeptical of the Nutri-Score label. Indicating that, on average, having a Nutri-Score A label increases purchase intentions by 0.998 units compared to products without a label, assuming that skepticism is constant. However, the interaction effect ($B = -0.653$) suggests that this positive effect of Nutri-Score A is moderated by consumer skepticism. Therefore, while Nutri-Score A generally enhances purchase intentions relative to no label, its effectiveness is diminished among more skeptical consumers. This means that the positive impact of Nutri-Score A on purchase intentions is less pronounced when having higher levels of skepticism. Therefore, the significant interaction effect supports the moderating effect, indicating that consumer skepticism towards the Nutri-Score system significantly moderates the relationship, reducing the difference between purchase intentions of products with a Nutri-score A in comparison to products without a Nutri-score. Therefore, hypothesis 4 is supported.

Skepticism itself does not directly influence purchase intentions ($B = -.001$, $SE = -.191$, $p = .995$), underscoring that its impact is primarily through moderating the effect of Nutri-Score A.

In addition to the interaction effect, the analysis shows that product liking ($B = .687$, $SE = .076$, $p < .001$) and brand attitude ($B = .335$, $SE = .111$, $p = .003$) are significant predictors of purchase intentions, with higher levels of liking and positive brand attitudes leading to increased purchase intentions. However, age ($B = -.028$, $SE = -.018$, $p = .115$) and gender ($B = .124$, $SE = .153$, $p = .421$) do not significantly affect purchase intentions in this model.

| | Unstandardized | | Standardized | | Sig. |
|------------------------------------|----------------|------------|--------------|--------|-------|
| | Coefficients | | coefficients | | |
| | Beta | Std. Error | Beta | t | |
| Constant | -.193 | .605 | | -.319 | .751 |
| Zskepticism * Nutri-score A | -.653 | .249 | -.229 | -2.619 | .010 |
| Zskepticism | -.001 | .191 | -.001 | -.006 | .995 |
| Nutri-score A | .998 | .194 | .332 | 5.138 | <.001 |
| Liking | .687 | .076 | .584 | 8.932 | <.001 |
| Brand attitude | .335 | .111 | .190 | 3.006 | .003 |
| Age | -.028 | .018 | -.083 | -1.592 | .115 |
| Gender | .124 | .153 | .043 | .809 | .421 |

Table 8 coefficients table Nutri-score A (Dummy) vs No label (Reference)

4.3.5 Hypothesis 5

H5: Increased levels of skepticism towards the Nutri-Score reduces the difference between purchase intentions of products with a Nutri-score E in comparison to products without a Nutri-score.

For this hypothesis, a regression analysis is to be performed to test for the moderating effect of skepticism, while controlling for brand attitude, liking of the product, age and gender.

First the assumptions of regression must be checked and met. First, the relationship between the independent variables and the dependent variable should be linear, as can be seen in the scatterplot in appendix H, this is the case, therefore the first assumption has been met. All other output for testing assumptions can be found in appendix H. Second, the assumption of independence of residuals must be checked to ensure that the value of one residual is not correlated with the value of another. The value of the Durbin-Watson should be between 1.5 and 2.5 to indicate that there is no significant autocorrelation present. In our analysis, the Durbin-Watson value was found to be 1.638, which is close enough to 2. This suggests that the residuals are independent and that there is no significant autocorrelation. Therefore, the assumption of independence of residuals has been satisfactorily met. The third assumption is the normality of residuals. The residuals are normally distributed as can be seen in the histogram in Appendix H. The fourth assumption checks for multicollinearity. A VIF value above 5 is considered multicollinear, as all values are below 5, this assumption has been met. Lastly, to verify the assumption of homoscedasticity, we examined the scatter plot of the standardized residuals versus the standardized predicted values. The plot revealed that the residuals are randomly scattered around the horizontal axis, showing no pattern or systematic structure. This random distribution of

residuals indicates that the variance of the residuals remains constant across all levels of the predicted values.

The hypothesis proposes that consumers' skepticism towards the Nutri-Score moderates the relationship between purchase intentions and the absence of Nutri-Score labeling and for products labeled with a Nutri-Score E, reducing the difference in purchase intentions between those two conditions. In the analysis the condition No label was designated as the reference variable, while the Nutri-score E condition served as the dummy variable.

It was expected that higher levels of skepticism would reduce the difference in purchase intentions between these two conditions. Hypothesis 2 revealed that products labeled with Nutri-Score E had significantly higher purchase intentions compared to those without any Nutri-Score label. This finding was surprising, as hypothesis 2 suggested that Nutri-Score E would receive lower purchase intentions indicating it being the least favorable Nutri-score.

In the regression analysis, the interaction effect between skepticism and Nutri-Score E on purchase intentions was found to be significant ($B = .627$, $SE = .280$, $p = .028$). Indicating that as levels of skepticism increase by one standard deviation, the effect of Nutri-Score E on purchase intentions increases by 0.627 units. In other words, higher skepticism amplifies the positive impact of Nutri-Score E on purchase intentions. Suggesting that the effect of Nutri-score E on purchase intentions depends on the level of skepticism. The direct effect of Nutri-Score E on purchase intentions is represented by a coefficient of 0.126, which is not statistically significant ($p = 0.548$). This indicates that, when considered in isolation, Nutri-Score E does not have a meaningful impact on purchase intentions compared to products without any label.

Contrary to the hypothesis, increased levels of skepticism do not reduce the difference in purchase intentions between Nutri-Score E labeled products and those without a Nutri-Score label. Instead, it enhances this difference, for every increase in standard deviation of skepticism the effect of Nutri-score E on purchase intention increases by .627 units relative to the reference category, leading to an even greater difference in purchase intentions. This contradicts the hypothesis and therefore hypothesis 5 is rejected.

The analysis indicates that skepticism does not have a direct effect on purchase intentions ($B = -.001$, $SE = .194$, $p = .995$), suggesting that its influence is primarily through its moderating role on the effect of Nutri-Score A. This means that while skepticism alone does not significantly alter purchase intentions, it affects how consumers respond to Nutri-Score A labeling.

The model highlights that product liking ($B = .687$, $SE = .098$, $p < .001$) and brand attitude ($B = .335$, $SE = .147$, $p = .003$) are significant predictors of purchase intentions. Higher levels of product liking and more positive brand attitudes are associated with increased purchase intentions, emphasizing the importance of these factors in consumer decision-making.

Conversely, demographic factors such as age ($B = -.028$, $SE = .011$, $p = .115$) and gender ($B = .124$, $SE = .166$, $p = .421$) do not significantly impact purchase intentions in this model. This suggests that age and gender have a minimal influence on purchase intentions compared to factors like product liking and brand attitude.

| | Unstandardized | | Standardized | | Sig. |
|------------------------------------|----------------|------------|--------------|--------|-------|
| | Coefficients | | coefficients | | |
| | Beta | Std. Error | Beta | t | |
| Constant | -.929 | .602 | | -1.542 | .127 |
| Zskepticism * Nutri-score E | .627 | .280 | .243 | 2.241 | .028 |
| Zskepticism | .073 | .194 | .035 | .375 | .708 |
| Nutri-score E | .126 | .209 | .049 | .603 | .548 |
| Liking | .535 | .098 | .438 | 5.446 | <.001 |
| Brand attitude | .627 | .147 | .333 | 4.257 | <.001 |
| Age | -.017 | .011 | -.101 | -1.607 | .112 |
| Gender | .081 | .166 | .030 | .485 | .629 |

Table 9 coefficients table Nutri-score E (Dummy) vs No label (Reference)

4.3.6 Hypothesis 6

H6: Increased levels of skepticism towards the Nutri-Score reduce the difference between purchase intentions of products with a Nutri-score E in comparison to products with a Nutri-score A.

For this hypothesis, a regression analysis is to be performed to test for the moderating effect of skepticism, while controlling for brand attitude, liking of the product, age and gender.

First the assumptions of regression must be checked and met. All output for testing the assumptions can be found in Appendix I. First, the relationship between the independent variables and the dependent variable should be linear, as can be seen in the scatterplot, this is the case. Second, the assumption of independence of residuals must be checked. A Value of the Durbin-Watson statistic between 1.5 and 2.5 indicate that there is no significant autocorrelation present. The Durbin-Watson value was found to be 1.569, therefore this assumption is met. Third assumption is the normality of

residuals. As can be seen in the histogram the residuals are normally distributed. Fourth is the check for no multicollinearity. A VIF value above 5 is considered multicollinear, as all value are below 5, this assumption has been met. Lastly, to verify the assumption of homoscedasticity, we examined a scatter plot of the standardized residuals versus the standardized predicted values. The plot revealed that the residuals are randomly scattered around the horizontal axis, showing no pattern or systematic structure.

In the analysis Nutri-score A was designated as the dummy variable, while the Nutri-score E condition was the reference category. To test the hypothesis, the coefficients table must be examined which can be seen in the table 10, specifically focusing on the interaction effect between skepticism and Nutri-score A

The hypothesis proposes that consumers' skepticism towards the Nutri-Score moderates the relationship between their purchase intentions and the presence of Nutri-Score A and for products labeled with a Nutri-Score E. In the analysis the condition Nutri-score A was designated as the dummy variable, while the Nutri-score E condition served as the reference category. The regression analysis reveals a significant interaction effect between skepticism and Nutri-Score A on purchase intentions ($B = -1.363$, $SE = .245$, $p < .001$). This interaction indicates that increased levels of skepticism towards the Nutri-Score system reduce the difference in purchase intentions between products with Nutri-Score A and those with Nutri-Score E. Specifically, this indicates that for each one standard deviation increase in skepticism, the positive effect of Nutri-Score A on purchase intentions decreases by 1.363 units. While nutri-Score A generally increases purchase intentions ($B = .982$, $SE = .168$, $p < .001$), this positive effect diminishes among consumers who are more skeptical of the Nutri-Score labeling system. This result supports the hypothesis that skepticism moderates the impact of Nutri-Score A, thereby reducing the gap in purchase intentions between products with Nutri-Score A and Nutri-Score E. Therefore, hypothesis 6 is supported

In addition to the interaction effect, the analysis shows that skepticism itself has a significant direct effect on purchase intentions ($B = .706$, $SE = .167$, $p < .001$). This indicates that higher levels of skepticism are associated with increased purchase intentions, which may be due to a mistrust of health claims or a preference for products that display Nutri-Scores more prominently.

The model also identifies product liking as a significant predictor of purchase intentions ($B = .626$, $SE = .087$, $p < .001$), where greater product liking leads to higher purchase intentions. However, brand attitude does not significantly affect purchase intentions ($B = .165$, $SE = .117$, $p = .164$). Demographic factors such as age ($B = -.007$, $SE = .011$, $p = .541$) and gender ($B = -.303$, $SE = .138$, $p = .030$) also

play roles in shaping purchase intentions, with gender having a significant negative impact, suggesting that males might have lower purchase intentions compared to females.

| | Unstandardized | | Standardized | | Sig. |
|------------------------------------|----------------|------------|--------------|--------|-------|
| | Coefficients | | coefficients | | |
| | Beta | Std. Error | Beta | t | |
| Constant | .950 | .537 | | 1.770 | .080 |
| Zskepticism * Nutri-score A | -1.363 | .245 | -.548 | -5.573 | <.001 |
| Zskepticism | .706 | .167 | .365 | 4.234 | <.001 |
| Nutri-score A | .982 | .168 | .367 | 5.832 | <.001 |
| Liking | .626 | .087 | .524 | 7.159 | <.001 |
| Brand attitude | .165 | .117 | .087 | 1.404 | .164 |
| Age | -.007 | .011 | -.032 | -.613 | .541 |
| Gender | -.303 | .138 | -.115 | -2.201 | .030 |

Table 10 coefficients table Nutri-score A (Dummy) vs Nutri-score E (Reference)

Chapter 5: Discussion

5.1: Conclusion

This study investigated how Nutri-Score labeling influences consumer purchase intentions across different nutritional ratings (A and E) and products without a label, alongside varying levels of skepticism. Hypothesis testing revealed that products labeled with Nutri-Score A significantly increased purchase intentions compared to those without any nutritional labeling. However, for products with a Nutri-Score E compared to those without any label, the hypothesis was not accepted. Although a significant result was found, this significant was not in the hypothesized direction. A significant result in the hypothesized direction was found between the condition with Nutri-score A and Nutri-score E.

Hypothesis 4, 5 and 6 explored how skepticism moderates the relationship between Nutri-Score labeling and purchase intentions, revealing a significant interaction effect for all the hypotheses. Higher levels of skepticism lead to lower purchase intentions for products with a Nutri-score A and higher purchase intentions for products with a Nutri-score E. Hypothesis 4 and 6 are accepted, however given the higher mean of purchase intentions for products with a Nutri-score E in comparison to the absence of the Nutri-score and the observed effect which amplifies the differences between those conditions, hypothesis 5 is rejected

| Hypothesis | Results |
|---------------------|----------------|
| Hypothesis 1 | Accepted |
| Hypothesis 2 | Rejected |
| Hypothesis 3 | Accepted |
| Hypothesis 4 | Accepted |
| Hypothesis 5 | Rejected |
| Hypothesis 6 | Accepted |

Table 9: Results

5.2: Theoretical implications

As tested in the first three hypotheses, two hypotheses showed a significant effect between the Nutri-score and purchase intentions, which was in line with several studies regarding this topic (Ares et al., 2018; Crosetto et al. 2020; De Temmerman et al., 2021; Egnell et al., 2021; Szabo de Edelenyi et al., 2019; Van den Akker et al., 2022). However, hypotheses 2 did not show a significant effect in the hypothesized direction, which is in line with other previous studies (Folkvord et al., 2021; Zeder et al., 2022). The non-significant effect could be explained due to a difference in survey design between the different studies. Ares et al. (2018), Crosetto et al., (2018) used bigger Nutri-scores on their packages in comparison to this study. De Temmerman et al. (2021) did not place the Nutri-score on the product but showed it next to the product. This might explain the non significant effects in those studies. Also, some studies used more products to measure the purchase intentions based on different Nutri-scores (Ares et al., 2018; Crosetto et al., 2018; De Temmerman et al., 2021; Frints, 2021). As a result, consumers can become biased, because of the previous products with Nutri-scores which they have seen which might influence their purchase intentions.

In this study the non-significant can't be explained by reasons mentioned above in other studies. Several other reasons could possibly explain the observed results in hypothesis 2. The higher purchase intentions for products with a Nutri-score E in comparison to products without a Nutri-score could possibly be explained by consumers valuing the transparency and honesty of the organization. Those consumers might appreciate the presence of the label because it demonstrates a commitment to transparency, regardless of the score itself (Tapscott & Ticoll, 2003). The act of labeling, even with a lower score like E, can be perceived as an honest disclosure by the organization, leading to an increase in purchase intentions among skeptical consumers. This appreciation for transparency and honesty in labeling appears to outweigh the negative implications of a low Nutri-score, leading to the observed increase in purchase intentions (Tapscott & Ticoll, 2003). Another reason for the observed findings is that consumers prefer having nutritional information, allowing them to make informed decisions and consciously choose less healthy products, which they prefer over the uncertainty of unlabeled products (Prinsloo et al., 2012). Consumers might choose products with a lower Nutri-score, because they value having some nutritional information to guide their choices (Prinsloo et al., 2012). This enables consumers to make deliberate and informed decisions about their dietary intake. Consumers are consciously choosing to consume less healthy products and appreciate the ability to make that choice knowingly. The presence of the Nutri-score allows them to understand exactly what they are consuming, even if this is not the healthiest option. This can be preferred over the uncertainty of products without a Nutri-score (Prinsloo et al., 2012). This can allow consumer for example to integrate less healthy options into their diet in a controlled manner, balancing them with healthier choices (Prinsloo et al., 2012). In combination with the observed and expected positive effect of

skepticism on purchase intentions for products with a Nutri-score E, the difference between purchase intentions for products with a Nutri-score E in comparison with products without a Nutri-score enlarges. Furthermore, the perception of transparency of the label of skeptical consumers could eventually even reduce levels of skepticism among consumers. Several studies emphasized the importance of transparency in addressing and reducing skepticism among consumers. (Kim & Lee, 2018). This eventually can lead to lower purchase intentions for products with a Nutri-score E, since lower levels of skepticism result in lower purchase intentions for products with a Nutri-score, therefore this may eventually close the observed difference between the two conditions. However, further research must be done to confirm those assumptions and to further explain the findings.

In terms of the hypotheses regarding the moderating effect of skepticism, 28% of the respondents (mean score of > 3.5 on skepticism) indicated to have at least some levels of skepticism towards the Nutri-score label. Findings in the literature fluctuate between 10% and 66% in regard of skepticism towards the Nutri-score label (Goiana-da-silva et al., 2021; Zander, 2022; Jürkenbeck et al., 2023; Perret & Skretkowicz, 2024). The higher levels of skepticism could be because of a difference of age in sample size. Perret & Skretkowicz (2024) showed a higher percentage of skepticism in their sample, but also has a significant older sample size in comparison to this research, which could attribute for the difference. Two of the three hypothesis were accepted indicating a moderation effect of skepticism on the relation between different Nutri-scores and the absence of the label on purchase intentions. This is in line with other studies which focused on skepticism on willingness to buy green products (Rossi & Rivetti, 2023; Cho & Taylor, 2020). Other significant results were found in regards of skepticism in relation to health labels (Mazis & Raymond, 1997; Fenko et al., 2015; Mitra et al., 2019).

5.3: Practical implications

The results of this study are helpful for especially organizations who are active in the manufacturing or retail of products in the food industry. First, there turned out to be a significant difference in purchase intention between products with a Nutri-score A and products without a label and products with a Nutri-score A and Nutri-score E. This highlights the potential value for retailers aiming to boost sales. Retailers and manufacturers should consider the strategic benefits of adopting or improving to a Nutri-Score A label, especially when targeting consumers who place a high value on nutritional information. For instance, organizations currently offering products with a Nutri-Score B could benefit from adapting their products to achieve a Nutri-Score A. Such changes, though potentially requiring adjustments in ingredients, could significantly enhance consumer appeal and drive sales. Given the consumer preference for products with higher Nutri-Score ratings, investing in achieving an A rating could represent a valuable opportunity for increasing market competitiveness and meeting consumer demand for healthier options.

However, there are also potential risks associated with this strategy. Reformulating products to improve their Nutri-Score could lead to unintended consequences, such as altering the product's taste or quality, which might alienate existing customers who are satisfied with the current formulation. Additionally, consumers who are skeptical of nutritional labels or who prioritize other product attributes may not respond positively to a change in Nutri-Score. Thus, while achieving a Nutri-Score A can enhance market appeal, it is crucial for organizations to carefully manage the adaptation process and consider potential consumer reactions to mitigate any negative impacts on their customer base.

As concluded in hypothesis 2, products with a Nutri-score E received significant higher purchase intentions in comparison with products without a Nutri-score. This suggests that even when a product has a less favorable Nutri-Score, displaying the label is more advantageous than not displaying it. The underlying reasons for this phenomenon likely relate to consumer trust and the desire for informed decision-making.

In hypothesis 4 and 6 there turned out to be a significant interaction effect of skepticism on the relation between Nutri-score A and no label and Nutri-score A and Nutri-score E on purchase intentions. Therefore, for organization involved in the product lifecycle of products with a Nutri-score is it important to consider levels of skepticism among their target group. Being the most important implication that higher levels of skepticism lead to lower purchase intentions for products with a Nutri-score A and higher purchase intentions for products with a Nutri-score E. Therefore, it could be more profitable for organizations who have products with healthier Nutri-scores to reduce skepticism among their target group. While for organizations involved in the product lifecycle of products with less healthy products it would be less beneficial to reduce levels of skepticism among their target group.

Reducing consumer skepticism towards nutritional labels like the Nutri-Score starts with enhancing transparency and addressing misconceptions. This involves clearly explaining how the Nutri-Score is calculated and its benefits through educational campaigns and straightforward product labeling (Cho & Taylor, 2020). Several consumers expressed confusion about the Nutri-Score system, highlighting a lack of understanding regarding its composition and the criteria it includes. Many indicated that they were unsure about how the Nutri-Score is calculated and what factors contribute to its overall rating (Perret & Skretkiewicz, 2024). Engaging credible stakeholders, such as health experts and consumer advocacy groups, in the development and promotion of the system can further build trust (Mitra et al., 2019). Additionally, organizations can actively correct misinformation by implementing fact-checking initiatives and using public relations strategies to clarify inaccuracies. By combining transparent communication, stakeholder involvement, and evidence-based validation, organizations can overcome

misconceptions and foster greater acceptance of nutritional labels (Cho & Taylor, 2020). For organizations who sell or manufacture products which are less healthy, it would be less beneficial or even detrimental to reduce levels of skepticism among their target audience. Since, higher levels of skepticism lead to higher purchase intentions for products with less healthy Nutri-scores. Such initiatives could be supported by health organizations or organization involved in retailing products with healthy Nutri-scores. Health organization benefit from reducing consumers skepticism since this encourages healthier eating habits and support their mission to improve public health. On the other hand, organization involved. While organizations who retail products with healthier Nutri-scores can profit from higher purchase intentions given the lower levels of skepticism.

5.4: Limitations and further research

In this section, the focus shifts to examining the limitations encountered during the research and outlining directions for future investigations. First, the generalizability of this research is limited due to its focus on a specific product, BBQ rice cakes, without considering other food items or product categories. This narrow scope restricts the applicability of the findings to a broader range of consumer products. To enhance the generalizability, future research should include a diverse range of products to determine if the observed effects of Nutri-Score labeling and the moderating role of skepticism are consistent across different food types and consumer preferences. Expanding the product range studied will provide a more comprehensive understanding of how Nutri-Score labels influence purchase intentions in varied contexts. Another reason why the generalizability of the research is also limited because the sample cannot be seen as representative for a population. 83.6% of the respondents pursued at least university level education. Thereafter, 90% of the sample was 25 or younger and 61,9% of the respondents were male. As a result, further research should be done on obtaining a more representative sample to test the effects.

One interesting result of this research was that the mean of purchase intention for products with no label was lower than for products with a Nutri-Score E. While literature suggest that this can be explained by consumers valuing the transparency and honesty of the organization (Tapscott & Ticoll, 2003). Consumers interpret the presence of any nutritional information, even a poor Nutri-score, as a form of transparency and trustworthiness (Zeder et al., 2022). It can be perceived as an honest disclosure by the organization, leading to an increase in purchase intentions. This appreciation for transparency and honesty in labeling appears to outweigh the negative implications of a low Nutri-score. Consumers who are skeptical towards the Nutri-score are expected to have higher purchase intentions for products with a low Nutri-score because they would earlier neglect this label (Kim & Lee, 2018). Another reason for the observed findings might be that consumers prefer having nutritional information, allowing them to make informed decisions and consciously choose less

healthy products, which they prefer over the uncertainty of unlabeled products (Prinsloo et al., 2012). Therefore, amplifying the difference between products without a Nutri-score and products with a Nutri-score E. To uncover the exact reason behind this observation, more research must be done regarding this specific aspect. This could reveal important insights into how consumers interpret and react to different types of nutritional information, or the lack thereof.

Next, this study was conducted as an online experiment where participants viewed a picture of the product online. However, this setup does not fully replicate a realistic shopping experience, as most people buy their groceries in physical supermarkets. Future research should focus on real-life shopping scenarios to see whether purchase intentions actually are translated in buying behavior.

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Appendixes

Appendix A - survey

Thank you for your interest in this short experiment. My name is Mike Peters and I am a master's student in Business Administration with specialisation in Marketing.

Your participation in this experiment is entirely voluntary and you are free to stop the experiment at any time and without giving any reason. Moreover, all responses will remain completely anonymous; the data will be used exclusively for this study and nowhere else. The experiment will last about 5 minutes. If you have any questions or comments, please do not hesitate to contact me at mike.peters@ru.nl.

By ticking 'Yes, I agree to participate in the study' below, you indicate that:

- You have read and understood this information;
- You voluntarily agree to participate;
- You realise that you can stop participating in this study at any time;
- You are at least 18 years of age or older.

If you do not wish to participate in this study, you may decline participation by selecting 'No, I do not agree to participate in the study' below. Thanks again for your help! You are helping me and science a step further!

I agree

I dont agree

Imagine you are looking for a snack in the supermarket, you see the following product:



€2,19,-

Indicate the extent to which you agree with the statements by selecting the correct answer.

1. I am positive towards buying this product

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

2. I think it is a good idea to buy this product

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

3. I intend to buy this product

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

4. Next time I buy a snack, I will choose this product

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

The product you see has a Nutri-score. We would like to ask some questions regarding this score

5. I feel like I have been accurately informed after viewing this label

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

6. This label does not tell much useful information about the product

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

7. I can trust the information this label.

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

8. *Products with a higher Nutri-score are healthier than those with a lower score*

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

Indicate the extent to which you agree with the statements by selecting the correct answer

9. *I like the taste of the product*

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

10. *I like the appearance of the product*

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

11. *I like the texture of the product*

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

12. *I like the brand Snack a Jacks very much*

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

13. *I find Snack a Jacks products very attractive*

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

14. Snack a Jacks brands is very desirable

1 = totally disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat disagree; 6 = agree; 7 = totally agree

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

Appendix B - Snacks



€2,19,-

BBQ with Nutri-score A



€2,19,-

BBQ without a Nutri-score



€2,19,-

BBQ with a Nutri-score E

Appendix C - Reliability analyses

Factor Matrix^a

| | Factor 1 |
|-----------|-------------|
| Purchase4 | .882 |
| Purchase3 | .937 |
| Purchase2 | .943 |
| Purchase1 | .930 |

Extraction Method:
Principal Axis
Factoring.

Table 1 Factor matrix Purchase intention

Reliability Statistics

| Cronbach's Alpha | N of Items |
|---------------------|------------|
| .967 | 4 |

Table 2 Reliability statistics Purchase intention

Factor Matrix^a

| | Factor 1 |
|-------|-------------|
| Skep1 | .973 |
| Skep2 | .943 |
| Skep3 | .960 |
| Skep4 | .954 |

Extraction
Method: Principal
Axis Factoring.

Table 3 Factor matrix Skepticism towards Nutri-score

Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .977 | 4 |

Table 4 Reliability statistics skepticism towards Nutri-score

Factor Matrix^a

| | Factor 1 |
|---------|-------------|
| Liking1 | .770 |
| Liking2 | .821 |
| Liking3 | .821 |

Extraction Method:
Principal Axis
Factoring.

Table 5 Factor matrix Liking of the product

Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .837 | 3 |

Table 6 Reliability statistics liking of the product

Factor Matrix^a

| | Factor 1 |
|--------|-------------|
| Brand1 | .785 |
| Brand2 | .749 |
| Brand3 | .868 |

Extraction Method:
Principal Axis
Factoring.

Table 7 Factor matrix Brand attitude

Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .834 | 3 |

Table 8 Reliability statistics brand attitude

Appendix D - Hypothesis 1

Levene's Test of Equality of Error Variances^a

Dependent Variable: PI

| F | df1 | df2 | Sig. |
|------|-----|-----|------|
| .127 | 1 | 96 | .722 |

Table 9 test of equal variances Nutri-score A vs no label

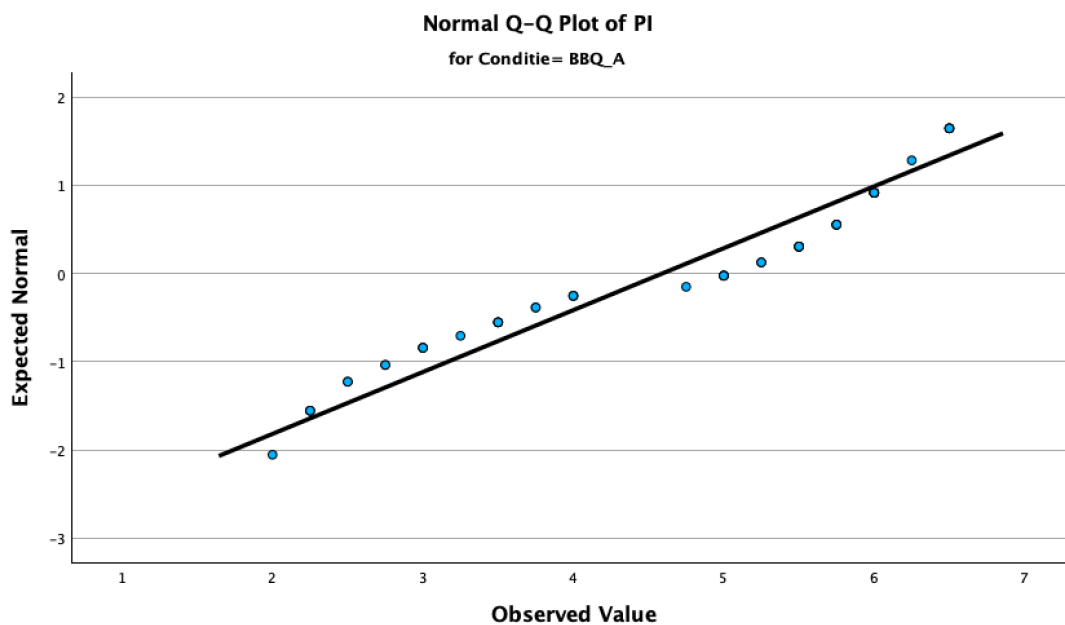


Table 10 test of normality of residuals Nutri-score A

Tests of Between-Subjects Effects

Dependent Variable: PI

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|-------|
| Corrected Model | 160.531 ^a | 5 | 32.106 | 48.738 | <.001 |
| Intercept | .059 | 1 | .059 | .090 | .765 |
| Liking | 69.133 | 1 | 69.133 | 104.945 | <.001 |
| Brand | 4.090 | 1 | 4.090 | 6.209 | .014 |
| Gender_ | .015 | 1 | .015 | .023 | .880 |
| Age | 1.975 | 1 | 1.975 | 2.998 | .087 |
| Nutri_scoreA | 14.485 | 1 | 14.485 | 21.989 | <.001 |
| Error | 60.605 | 92 | .659 | | |
| Total | 1807.188 | 98 | | | |
| Corrected Total | 221.136 | 97 | | | |

a. R Squared = .726 (Adjusted R Squared = .711)

Table 11 tests of between-subjects effects Nutri-score A vs no label

2. Nutri_scoreA

Dependent Variable: PI

| Nutri_scoreA | Mean | Std. Error | 95% Confidence Interval | |
|--------------|--------------------|------------|-------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| .00 | 3.627 ^a | .118 | 3.393 | 3.860 |
| 1.00 | 4.419 ^a | .118 | 4.185 | 4.653 |

a. Covariates appearing in the model are evaluated at the following values: Liking = 4.23473, Brand = 4.0443, Gender = 1.43, age = 22.20.

Table 12 means Nutri-score A and no label

Appendix E - Hypothesis 2

Levene's Test of Equality of Error Variances^a

Dependent Variable: PI

| F | df1 | df2 | Sig. |
|------|-----|-----|------|
| .012 | 1 | 92 | .914 |

Table 13 test of equal variances Nutri-score E vs no label

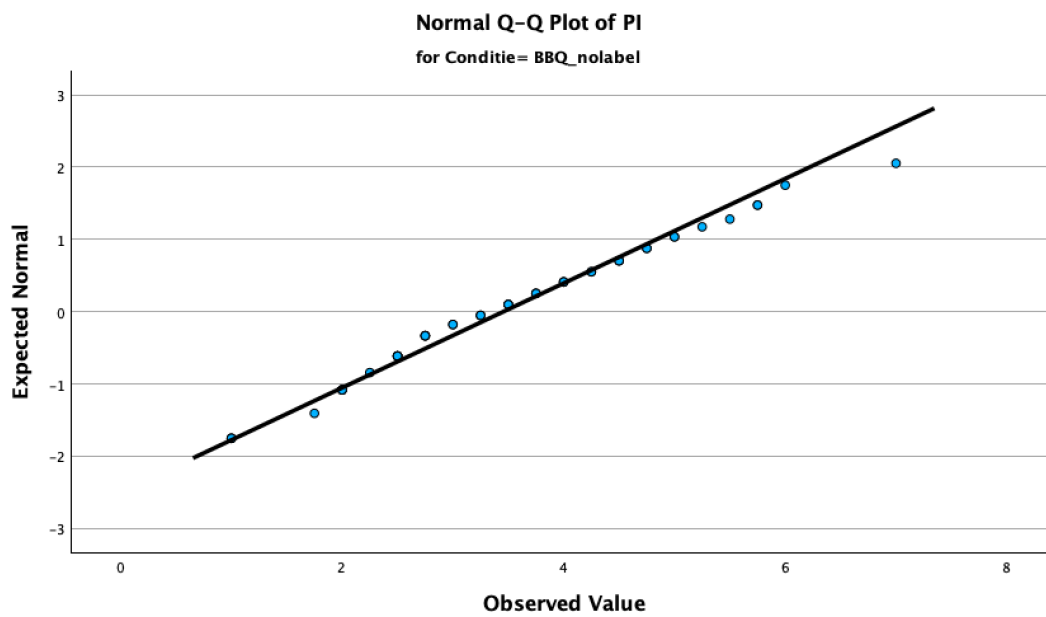


Table 14 test of normality of residuals No label

Tests of Between-Subjects Effects

Dependent Variable: PI

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|--------|-------|
| Corrected Model | 98.003 ^a | 5 | 19.601 | 29.909 | <.001 |
| Intercept | 2.381 | 1 | 2.381 | 3.633 | .060 |
| Liking | 29.492 | 1 | 29.492 | 45.001 | <.001 |
| Brand | 10.445 | 1 | 10.445 | 15.938 | <.001 |
| Gender_ | .002 | 1 | .002 | .003 | .953 |
| Age | .952 | 1 | .952 | 1.453 | .231 |
| No_label | 3.217 | 1 | 3.217 | 4.909 | .029 |
| Error | 57.671 | 88 | .655 | | |
| Total | 1420.063 | 94 | | | |
| Corrected Total | 155.674 | 93 | | | |

a. R Squared = .630 (Adjusted R Squared = .608)

Table 15 tests of between-subjects effects Nutri-score E (reference) vs no label (dummy)

2. No_label

Dependent Variable: PI

| No_label | Mean | Std. Error | 95% Confidence Interval | |
|----------|--------------------|------------|-------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| .00 | 3.864 ^a | .122 | 3.622 | 4.106 |
| 1.00 | 3.487 ^a | .117 | 3.255 | 3.719 |

a. Covariates appearing in the model are evaluated at the following values: Liking = 4.08865, Brand = 3.9362, Gender = 1.38, age = 23.05.

Table 16 means Nutri-score E vs no label

Appendix F: Hypothesis 3

Levene's Test of Equality of Error Variances^a

Dependent Variable: PI

| F | df1 | df2 | Sig. |
|------|-----|-----|------|
| .070 | 1 | 92 | .791 |

Table 17 test of equal variances Nutri-score A vs Nutri-score E

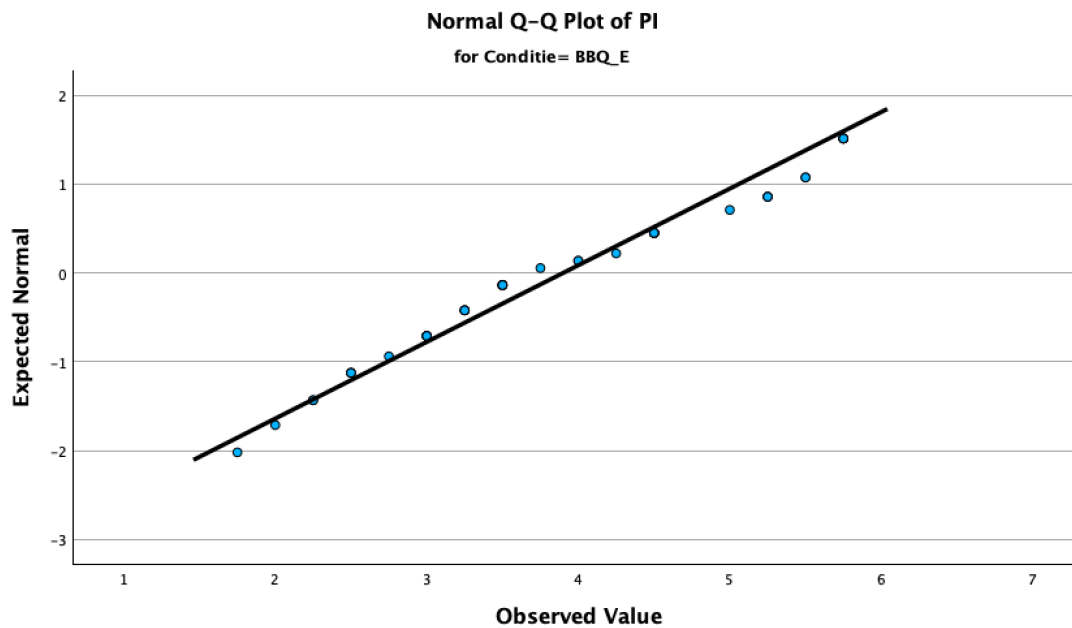


Table 18 test of normality of residuals Nutri-score E

Tests of Between-Subjects Effects

Dependent Variable: PI

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|-------|
| Corrected Model | 118.028 ^a | 5 | 23.606 | 41.578 | <.001 |
| Intercept | .680 | 1 | .680 | 1.197 | .277 |
| Liking | 59.765 | 1 | 59.765 | 105.268 | <.001 |
| Brand | .279 | 1 | .279 | .491 | .485 |
| Gender_ | 4.081 | 1 | 4.081 | 7.188 | .009 |
| Age | .016 | 1 | .016 | .027 | .869 |
| Nutri_scoreE | 4.659 | 1 | 4.659 | 8.206 | .005 |
| Error | 49.961 | 88 | .568 | | |
| Total | 1874.375 | 94 | | | |
| Corrected Total | 167.989 | 93 | | | |

a. R Squared = .703 (Adjusted R Squared = .686)

Table 19 tests of between-subjects effects Nutri-score E (Dummy) vs Nutri-score A (Reference)

Appendix G - Hypothesis 4

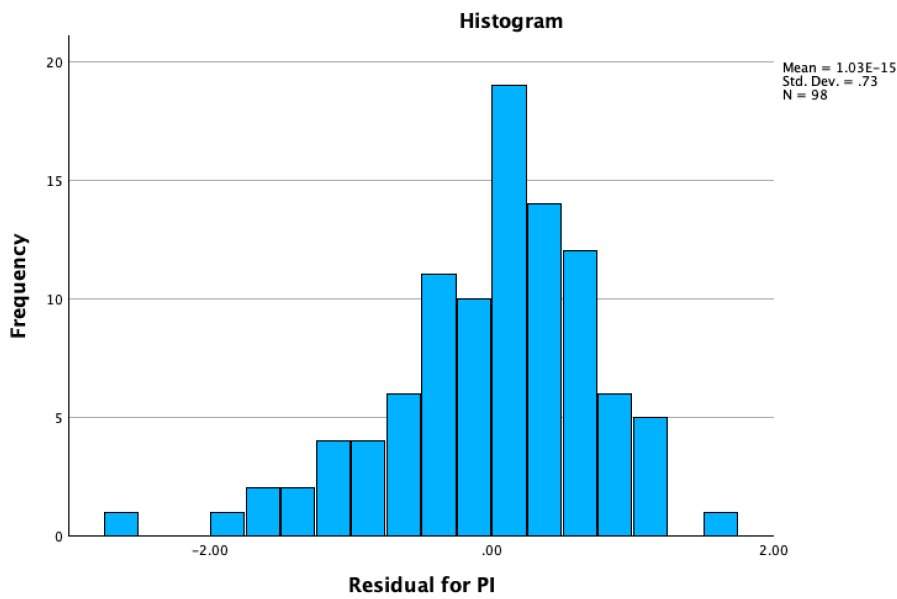


Table 20 residuals histogram Nutri-score A

Model Summary^b

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | R Square Change | Change Statistics | | | Durbin-Watson | |
|-------|-------------------|----------|-------------------|----------------------------|-----------------|-------------------|-----|-----|---------------|-------|
| | | | | | | F Change | df1 | df2 | | |
| 1 | .876 ^a | .767 | .749 | .75637 | .767 | 42.362 | 7 | 90 | <.001 | 2.092 |

a. Predictors: (Constant), Gender, Nutri_A, Liking, age, Zscore(Skep_rever), Brand, zskep_X_NutriA

b. Dependent Variable: PI

Table 21 model summary Nutri-score A (Dummy) and no label (Reference)

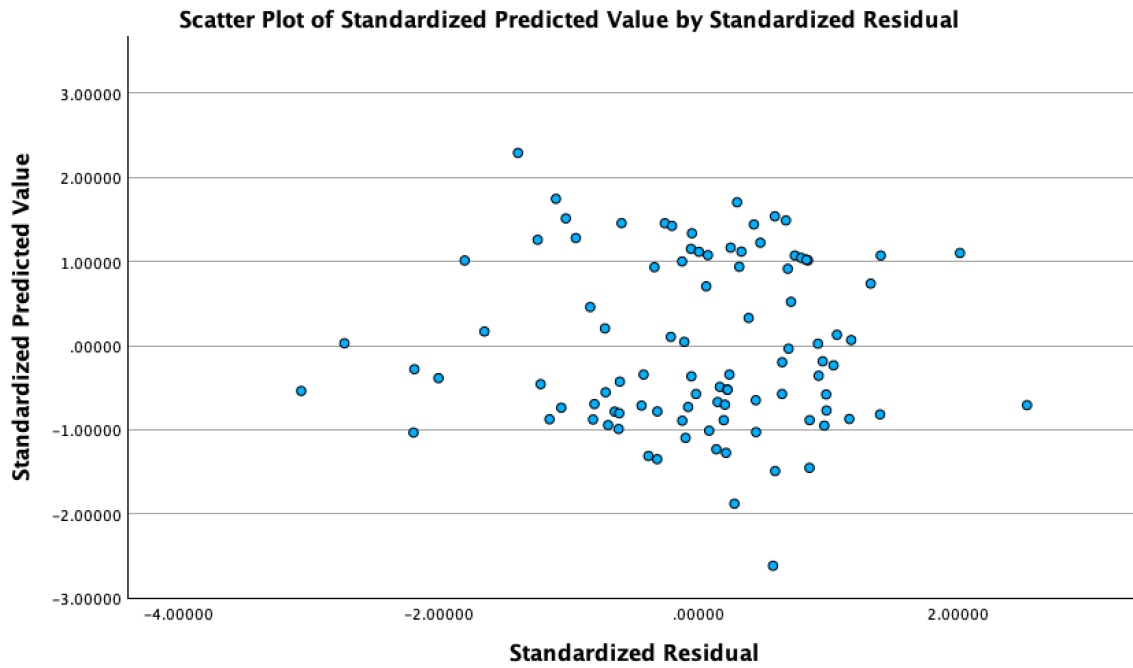


Table 22 residuals Nutri-score A (Dummy) and no label (Reference)

| | | Coefficients ^a | | | | | | |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|-------|-------------------------|-------|
| | | Unstandardized Coefficients | | Standardized Coefficients | | | Collinearity Statistics | |
| Model | | B | Std. Error | Beta | t | Sig. | Tolerance | VIF |
| 1 | (Constant) | -.193 | .605 | | -.319 | .751 | | |
| | zskep_X_NutriA | -.653 | .249 | -.229 | -2.619 | .010 | .337 | 2.966 |
| | Zscore(Skep_rever) | -.001 | .191 | -.001 | -.006 | .995 | .362 | 2.759 |
| | Nutri_A | .998 | .194 | .332 | 5.138 | <.001 | .619 | 1.617 |
| | Liking | .687 | .076 | .584 | 8.982 | <.001 | .611 | 1.635 |
| | Brand | .335 | .111 | .190 | 3.006 | .003 | .646 | 1.548 |
| | age | -.028 | .018 | -.083 | -1.592 | .115 | .955 | 1.047 |
| | Gender | .124 | .153 | .043 | .809 | .421 | .935 | 1.069 |

a. Dependent Variable: PI

Table 23 coefficients Nutri-score A (Dummy) and no label (Reference)

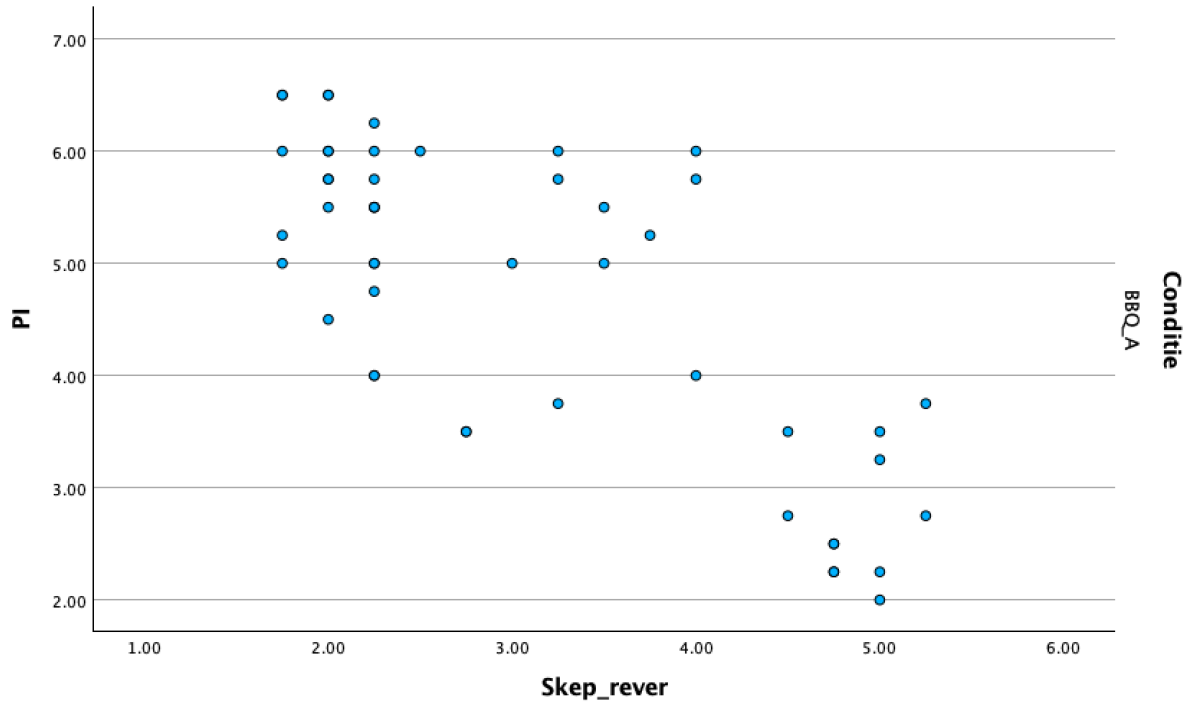


Table 24 scatterplot skepticism, Nutri-score A

Appendix H - Hypothesis 5

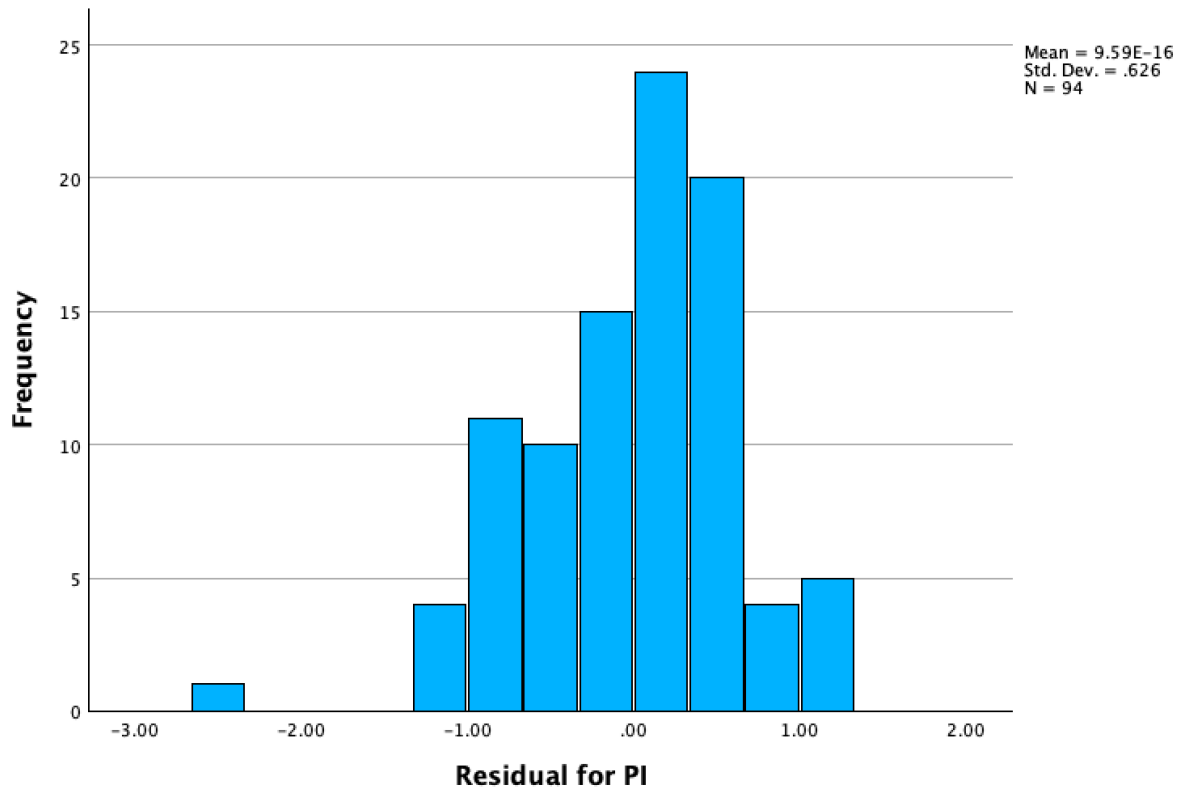


Table 25 residuals histogram Nutri-score E

Model Summary^b

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1 | .825 ^a | .680 | .654 | .76107 | 1.638 |

a. Predictors: (Constant), Gender, Liking, Nutri_E, age, Zscore(Skep_rever), Brand, zskep_X_NutriE

b. Dependent Variable: PI

Table 26 model summary Nutri-score E (Dummy) and No label (Reference)

Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|-------|-------------------------|-------|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | -.929 | .602 | | -1.542 | .127 | | |
| | zskep_X_NutriE | .627 | .280 | .243 | 2.241 | .028 | .315 | 3.170 |
| | Nutri_E | .126 | .209 | .049 | .603 | .548 | .566 | 1.767 |
| | Zscore(Skep_rever) | .073 | .194 | .035 | .375 | .708 | .427 | 2.342 |
| | Brand | .627 | .147 | .333 | 4.257 | <.001 | .607 | 1.648 |
| | Liking | .535 | .098 | .438 | 5.446 | <.001 | .576 | 1.735 |
| | age | -.017 | .011 | -.101 | -1.607 | .112 | .947 | 1.056 |
| | Gender | .081 | .166 | .030 | .485 | .629 | .944 | 1.059 |

a. Dependent Variable: PI

Table 27 coefficients Nutri-score E (Dummy) and No label (Reference)

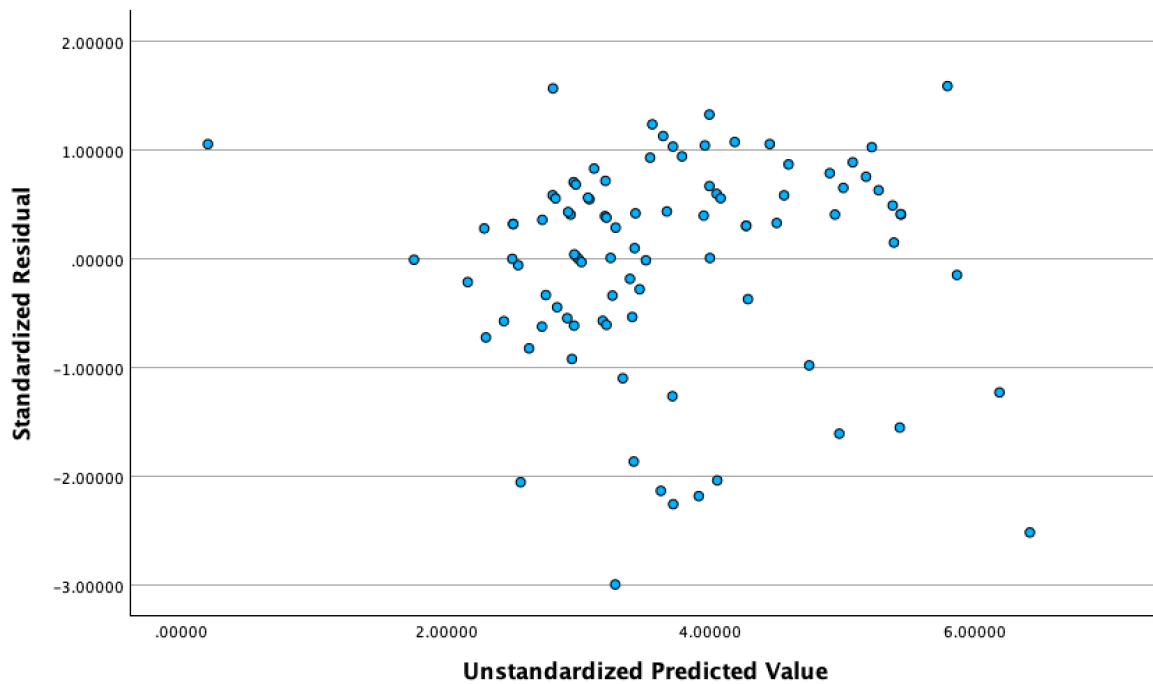


Table 28 residuals Nutri-score E (Dummy) and No label (Reference)

Appendix I - Hypothesis 6

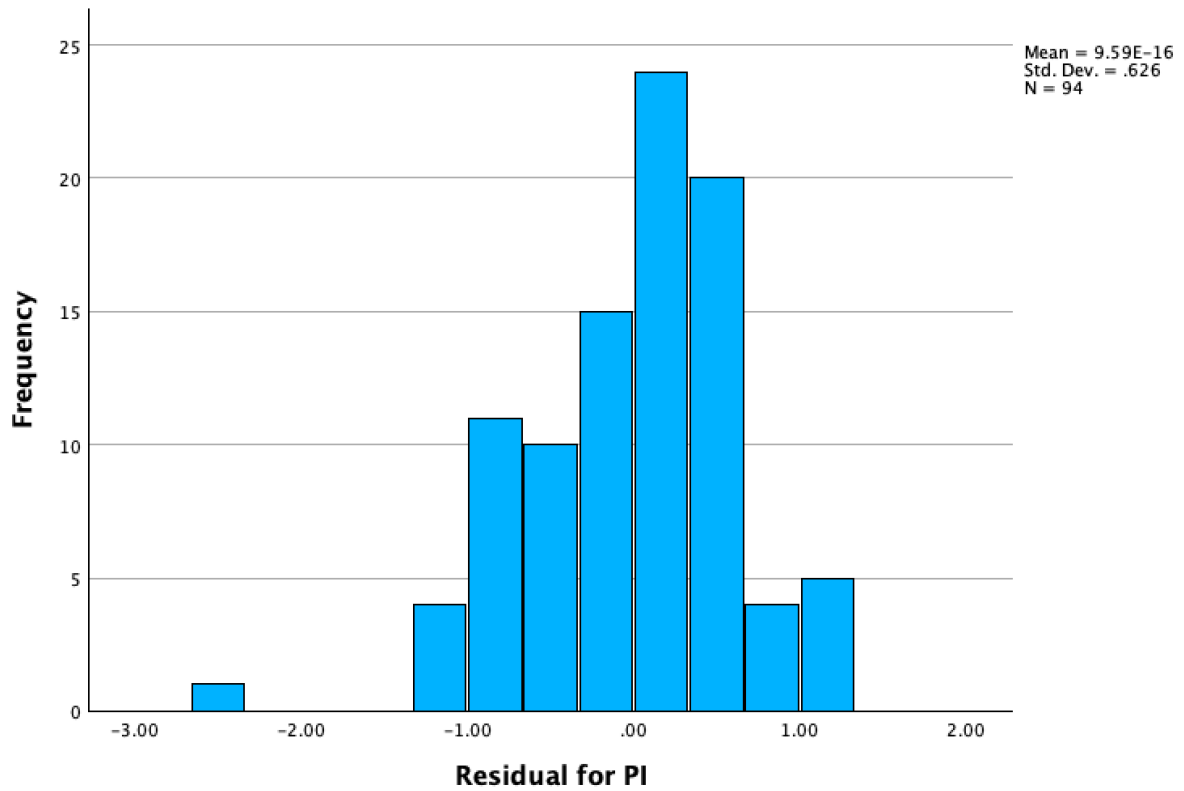


Table 29 histogram Nutri-score E

Model Summary^b

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1 | .884 ^a | .782 | .764 | .65280 | 1.569 |

a. Predictors: (Constant), Gender, Brand, Zscore(Skep_rever), age, Nutri_A, Liking, zskip_X_NutriE

b. Dependent Variable: PI

Table 30 model summary Nutri-score E (Dummy) and Nutri-score A (Reference)

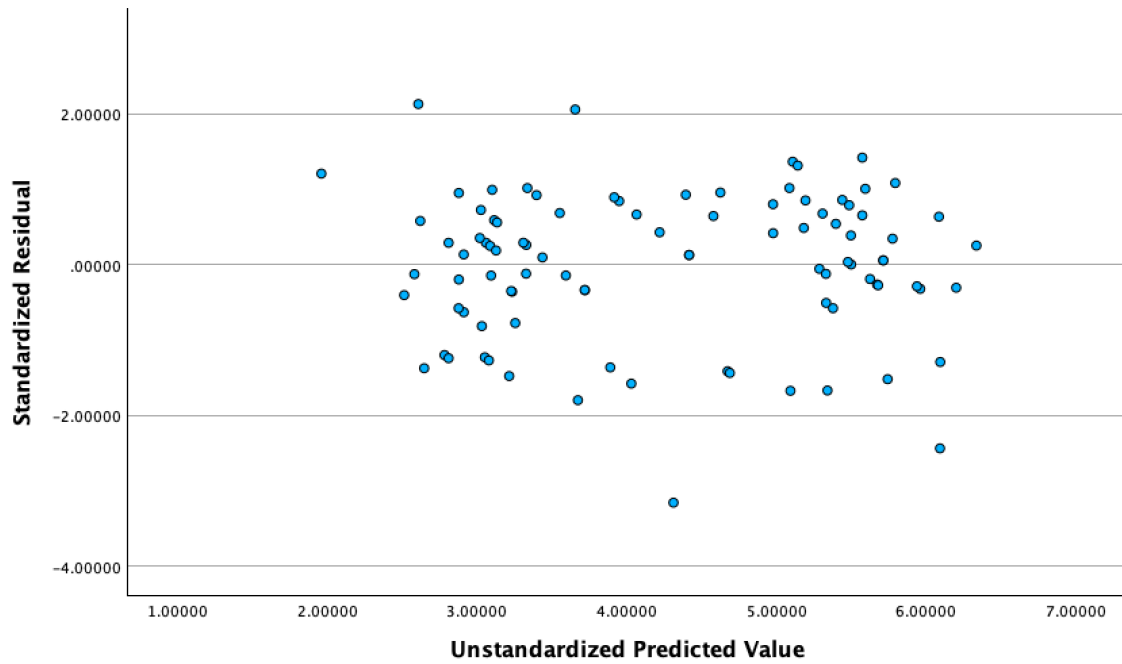


Table 31 residuals Nutri-score E (Dummy) and Nutri-score A (Reference)

| | | Coefficients ^a | | | | | | |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|-------|-------------------------|-------|
| | | Unstandardized Coefficients | | Standardized Coefficients | | | Collinearity Statistics | |
| Model | | B | Std. Error | Beta | t | Sig. | Tolerance | VIF |
| 1 | (Constant) | .950 | .537 | | 1.770 | .080 | | |
| | Zscore(Skep_rever) | .706 | .167 | .365 | 4.234 | <.001 | .342 | 2.927 |
| | zskep_X_NutriA | -1.363 | .245 | -.548 | -5.573 | <.001 | .262 | 3.816 |
| | Nutri_A | .982 | .168 | .367 | 5.832 | <.001 | .641 | 1.560 |
| | Brand | .165 | .117 | .087 | 1.404 | .164 | .658 | 1.519 |
| | Liking | .626 | .087 | .524 | 7.159 | <.001 | .473 | 2.112 |
| | age | -.007 | .011 | -.032 | -.613 | .541 | .920 | 1.088 |
| | Gender | -.303 | .138 | -.115 | -2.201 | .030 | .928 | 1.078 |

a. Dependent Variable: PI

Table 31 coefficients Nutri-score E (Dummy) and Nutri-score A (Reference)