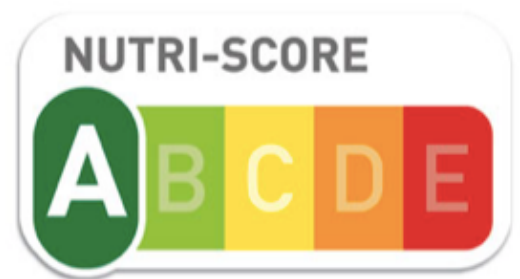MASTER THESIS

A qualitative approach to discussing perception and healthy lifestyle in nutrition labelling

NUTRI-SCORE
A B C D E

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Abstract

Objective

One of the challenges that politics and the food industry are facing is reducing obesity but promoting healthier food choices and living. Food labelling is proving to be an effective tool. Previous quantitative nutritional research has shown that Nutri-Score is favoured by society and thus, politicians are striving for a Europe-wide standardisation of the label. However, due to its novelty, insights into Nutri-Score perception remain scarce, limiting the food industry's ability to fully understand consumer attitudes and usage patterns. This study aims to fill this gap in the literature by examining consumer Nutri-Score perception and the link between label and health. Finally, the aim is to complete practical approaches for Nutri-Score practitioners and the Federal Government.

Method

A qualitative study was carried out in the segment of German food consumers. The data was collected through semi-structured interviews, which took place via Skype due to the corona situation. A group of 18 young to middle-aged, female consumers with Nutri-Score experience was recruited for this purpose. Four content categories were examined: sociodemographic characteristics, consumer variables, Nutri-Score perception, and healthy lifestyle. The last three were discussed scientifically.

Results

Perceived as a helpful tool for everyday product decisions, the Nutri-Score contributes to maintaining health through a balanced diet and lifestyle. The comparability of foods within a category is particularly valued and is one reason a mandatory cross-use of the label is desired. It owes its attractiveness to the traffic-coloured design, which is understood as breaking down barriers to use. However, the lack of communication on the correct application and ultimately the risk of users being misled by partially questionable product classifications are criticised. A countermeasure at this point would be communication via design enhancements or information campaigns.

Conclusion

The study confirms positive Nutri-Score attitudes of German consumers. The homogeneity of the socio-demographic characteristics of the sample was seen as decisive for label interest, use, positive perception, and criticism. The knowledge gained on the relevance of label colouring supports existing theoretical data. Together with new insights into critical perspectives on the current application and communication of the label, new approaches for future research were derived.

Keywords: Nutri-Score, nutrition labelling, German food consumers, perception, healthy lifestyle

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Introduction

Worldwide, the proportion of chronic diseases in society has increased rapidly and has reached its peak in the last thirty years (Yarar & Orth, 2018). According to the World Health Organization (WHO) (2004), obesity alone causes an average of 2.8 million deaths worldwide, and the trend is rising. To lead society towards healthier lifestyles, health authorities and governments are implementing preventive measures in the form of dietary guidelines, public health measures, and educational programs (Nishida et al., 2007; Yarar & Orth, 2018).

The spread of healthy eating habits in society is a challenge, especially in developed countries. This is due to the variety of (unhealthy) foods and their unrestricted access for consumers. Recently, however, a growing societal interest in healthy well-being through a balanced diet has been noticed. Here, the increased communication of nutritional information from the food industry is proving to be an effective guide for consumers (Koenigstorfer & Groeppel-Klein, 2010). Consequently, European governments have recognised nutritional labelling as an important, cost-effective element of a holistic policy (Campos et al., 2011). Thereby, nutrition labelling can be adapted to cultural consumption patterns to provide target group-specific, simplified health-related information (Federal Ministry of Food and Agriculture, 2019).

However, the urgency with which policy interventions have been implemented so far creates new and unwanted difficulties on the consumer side. Excessive nutritional labelling challenges consumers to understand the information (Yarar & Orth, 2018), triggers label fatigue (Rupprecht et al., 2020) and can inhibit product choice (Draper et al., 2013). To counteract, the European countries have intensified their cooperation towards a uniform and harmonised labelling system since 2016. The labelling application for food manufacturers and thus the labelling use for consumers should be simplified (Federal Ministry of Food and Agriculture, n.d.). The European Commission is currently deciding on new scientific evidence on the performance of nutritional labelling in consumer markets. With this knowledge, one of the various labels for transnational implementation is to be standardised by the end of 2022 (European Commission, n.d.).

The latest nutrition label for processed foods in the European Union is the Nutri-Score (see Figure 1). Santé Publique France, the French health authority, introduced and registered the extended labelling system as a trademark in 2017 (BMEL, 2020). So far, Spain, Belgium, the Netherlands, Luxembourg, and Germany have joined the initiative. After the first scientific, quantitative studies in all participating countries showed a high level of consumer interest in the Nutri-Score, not only food manufacturers but also national supermarket and discounter chains are increasingly getting involved

by registering their brands for the label (e.g.Rewe, n.d.). In Germany, for example, a total of 470 brands prints the label on their products to date and it is the Federal Government's goal to consolidate the Nutri-Score as a nutrition label (BLE, 2021).

The Nutri-Score shows the nutritional quality of the food in five categories by scientifically outweighing desired indicators (e.g., vegetables) with undesirable indicators (e.g., total sugar) to derive at a value between -15 points (most unhealthy) and +40 points (healthiest) (Julia & Hercberg, 2017). The final score of A to E indicates how (un)healthy a product is in comparison to other products in the product category (e.g., rice vs. quinoa). Thereby, the green highlighted A and B scores symbolise a rather healthier product. The yellow highlighted C corresponds to a neutral classification and the red highlighted D and E symbolise rather unhealthy products. The visual design in font and colour as well as the positioning on the front of the package serve as a shortcut for consumers to process the information quickly (Colruyt Group, n.d.).

Figure 1

Nutri-Score, all possible ratings (Julia & Hercberg, 2017)

Qualitative insights into how users feel and think about the Nutri-Score are key to understanding why and how consumers rely on the label. However, previous studies mainly followed a quantitative structure, which ultimately did not provide any profound insights into consumers' understanding of the label. What is known is that the Nutri-Score seems to rank highest in terms of comprehensibility and attractiveness (Julia & Hercberg, 2017). In addition, it is described as the most helpful label for selecting healthy products compared to other labels (Egnell et al., 2020). Reasons for this remain explored. However, for the development of tailored European and/or national labelling strategies, it is precisely this knowledge that needs to be retrieved (Feunekes et al., 2008; Koenigstorfer & Groeppel-Klein, 2010). At this point, the expansion of research to intercultural contexts is expressly important, since previous studies have disputed the generalisability of the results (Koenigstorfer & Groeppel-Klein, 2010; Szabo de Edelenyi et al., 2019).

Based on the existing data and the importance of promoting research in practising countries, the present study aims to contribute theoretical knowledge that may be of practical relevance for Nutri-Score practitioners in the food industry and the involved governmental ministries. It is well

known that labelling in general and Nutri-Score in specific are useful for making healthier food choices and are valued by consumers. However, these quantitative findings have not been further explored so far. Thus, data on the detailed consumer perception of the Nutri-Score are not yet available. This means that the effectiveness of the label cannot yet be meaningfully linked to the topic of health. Consequently, there is a lack of important data for the country-specific debates regarding the projected long-term acceptance of the label and thus its expected effectiveness. In order to fill the current scientific gap, this research follows a qualitative approach to provide detailed insights into the Nutri-Score perceptions of consumers. Based on the researcher's cultural background, the study is conducted on the German food consumer market. In addition to the Nutri-Score perception, the possible connection between the label and a healthy lifestyle is examined.

With the reporting on the use of the label in the German consumer market, one of the still rather unexplored Nutri-Score target groups is recorded. This is due to Germany's recent decision to introduce the label in early 2020. Therefore, current theoretical data is expanded to include new findings that may be of value for further discussions about the suitability of the label in Germany. The qualitative design of the study provides insights into consumer psychology and fuels future research. Therefore, as part of the EU Commission, the Federal Government is scientifically supported in its striving for new, well-founded findings. Therefore, the project supports the European Commission in adopting a review of the use of the Nutri-Score to promote the standardisation of policies at the policy level (European Commission, n.d.). The data obtained can be used to promote two-way communication between the German Confederation and the food industry to develop information campaigns (Van den Wijngaart, 2002) and marketing communication strategies (de Magistris et al., 2010). With society's increasing interest in identifying healthy products using the Nutri-Score, food manufacturers could be encouraged to promote healthy food production in the long term (Van den Wijngaart, 2002).

The central research question is:
"How do German food consumers perceive the Nutri-Score and how are these perceptions related to a healthy lifestyle?"

Theoretical framework

This section succeeds with an elaboration of the concept of "nutrition labelling" to clarify the contextual background of this study. An overview of the literature on the terms "German food consumer", "Nutri-Score perception" and "healthy lifestyle" is given. A conceptual map is then shown that captures the factors of interest for this investigation. Finally, the refined research question and the leading sub-research questions are outlined.

Nutrition labelling

Nutritional labelling dates to the 1960s and was introduced to help consumers comply with dietary recommendations (Wartella et al., 2010). Since then, governments, health authorities, and food industry stakeholders have recognised its use as a practical approach to proactively, directly but unobtrusively encouraging society to adopt healthier lifestyles. The goal of nutritional labelling is to provide scientifically sound information about the nutritional quality of a product (Wąsowicz et al., 2015). Consumer research reports labelling to qualify as a valuable guide because it lowers costs for obtaining health information triggers impressions of product quality, influences product selection (Bravo et al., 2013, Song et al., 2021) and supports the desired lifestyle (Küster & Vila, 2017). From a consumer psychological point of view, nutrition labelling is therefore mainly understood as a knowledge-based health intervention (Arno & Thomas, 2016).

Reaching out to consumers is a challenge for those promoting the use of labels. Cultures can induce different patterns of food consumption, creating unequal rates of success for countries in addressing public health problems and highlighting the challenge of transnational standardisation of nutrition labelling. All primary actors, for example, the food industry and politics, are expressly instructed by the WHO to support the implementation of nutrition displays through accompanying public information campaigns in various media. The results of consumer behaviour then determine the success and impact of both the implementation process and the label. The aim is to awaken the need for information and thus create an interaction between industry and consumers that increases labelling awareness and forms the basis for consumers to use the nutrition display (World Health Organization, 2021).

European governments are keen on harmonising nutrition labelling policies and in 2014 discussed transnational regulations for their application in a food information ordinance. This was supplemented in 2016 by the mandatory introduction of a uniform back-of-package label (BoPL), which contains information on the seven nutritional categories (calories, fat, saturated fatty acids, carbohydrates, sugar, protein, salt) per 100 grams (Federal Ministry of Food and Agriculture, n.d.). In

light of fast-developing food trends, label communication has evolved, and food manufacturers are increasingly relying on front-of-package labels (FoPL) (Koenigstorfer & Groeppel-Klein, 2010). These were introduced as an alternative representation and their implementation can be decided individually by each European member state (Federal Ministry of Food and Agriculture, n.d.). FoPL are creative visuals and categorised as nutrition-specific labels or summary labels (see Figure 2) (Julia & Hercberg, 2017), which Van Kleef and Dagevos (2015) and Egnell et al. (2020) state as preferred measures to favourably influence the decision-making process compared to BoPL.

Figure 2:

Categorisation of nutrition labels (Julia & Hercberg, 2017)

In the context of summary labels, the design features, in particular, must be carefully considered, as these determine the meaningfulness of the label. Information integrated into a colour scale is more easily understood across cultures and societies. This is because of cognitive connections between colour and proper meaning that provide a stimulus for interpreting the information (Antúnez et al., 2013; Wąsowicz et al., 2015, Egnell et al., 2020, Song et al., 2021). Nutritional research has shown that green is associated with a "go" appeal, while red carries a "stop" signal (Mehta & Zhu, 2009; Schuldt, 2013; Wąsowicz et al., 2015).

Label effectiveness: consumer variables

The effectiveness of a label depends largely on a set of consumer variables. Although nutrition labelling is considered a successful tool for reducing obesity rates in all social classes (Drichoutis et al., 2006), variables such as gender, age, attitudes towards health and motivation/interest to use food labels seem to be predictive target group criteria (Grunert & Wills, 2007; Campos et al., 2011; Chen, 2011). In most cross-cultural households, the woman is responsible for preparing the food and thus

also for grocery shopping. Therefore, women are considered to be the primary target group who come into contact with nutritional labels. In addition, a high level of nutritional and health awareness/interest correlates positively with greater use and a better understanding of labels (de Magistris et al., 2010). Other individual consumer factors influencing label effectiveness include lifestyle considerations (Anderson, 2000) as well as grocery shopping patterns (Chen, 2011). Previous research reports well-educated women of young to middle age as most interested in nutrition labels (Guthrie et al., 1995; Christoph et al., 2018).

In summary, food labels have proven to be an effective tool for conveying nutritional information. In particular, FoPLs, including the Nutri-Score, serve as a guide to choosing healthier products because they convey information through design elements that are easy to understand. However, the effectiveness of the label largely depends on consumer variables. Based on existing data, the present study examines the Nutri-Score from a female perspective, considering the variables of gender and grocery shopping patterns to derive detailed insights. Other consumer variables perceived as crucial are lifestyle/diet, health, and nutritional awareness/interest as well as label interest and user motivation.

German food consumers

The German consumer food and beverage market is a high-consumption (Koptyug, 2020) and mass-consumption (Santander, 2021) society. High demand for frozen food, meat, sausage, and dairy products as well as fresh baked goods illustrate the traditional taste preferences of both German male and female consumers (BMEL, 2021). Poor diet, however, has led to increased health problems. 62% of men, 47% of women and 15% of young people are classified as obese (BMEL, 2020). Due to this development, politics, food manufacturers, and supermarket chains have recognised the need to intervene more through nutritional labelling (Bernadi, 2019).

Previous nutrition research among German food consumers supports women to have higher nutritional awareness and interest in labelling (Koptyug, 2020; BMEL, 2021). Trends such as the ageing of the population, animal welfare and sustainability have recently led them to attach increasing importance to a healthy lifestyle and mindful consumption. In addition, the finding of positive interaction between a balanced diet and healthy well-being triggers new motivations for changed consumer behaviour (Bernadi, 2019). With growing concerns that unhealthy foods promote diseases, (female) consumers are becoming more and more suggestible. This is where food industry communication is valued by grocery shoppers as it reduces the cost of obtaining credible nutritional

information. Intention to eat, health-promoting product alternatives (Bravo et al., 2013) and the communicated product information on nutritional values thus reflect important food selection criteria (Möser et al., 2010; BMEL, 2020). The intention to reduce sugar and fat intake for living healthier (USDA, 2020) contributes to the new behavioural grocery shopping patterns. Clustering and profiling approaches coherently classify most German consumers as cautious planners (USDA, 2020) or rational food consumers (Brunsø et al., 1996) who take health and nutritional information into account (Lueth et al., 2004).

In summary, consumers are influential, trend-driven, and knowledge-seeking stakeholders. Individual lifestyle desires and product perceptions are most important for predicting and understanding consumer behaviour as they influence decision making. For this study, female consumers in the German food industry are explicitly understood as conscious decision-makers who are increasingly striving for a balanced diet and a healthy lifestyle. The nutritional information transmitted via the label serves as a key that determines their Nutri-Score perception and usage patterns.

<u>Nutri-Score perception</u>

As suggested by Ikonen et al. (2019) effectiveness of a FoPL depends on its relevance to the consumer, with its importance depending on individual and psychological factors associated with the desired lifestyle. Thereby, the perception of the label is an important factor (Munnukka, 2008) because it influences consumer behaviour regarding label and product evaluation (Grunert & Wills, 2007; Agyekum et al., 2015) as well as individual consumption patterns (Carels et al., 2006; Hawley et al., 2012).

The term perception describes a person's ability to formulate an opinion that embeds emotions based on the meaning of stimuli (Jyosthna, n.d.; Khanka, 2006). As elaborated by Pareek (2012), perception is a process of "receiving, selecting, organizing, interpreting, testing, and reacting to sensory stimuli [...]" that outlines a staged perceptual process (Fiske & Taylor, 1991; Madichie & Kapoor, 2012). The salience of stimuli/products determines whether the attention of consumers is low or high during the selection phase. The organisational step symbolises the creation of meaning by the consumer and the interpretation phase relates to the evaluation and the actions pursued (Fiske & Taylor, 1991). Responses to stimuli then contain the consumer-created meaning that is representative of personal needs (Madichie & Kapoor, 2012). Consumer perceptions cannot be generalised because opinions entail psychological components, including interests and motivations for acquiring a

particular lifestyle (Mahalda & Rahman, 2020). This is referred to by Jyosthna (n.d.) by naming perception as a subjective process.

As mentioned earlier, since label effectiveness depends on a couple of factors, so does Nutri-Score perception. Consumer-specific factors thus provide a base for recognition and perception. Accordingly, these include demographic characteristics (gender, age) (Grunert & Wills, 2007), nutritional and health awareness/interest (de Magistris et al., 2010), lifestyle/diet (Anderson, 2000) and grocery shopping patterns (Chen, 2011). However, perception also depends on external factors. These include variables such as label attractiveness in terms of textual and visual design (Bech-Larsen & Grunert, 2003; Ikonen et al., 2019; Schiano et al., 2020), label comprehensibility, trust, and attitude (Talati et al., 2019). Regarding comprehensibility, the consumer understanding of the communicated nutritional information can provide incentives to draw conclusions about product quality in terms of food health (Machín et al., 2017; Machín et al., 2018). This may impact grocery shopping behaviour.

Consumers are aware of the influence of some but not all factors that influence their opinion, which means that Nutri-Score perceptions may be changed (un)consciously. Scientific explanations for unconscious consumer decisions based on intuition and heuristics can be found in the Dual-Process Theory (Tversky & Kahneman, 1974) and the Elaboration Likelihood Model (Petty & Cacioppo, 1984). Accordingly, decision-making and perception are cognitive, inherently flawed processes. Building on this assumption, the nudge theory was later introduced by Thaler and Sunstein (2003). Constructed nudges, including, for example, default settings, warnings, guidelines, and choice architectures, illustrate well-formulated guidelines for consumers to overcome cognitive biases at the time of decision-making (Selinger & Whyte, 2011).

The perception of stimuli can also be significantly influenced by the consumer's memory system (Atkinson & Shiffrin, 1968). Positive or negative experiences, theoretical knowledge, beliefs, and lifestyle aspirations are stored as cognitive nodes that provide incentives for evaluating these stimuli. In other words, only incentives that match consumer interests illustrate guidelines for considering available product alternatives (Agyekum et al., 2015). Through advertising and marketing, among other things, colours have a variety of universal, but also individual meanings that represent a form of cognitive distortion. This can either support or hinder the positive perception of consumers (Labrecque et al., 2013; Wąsowicz et al., 2015).

In summary, the concept of consumer perception describes the sequential process of the (un)conscious formulation of an attitude, considering product (un)related factors. Derived opinions

can be influenced by individual, internal but also external, label-related factors. Perception is an approach to understanding label stimuli. Design elements, therefore, illustrate nudges that serve as pointers when interpreting the information. The study aims to understand Nutri-Score perceptions as these inform individual choice-making and consumption patterns. These then determine the necessity of public-health interventions and support the objective of this study. According to the literature, the examined dimensions of Nutri-Score perception include label comprehensibility, attractiveness, trust, and attitude.

Healthy lifestyle

Given increasing health problems, a healthy lifestyle is increasingly being valued by a large part of (German) society. According to WHO (1998), a healthy lifestyle is a lifestyle that includes a healthy diet to reduce the risk of disease but to increase mental, social, and physical well-being (Kraft & Goodell, 1993; Yarar & Orth, 2018). The concept of healthy living embeds psychological and emotional facets as it is associated with happiness and contentment. These states of mind are reflected in a person's ability to achieve their goals by considering intentions, choices, and the consequences of behaviour (Leonardi, 2018). Personal health is therefore an essential good that is associated with life-related needs and aspirations that determine living patterns.

Living according to health-related behaviour refers to the consumption of healthy food (Gil et al., 2000), whereby the individual is responsible for their balanced diet (Kraft & Goodell, 1993). Kumar (2017) and Romas and Sharma (2017) coherently treat food intake and nutrition as key concepts for maintaining a health-oriented lifestyle. In the context of global nutritional trends and increasing consumer demand for functional foods (Finger et al., 2019), health and healthy lifestyle through conscious food consumption are gaining in importance (Ogundijo, 2021). This is due to health being the new driver for food choices (Chen, 2011). In short, good health is positively correlated with a balanced diet over time (Kumar, 2017).

Food intake and grocery shopping behaviour

Undernutrition and malnutrition are described as opposing health concepts (Jones et al., 2017). Health in food consumption is defined as the food quality perceived by the consumer (Grunert, 2005). As suggested by Brunsø et al. (1996) and Petrescu et al. (2020), the perceived food quality is derived from the elaboration of contextual health characteristics by the consumer, including nutritional indicators, ingredients, and the likelihood that the product supports or hinders the lifestyle. Nutritional research highlights that product health perception depends on nutrition labelling (Petrescu

et al., 2020). Consumers rely on available nutritional information when formulating opinions about food alternatives because the nutrients in a product are invisible and intangible (Carels et al., 2006). It is found that consumers generally perceive food to be of high quality if the calorie, sugar, and fat content remains low (Hagen, 2020).

Product quality assessments for healthy living are part of grocery shopping behaviour and involve a two-step process. First, consumers consider available product information at the point of purchase through nutrition labels. Second, the initial perception is confirmed, adjusted, or denied at the point of consumption, which affects future food intake (Van Ooijen et al., 2017). Agyekum et al. (2015), support this explanation by emphasising the circular sequence of consumer perception and purchase intention, which Temmerman et al. (2021) demonstrate in the explicit context of the Nutri-Score label and its relation to healthy living.

In summary, a healthy lifestyle is becoming more important today. To achieve this, value is placed on nutrition, as this determines one's health status. At this point, labelling provides a direction for determining the extent to which a product promotes healthy living. Lifestyle is thus directly related to label perception and product perception. This study explores to what extent Nutri-Score perception and healthy lifestyle of the participants are connected. For this purpose, reference is made to their nutritional style and Nutri-Score's effects on grocery shopping behaviour.

Conceptual model

Based on the literature research; a selection of variables was made that are used in the present study. Grouped into three content categories (1) consumer variables, (2) Nutri-Score perception, and (3) healthy lifestyle, these guide the field research (see Figure 3). The focus is on the factors found in the literature that Nutri-Score users can consciously refer to when making a purchase. The perspective taken in this study is expressed in the visualisation below and means the following: consumer variables contain several internal factors that determine the perceptual process because these provide a base for recognition and perception. External, label-specific factors are part of the perception and decisive for the formation of opinions on the Nutri-Score. The perception of the label is then expected to relate to the concept of a healthy lifestyle. The conceptual map is presented on the following page.

Figure 3

Conceptual model
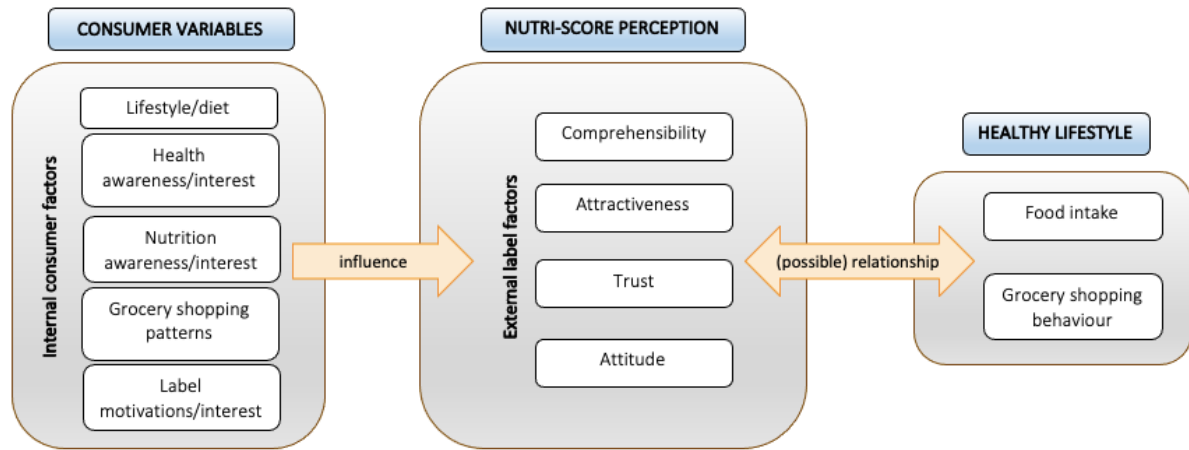
Based on the literature research, the central research question was refined:

"How do young to middle-aged German female food consumers perceive the Nutri-Score and how are these perceptions related to a healthy lifestyle?"

For the orientation of the exploratory field research, introductory, category-specific sub-research questions were formulated, which are shown in the following table (see Table 1).

Table 1

Overview of sub-research questions

Content category	Sub-research question
Consumer variables	What is the interest in the Nutri-Score based on and which factors induce women to use the label?
Nutri-Score perception	How is the Nutri-Score perceived and what is this perception based on?
Healthy lifestyle	To what extent are the Nutri-Score perception and a healthy lifestyle of women related?

Method

This chapter describes the methodology used to collect data to answer the research question. In the following, the research design, the study, and analysis procedure as well as a description of the participants are presented.

Research design

This study had a qualitative research design, which was perceived as an open, flexible, and appropriate approach to understanding people's feelings about a particular topic (Verhoeven, 2015). Thus, study participants were enabled to elaborate on the Nutri-Score as such (Horton et al., 2004). The aim was to discuss the perception of the Nutri-Score from the point of view of female consumers in order to conclude its value for their lifestyle. Ultimately, it was aimed that theoretical foundations can be incorporated into the currently quantitative data situation.

The data collection method followed the approach of Draper et al. (2013) on effective data collection in qualitative research (Glegg, 2019). Accordingly, semi-structured interviews were carried out in which the respondents were visually presented some products that were labelled differently by the Nutri-Score. This exposure should activate cognitive processes to help the sample reflect its actual perception (Verhoeven, 2015), which explicitly corresponds to research into habitual consumer behaviour (Koeningstorfer & Groeppel-Klein, 2010). By asking follow-up questions, the researcher was able to gain additional insights by responding to unexpected responses from respondents, leading to well-founded research results.

Research instrument

A topic guide was designed based on the conceptual model. The three content domains were expanded to include a category called "sociodemographic variables". Thereby, it was aimed to check at the beginning of the interview whether all inclusion criteria were met and to obtain background knowledge about the sample. This resulted in a topic guide with the four following content categories: (1) sociodemographic variables, (2) consumer variables, (3) Nutri-Score perception, and (4) healthy lifestyle. The conversations followed this thematic structure (see Appendix A).

The first category of sociodemographic variables contained information on age, level of education, professional status, living situation as well as diet and was intended to help interpret the results on the homogeneity of the sample. The second category of consumer variables included questions on the subtopics of lifestyle/diet, health and nutrition awareness/interest, and general grocery shopping patterns. This data served to discern how the individual affects label perception

itself. For example, they were asked about their responsibility for purchasing groceries and the criteria for product selection. Third, Nutri-Score perception was examined by questioning the variables of label comprehensibility, attractiveness, trust, and attitude to understand how and why Nutri-Score is effective. These subtopics provided insights into perceived strengths, weaknesses, criticism, ideas for improvement, and the meaningfulness of the label. As part of the fourth and final category of healthy lifestyle, data were collected on a possible relationship between label perception, food intake and grocery shopping behaviour. In combination with category three (Nutri-Score perception), reference was made to the emotional state and lifestyle of the participants.

Procedure

Since the study was carried out admits the Corona pandemic, precautions were taken for the sampling and interview procedure. Therefore, national regulations of the study location in Germany and the guidelines of the faculty were followed. Before potential study participants were contacted, the BMS ethics committee of the University of Twente approved the study.

Sampling procedure

Inclusion criteria correlate with previous nutrition labelling studies that identified young to middle-aged women as the main target group (Guthrie et al., 1995; Christoph et al., 2018; Koptyug, 2020; BMEL, 2021). The aim was to draw a sample of German participants who are actual consumers of products with the Nutri-Score label and are interested in a healthy lifestyle. Thus, the participants were aware of the central research topic of this study. A non-probability approach was used to recruit 18 participants. To reduce the risk of researcher or response bias, it was decided to use the snowball sampling technique (Boeije, 2010).

Interview procedure

To ensure a safe environment for researchers and participants, the 18 individual interviews were conducted via the online platform Skype. Both interviewer and participants used the webcam. As stated in the ethics application, all participants were informed in writing about the subject, purpose and procedure of the study and their rights. All participants gave written informed consent. The interviews took place between September 26th, 2021, and November 3rd, 2021, and lasted an average of 32 minutes. It was decided to conduct the interviews in German, the mother tongue of the researcher and participants. All interviews were recorded with the women's permission.

Since sociodemographic questions, that collect sensitive data, could cause discomfort among the respondents, it was important to take targeted measures for creating a pleasant interview atmosphere. For this purpose, the beginning of the interview served to break the ice between those present and was designed in such a way that the conversation proceeded like a friendly talk among acquaintances. Therefore, the interviewer also responded to the participants' answers with personal insights.

The main part of the interviews dealt with the perception of the label by the participants and followed a classic question-and-answer discussion structure. In order to ensure a solid interpretation of the findings, consumer variables, as elaborated in the literature, were first examined by formulating thematic questions, for example on grocery shopping behaviour. In almost all interviews, the researcher was able to use the participants' answers for a direct transition to the Nutri-Score as the central research topic, because women addressed the label themselves. In this phase, the respondents were presented with differently Nutri-Score labelled foods from different manufacturers by holding them temporarily in front of the camera (see Figure 4). Based on the traffic light colours it was decided to present an example for each classification. In other words, one product with a healthy rating, one with a neutral rating, and one with an unhealthy rating was randomly selected. This visual exposure served as an aid to participants in elaborating their Nutri-Score perception. The researcher ended the interview by questioning the possible relationship between Nutri-Score perception and a healthy lifestyle. The participants were able to discuss the relevance of the Nutri-Score for drawing conclusions about product perception, health status and intention for further use.

Figure 4

Presented Nutri-Score labelled foods

Note. The researcher used oat milk with Nutri-Score A (healthy), vegan cold cuts with Nutri-Score C (neutral), and gluten-free dark chocolate with Nutri-Score E (unhealthy).

The questions asked varied in depth. This was intended to allow respondents to initially respond broadly without being given a narrow guideline for the formulation of the answer. In this way, the researcher was able to gain insights into the extent to which individual topics were already related from the participants' perspective. Based on the knowledge gained, the conversation could be directed to individual sub-topics with more specific follow-up questions, which, for example, appeared very interesting or had not yet been adequately answered. This approach ensured comprehensive data collection tailored to the individual participant but enabled consistent data collection across all interviews as all topics were addressed in each interview (Lindlof & Taylor, 2002). In this way, consumers' emotions linked to the Nutri-Score were explored that would otherwise have gone unnoticed.

Data processing and analysis

The recorded interviews were transcribed with the Amberscript software. All 18 data files were anonymised, exported, and then uploaded to ATLAS.ti. This program was used to structure and analyse the data by performing an attributional coding process including open, axial, and selective coding. The respondents' answers were broken down into text fragments, which were visualised by paragraphs in the interview transcripts. A text fragment was characterised by the fact that it contained the same content and thus extended over several sentences. For example, if a woman answered the question about the label's strengths by initially addressing positive but then negative aspects, this answer was divided into two fragments. A total of 744 text fragments was labelled. Quotations were drawn from some fragments for illustrating the research results in a later step.

Instead of performing separate open and axial coding processes, it was decided to combine both steps. The researcher worked with code constructs. These constructs consisted in the first part of an axial code related to the sub-topic set in the topic guide. In the second part, an open code was attached to this axial code, which referred to the concrete findings of the respondents (e.g., code construct = AXIAL CODE – open code: "ACTIVITY – meeting friends"). These code constructs were assigned to individual text fragments in such a way that the first part of the construct (axial code) indicated the overall content of the fragment, while the second part of the construct (open code) related to the specifically addressed content by the interviewee. As a result, more than one code construct was assigned to some text fragments. Working with code constructs was found to be advantageous for ensuring a good overview of all topics and coding and analysis method along with the topic guide, which is also emphasised in the following.

After coding each interview, all created code constructs were inspected closely. Some code constructs were found to have similar meanings. When possible, it was decided to merge them or to delete these that were used only a few times. In this way, the initial list of 138 code constructs was shortened to a total of 113 code constructs. Afterwards, these were grouped into six code categories. The names of the code categories represent the selective codes and connect to the overall content categories as indicated in the topic guide. The following table lists all three content categories as named in the topic guide in connection to all six code categories. It also provides some examples of the code constructs for visualising their sequential connection (see Table 2). The complete list of code constructs can be found in Appendix C.

Table 2

Overview; all content categories, all code categories, and some examples of code constructs

Content categories as in the topic guide	Code categories (selective codes)	Code constructs, examples (axial – open code)
Consumer variables	Health	DEFINITION – via healthy nutrition
		DEFINITION – mentally & physically fit
	Nutrition & labelling	DIETARY STYLE – balanced nutrition
		DIETARY STYLE – vegan/vegetarian
		LABELLING – general scepticism
	Consumer shopping patterns	RESPONSIBILITY – for self only
		RESPONSIBILITY – for self and housemates/family
		CRITERIA – low fat/sugar/high protein
	Nutri-Score (basic information)	MOTIVATIONS – time-saving
		TYPE OF APPLICATION – (to) compare
		USAGE OBSTACLE – limited application
Nutri-Score perception	Perception	STRENGTHS – design
		CRITIC – type of calculation
Healthy lifestyle	Nutri-Score impacts	PURCHASE BEHAVIOUR – looking for product alternatives
		LIFESTYLE – Nutri-Score is a support
		… see Appendix C for the complete list of code constructs.

In the following, a second independent coder was asked to code three transcripts, corresponding to 17% of interview transcripts. Thereby, it was aimed to verify whether text fragments were understood similarly to ensure an objective coding process and a final codebook that can be considered reliable. The selection of the transcripts belonging to respondents 3, 8, and 10 was done based on the random principle.

The second coder was provided with three materials: (1) the topic guide, (2) an excerpt from each selected interview transcript that contained all coded text fragments about the findings on the three main content categories of consumer variables, perception, and health, and (3) the list of axial codes used by the researcher. Reasons for making this information available to her were twofold. On the one side, to ensure her focus on the study relevant content while coding and on the other side, to grant comparability of the final code constructs since both used the same list of axial codes as a guideline. However, she was not provided with the complete code constructs with the belonging open codes. This was done to avoid any form of distortion from overly narrow thinking but rather to ensure an objective interpretation of what specific content the text fragments were about. In addition, the researcher could check that all sub-topics from the topic guide were covered.

She was asked to read each interview excerpt and thus all text fragments as a coherent conversation and to formulate code constructs using the axial codes. Each text fragment should be assigned as many code constructs as topics were perceived. Consequently, the second list of code constructs was retrieved that was then subject to comparison with the list created by the researcher. The total number of code constructs assigned to each excerpt was reviewed and found to be approximately equal, which is presented in the table below (see Table 3).

Table 3

Number of code constructs assigned by both, per transcript

	Researcher	Second coder
Transcript 3	87	91
Transcript 8	66	69
Transcript 10	85	79

It turned out that their perception of the topics discussed for each text fragment was the same, as these were coded with the same axial codes. However, two types of inconsistencies were

found with the attached open code for formulating the code construct. An example for each of these types is presented in the table below (see Table 4). Inconsistency type 1 describes cases, in which one code construct consisted of the same axial code and an attached open code that had similar meaning but was formulated in different words. Type 2 inconsistency refers to cases where researchers or second coder have used an axial code more often to formulate multiple code constructs. In other words, one of the two formulated more code constructs based on an axial code than the other.

Table 4

Examples of both inconsistency types

Inconsistency type	Axial code	Open code, formulation by the researcher	Open code, formulation by the second coder
Type 1 (different formulation)	STRENGTHS	– type of appeal	– type of labelling & message
Type 2 (more/fewer open codes attached to one axial code)	CRITERIA	– low fat – low sugar – high protein – high fibre	– single nutritional values

When comparing both lists, a total of 29 differences was detected. Inconsistency type 1 was found 11 times and inconsistency type 2 was found 18 times for the three selected transcripts. Discussing all differences clarified that inconsistencies were due to a more or less detailed formulation of the codes rather than a conflicting understanding of the content. For instance, while both assigned one text fragment the axial code "STRENGTH", the researcher attached the open code "type of appeal", but the second coder added the open code "type of labelling & message". It was decided to merge both formulations as their meanings were similar. This procedure resulted in the code construct "STRENGTHS – type and appeal of labelling". It was agreed to comprise multiple open codes belonging to one axial code if their meaning was alike to reduce the number of final constructs. This allowed for shortening the list of code constructs to a total of 107. An overview of the 29 differences and how the code fragments were then adjusted in a joined effort can be found in Appendix B.

Since few differences were found but were immediately resolved, it was agreed that no additional statistical test would be required to check the reliability of the coding. As a consequence of

the qualitative research design, not all code constructs that were used, discussed, and adjusted for the transcript excerpts of respondents 3, 8, and 10, were entirely used across the data set of all 18 interview transcripts. In turn, this also meant that not all code constructs developed by the researcher could be verified in discussion with the second coder. An example of a code that was not used in any of the three selected transcripts, but in the others, was "USAGE OBSTACLE – shopping routine". To look again in detail at all code constructs, including those that were not discussed together, the researcher undertook a final review. This process resulted in 93 code constructs that were overall assigned a total of 1141 times to the 744 text fragments. These were then subjected to analysis and interpretation. The final list of code constructs and a compact overview of all the above-mentioned steps that made it possible to reduce the number of code constructs from 138 to 93 can be found in Appendices C and D.

Based on the number of fragments one code construct was assigned to, patterns were recognised that suggested some topics to be more relevant than others from the prescriptive of the sample. Table 5 provides an overview of code constructs that were assigned the most.

Table 5

Code constructs that were used most, number of text fragments by number of respondents

Code constructs	Nr. of text fragments / nr. of respondents
STRENGTHS - design	37 text fragments / 17 respondents
LIFESTYLE - Nutri-Score is a support	30 text fragments / 16 respondents
PURCHASE BEHAVIOUR - conscious decision for/against a product	28 text fragments / 15 respondents

Participants

The data was gathered among a sample of 18 female, German respondents. Four were born in the year 1998, six in 1997, and five in 1996. The other three respondents were either born in 1991, 1972, or 1971. Consequently, sixteen participants belong to generation Z, two respondents represent generation X (Dimock, 2019).

All participants obtained their A-level diploma and continued education by starting a study or an apprenticeship. At the time of the interview, twelve women stated that they had already achieved

a higher degree. Educational backgrounds differ and include, for instance, a bachelor's degree in human resource management as well as completed apprenticeships as a real estate agent or dentist. At the time of the interviews, six of these women have started their professional careers. Eleven women were still in education and one woman was in a transition phase between study and job entry. Among the employees are the two middle-aged participants, who indicated to be also married and living with their families. Their children, however, have meanwhile already grown up and moved out. Compared to all other participants who either live with their boyfriend, parents, or other students, both have reached an advanced phase of the life cycle. An overview of the sociodemographic characteristics is displayed in the table below (see Table 6).

Table 6

Demographic characteristics of the study sample

Participant	Year of birth	Level of education	Professional status	Living situation	Diet
1	1996	Master's degree	Employed	With boyfriend	Omnivore
2	1998	A-level diploma	Bachelor student in full-time	Student house	Omnivore
3	1997	A-level diploma	Bachelor student in full-time, working student	Student house	Omnivore
4	1997	Bachelor's degree	Master student in full-time	Student house	Omnivore
5	1998	A-level diploma	Bachelor student in full-time	With boyfriend	Vegan
6	1998	Bachelor's degree	Master student in full-time	With family	Vegetarian
7	1996	Bachelor's degree	Employed	With boyfriend	Vegetarian
8	1996	Completed apprenticeship	Employed	With boyfriend	Omnivore
9	1996	Completed apprenticeship	Bachelor student in full-time	Student house	Vegetarian
10	1996	Double Bachelor's degree	Master student in full-time, working student	Student house	Vegetarian

11	1991	A-level diploma	Bachelor student in full-time	Student house	Vegan
12	1971	A-level diploma	Employed, married	With family	Omnivore
13	1997	A-level diploma	Bachelor student in full-time, working student	With family	Omnivore
14	1997	Completed apprenticeship	Bachelor student in full-time	Student house	Vegan
15	1998	Bachelor's degree	In transition, working student	Student house	Vegetarian
16	1972	A-level diploma	Employed, married	With family	Omnivore
17	1997	A-level diploma	In apprenticeship and bachelor student in part-time	With boyfriend	Omnivore
18	1997	Bachelor's degree	Employed	With boyfriend	Omnivore

Lifestyle

Regardless of age and phase of life, all participants in the study enthusiastically refer to their very active lifestyle with many leisure activities and a high degree of social interactions, which makes the group a homogeneous unit in this aspect. For eight women, spending time with friends is an essential part of life, seven participants enjoy cooking, and six of the full-time students consider their responsibility for studying as part of their way of living. This is because they put a lot of effort into completing all of the tasks, which reduces the time left over for leisure activities. In addition, four of them are also working students.

The sporting component is of particular importance for sixteen participants and thus appears to be the most important factor that sets the lifestyle trend. Only two women did not address sports activities in particular but referred to being active in terms of spending time outside. Body movement motivations can be divided into three main categories, which, however, are closely linked to one another. Sports are either fun and practised as a hobby, integrated to balance stress in everyday life or done to preserve good health. Shared values of living among the sample include conscious and healthy nutrition (14/18 = fourteen out of eighteen), adopting an overall healthy lifestyle (11/18), achieving personal goals (3/18), and deliberately taking time for the self (3/18).

Results

In this chapter, the research results are presented according to the structure of the theoretical framework and the research design. Following the division of topics in the thematic guide, the findings are summarised in three consecutive content categories: consumer variables, Nutri-Score perception, and healthy lifestyle.

Consumer variables

Health awareness/interest

All participants confirm that their health is vital. Health awareness is perceived in two ways: mentally and physically. According to them, top performance and personal goals can only be achieved if both are in harmony. In addition, a balanced relationship between mental and physical well-being is the basis for preventing any illnesses in the long term. The latter is explicitly addressed by those women who have suffered health setbacks in the past and have thus experienced the influence that lifestyle decisions can have (10/18). The consideration of both mental and physical aspects is mainly described as health-promoting.

[1] *"Of course, health is essential, without it nothing works." (Respondent 16)*

[2] *"For me, health means that you are at peace with yourself, that you are fit, that you have less physical sagging, such as fatigue, etc. Of course, it is all situation-specific, but you have a good energy level, which brings motivation during the day. That you are in a positive mental state." (Respondent 11)*

As with the lifestyle of the sample, the two aspects healthy eating (12/18) and fitness (7/18) are perceived as indispensable factors that make up health. The interactions of food intake and health, as well as fitness and health, are understood as causal. All three factors (nutrition, fitness, health) are closely related. On the one hand, it is argued that the state of health is largely determined by food intake. Consumption then promotes or hinders physical fitness. At the same time, the state of health is based precisely on this physical activity, because exercise triggers well-being and prevents diseases such as obesity.

[3] *"I think you can tell, for example, if you have eaten pizza in the evening before you go to exercise the next day, then you do not feel as fit as if you had a quinoa salad or something else healthy in the evening." (Participant 18)*

[4] *"And with so many diseases, diet contributes to a shortening of the lifespan. Diet and obesity, these are mostly risk factors."* (Participant 6)

Nutrition awareness/interest

To discuss the aspect of healthy nutrition as an integral part of lifestyle and health more precisely, all respondents were asked to explain nutrition's functional role and to elaborate to what extent nutritional values are of relevance. According to the respondents, maintaining health is the main driver of a healthy diet. In contrast to genetic factors, conscious food intake illustrates a certain form of individual control and influence.

[5] *"Because I had a few problems in between, mentally and physically, I did not feel so fit. That made it more and more important for me. I got to the point where I recognised: Okay, the diet really plays a role to feel better."* (Participant 13)

When asked for a description of the nutritional style, all respondents indicate to follow a very balanced and conscious diet. Overall, five women follow a vegetarian diet and three completely dispense with animal products. The majority (10/18) does not follow any special diet but is an omnivore. The word balanced was used as a synonym for healthy eating by all participants. To them, balanced nutrition means regular cooking with mostly fresh vegetables and fruits instead of consuming frozen convenience products. However, a balanced diet also includes indulging in something less healthy now and then, with a piece of cake as the most common treatment.

In general, the nutritional composition of consumed foods is considered to be relevant for achieving this balanced and healthy diet. In other words, there is a high level of consumer awareness of the role and importance of nutritional values in determining food health. Thereby, vegans/vegetarians and those with previous illnesses are particularly aware of the seven single nutritional values. They break the nutritional quality into its pieces. For all women of Generation X, the consideration of individual nutritional values is based on the desire to consciously forego individual nutrients or to minimise some of them. The decisive factor here, for example, is that due to a vegetarian diet, more conscious attention must be paid to the intake of proteins. But diseases such as chronic iron deficiency also require a close examination of all individual values. The detailed consideration of individual nutritional values, on the other hand, is less important to the two middle-aged women. According to them, this is due to their responsibility for grocery shopping for family members and cooking routine. For them, the rough classification of products into healthy/unhealthy plays a more important role in putting together a balanced diet.

In the interviews, however, it also became clear that the assistance given to consumers in the form of labels such as the nutritional table on the back of the package tends to be viewed very critically. Women criticise them for often being too complicated to understand and for burdening too many tasks on the consumer for using the information. In some cases, the information not only has to be searched for in a targeted manner but is presented in a notation that requires comparison and interpretation. This is perceived as difficult because the consumer as a layperson often lacks in-depth knowledge. The associated time expenditure for these tasks illustrates another point of criticism. While every woman identifies at least one point of criticism, seven interviewees express to be generally sceptic about any labelling system.

[6] *"I think that many brands create their own things, then I ask myself how trustworthy it is. For example, these slogans for particularly low sugar, particularly low fat. Here I ask myself "based on what"?"* (Participant 10)

<u>Grocery shopping patterns</u>

The majority (15/18) is familiar with different label formats. These include, for example, health claims (e.g., Vitalis muesli: "30% less sugar."), the percentage daily intake, Nutri-Score, and the list of ingredients. The sample's awareness of the variety of labels suggests its general interest in conscious food consumption and dietary composition. Despite scepticism and criticism of existing labels, everyone emphasises using at least some parts of the information available when shopping, because they represent a guide to weigh decisions as well as possible. For instance, product alternatives may be searched for more explicitly. Two women describe their purchases as also often solely based on their product and nutrition awareness that they have obtained during the past years. Depending on the items on the shopping list, seven women view their shopping behaviour as partly routine, for example when buying basic products such as rice, pasta, and milk. On these occasions, nutritional information is less relevant.

They take shopping responsibility either only for the purchase of their products (9/18) or for those of their housemates/families (9/18) as well. Mainly the two largest supermarket chains (Rewe, Edeka) and discounters (Aldi, Lidl) are visited because the product range is the largest (18/18). Fresh ingredients are occasionally bought at the weekly market or in individual organic shops (6/18). When choosing a product, twelve participants value the (non)presence of individual nutrients. Products with little sugar (8/18), little fat (6/18), high protein (10/18) and fibre content (2/18) end up in the shopping cart. Ten participants use the information in the nutritional table on the back of the product to make informed choices. Further criteria for product selection are the price (7/18), the sustainability

of the product (5/18), the product design (4/18) and the brand image (3/18). Since its implementation, the Nutri-Score serves as the newest criterion for almost all respondents (14/18). The other participants are equally aware of the Nutri-Score when asked but have not yet consciously perceived it as a fixed benchmark when grocery shopping.

[7] *"I look (...) at the nutritional values (…). I pay attention to the sugar content in particular. That is somehow quite important to me because it is also about the vessels. And because I do sports, it is also important to me that the protein content is right. To know whether these good indicators are relatively accurate, I have recently been looking at the Nutri-Score, for example. Because I have exactly this information at a glance."* (Participant 3)

Nutri-Score motivation and interest

All participants were familiar with the Nutri-Score at the time of the interview and emphasised that since its introduction they have encountered more information than with any other labelling system before. Their awareness is either based on communication in the media by Julia Klöckner, German Federal Minister for Food and Agriculture, (11/18) or an active recognition in the supermarket (7/18). The media release and the subsequent introduction of the label immediately aroused the thirst for knowledge in nine women. They felt compelled to do more research on their own about the label to compare it to previous formats. This information research also contributed to their current understanding of the correct use of the label.

[8] *"Then I looked out and questioned: what is it and where else is it available? Can it now be found on several products? And what does it actually reflect? Then I first looked at what an A means based on the list of ingredients and the nutritional table on the back."* (Participant 3)

The fact that the score was recognised that actively and had such a direct impact on some of the women, suggests that the label was understood as something potentially valuable, which may hint at some better label image compared to previous visualisations. Given the widespread criticism of earlier labels, it can be assumed that the Nutri-Score was initially questioned critically but welcomed. This interpretation may be supported by the fact that all women agree to associate a very positive first thought with the implementation of the label. For eleven women, their lifestyle is the decisive driving factor to consider the score in their purchases. In addition, the time saved compared to using previous labels (10/18) and the possibility to better and instantly classify products as more/less healthy (7/18) motivate the sample to use the Nutri-Score. In this context, it was particularly emphasised that the

Nutri-Score represents a competency extension. The label facilitates the comparison and interpretation of individual data, which otherwise remains difficult for the consumer.

[9] *"For me, this is basically the approach that the Nutri-Score gives me the certainty that I am on the right path to living a healthy life, to eat healthily." (Participant 14)*

[10] *"I mainly use it because I do not know about all products to be able to say whether it is really healthier than another product in the same category. I simply cannot deal with every product and then compare it. So, that is what the Score does for me." (Participant 17)*

As can be seen from the table below, all women were actively using the Nutri-Score at the time of the interview, albeit to a limited extent (see Table 7). Regarding their overall positive label attitude, it was interesting to discuss what stops them from using the label in all purchases. Although 470 brands already use the label in this country, this share does not correspond to all available brands. As a result, the majority of the products have so far remained unlabelled. The participants argued that it is therefore currently not possible to absolutely compare all products and to use the label in every product decision. This aspect was also discussed as a point of criticism. At this point, the extension of the label is explicitly desired to be able to weigh all foods across brands. This would help to classify unfamiliar products and to find alternatives that suit their lifestyle best (13/18). Thus, these findings underline once more the pursuit and definition of a balanced and healthy diet.

Table 7

Nutri-Score usage patterns

Axial code	Open code & frequency		Quotation
USAGE FREQUENCY	Irregularly	17/18	[11] *"(...) it is difficult to take the score into account in all your decisions over the long term because not all products are labelled. And that is why you cannot always use the score as a basis for decision-making because it is just not always there. (...) and it is also simply not on enough products yet." (Participant 10)*
USAGE OBSTACLE	Limited application	7/18	
	Shopping routine	3/18	
	Scepticism	3/18	
TYPE OF APPLICATION	(to) orientate	7/18	[12] *"But with the products on which I see the score, I use it very often to compare. Especially with two identical products from different brands because manufacturers sometimes process their products differently." (Participant 2)*
	(to) compare	7/18	
	(to) look for alternatives	6/18	
PRODUCT TYPES	New products	7/18	[13] *"It helps me particularly well with new types of products that I am not yet familiar with. For example, because I do not know whether a new type of bread is totally healthy or not." (Participant 17)*
	Frozen products	6/18	
	Dairy products	5/18	
	Muesli/sweets	3/18	
	Bakery products	2/18	

There is consensus as to why the score might be so effective in the general population. The design was emphasised 23 times by 16 of the women. In this context, the words "signal colours" and "traffic light system" were used repeatedly to refer to the score's property to appeal to general knowledge. Building on this, further reasons for the effectiveness include its understandability and accessibility, which is a direct consequence of the design (14/18). The label is described as having high ease of use, which does not place any extra burden on the consumer. Furthermore, time savings (5/18) and higher media presence (3/18) than with previous labels are noticeable. Thereby, people can recall the label better. The attainment of higher consciousness for the ingested food can thus even take place unconsciously.

[14] *"I think especially the design is very important and decisive because it somehow contains a summary of what is actually in the product, like a conclusion which is easy to understand and use for product selection." (Participant 3)*

[15] *"I think that is because it is really such a low-threshold offer, it gives a very simple orientation aid via the colours and the letters that everyone understands. When (...) I think of this MSC seal, for example, for fishing. Then I see the label and the letters, but in the end, I do not know what is behind it. And this classification in the Nutri-Score is somehow simple. You do not have to think a lot or have a lot of background knowledge."* (Participant 12)

[16] *"I am not aware of any other label that has been made so public or is so conspicuous in media."* (Participant 1)

In summary, for all interviewed women, health (mental & physical) plays an important role in everyday life. Health is largely defined by nutrition intake. With a thoroughly balanced lifestyle and diet, all women have a high level of health and nutritional awareness. Regardless of the special form of nutrition, attention is paid to the nutritional quality of a product. Product information in the form of labels is used for this purpose. However, previous labels have been criticised for their complexity.

Each of the women is responsible for grocery shopping and refers to various product selection criteria, including, for example, product price and packaging. Since the Nutri-Score has existed in Germany, women have been using it to consciously search for product alternatives and to better classify products at a glance. The colour representation and media presence aroused their label interest and further motivate them to use it. Enthusiasm for the label is due to the ability to compare products within a category. However, the current frequency of use is limited to isolated purchases. The main reason for this is that the label is still used by too few food manufacturers and absolute product comparability is not possible.

Nutri-Score perception

Strengths, weaknesses, and critics

To further investigate the effectiveness of the label, the following questions should gain insight into the concrete perceptions of the participants. Three argumentation patterns that emphasise the consistency of the sample are striking.

On the one hand, the women's statements about the factors they perceive as general strengths correspond to the statements about the respective factors that they find attractive and decisive for their label commitment. The aspects were mostly addressed with equal frequency in both subject areas, which indicates a pattern in the data (see Table 8). On the other hand, the perceived

weaknesses were predominantly expressed in the form of points of criticism, which refer to the general scepticism and critical consideration of such labels (see Table 9). In addition, what is perceived as positive is sometimes also perceived as problematic. This means that the Nutri-Score is used and favoured but a discussion is ongoing. Finally, the sample provided an equal number of positive and negative arguments, which underscores the inability to determine a trend. However, the negative associations of the sample were relativised to the effect that several suggestions for improvement were made that could outweigh the strengths.

Table 8

Nutri-Score strengths and its attracting factors, frequencies

	Axial code, frequencies	
Open code	STRENGTH	ATTRACTING FACTOR
Design (general)	17/18	11/18
Time-saving and no extra burden	10/18	3/18
Understandability and accessibility	7/18	6/18
Type and appeal of labelling	7/18	7/18
Positioning	5/18	3/18

As can be taken from the table above, the design of the label is referred to as the greatest strength (see Table 8). Thereby, the design is considered based on the colours and letters, which is addressed by almost all women and in total 23 times. Agreement can also be seen in the interpretation of the design. The colours are understood as a traffic light system or warning signals and the letters are equated with a grading system. These factors make the label easy to understand and accessible.

[17] *"Because such a traffic light is relatively easy to understand. It is a simple symbol that just works with letters and colours. (...) I think that is great about the design, that it is so straightforward."* *(Participant 15)*

In general, however, the colour scheme appears to be much more important than the letters from A to E. While some of the women refer solely to the colours, no one highlights the letters as the sole outstanding characteristic. In this respect, a discrepancy in the observation of the letters can be

seen. While two explicit negative statements are made, which underline the higher relevance of the colouring, the letters are interpreted as meaningful and respectful of the consumer. According to them, this is because letters make the label also accessible to colour-blind people. However, this highly positive association with the letters has only been given by a small minority (3/18).

[18] *"I only register the letter on the edge, but can directly see with the colours, that everything is in the green area. That is simply uncomplicated." (Participant 4)*

[19] *"Yes, this traffic light, only with five colours. A traffic light is something you know from an early age on. Green means good, continue. Red means bad, stop. And I think that is what makes it so appealing. This is such an intuitive classification because the meaning is internalised." (Participant 6)*

As mentioned by the participants themselves, seven women like that the Nutri-Score is a universal label in comparison to other formats, because it allows an application across all food categories. This enables society to use the label, regardless of eating habits, diet, or individual tastes. Additionally, the label stimulates product considerations for better choice-making through the striking classification. Another plus point is that the score not only indicates and represents positive reviews but that negative reviews are also displayed in a targeted manner. In this context, reference was made to other existing labels such as the "high-in-protein" health claims, which only emphasise some products as supposedly healthier without reference to comparison. The label thus creates transparency and might establish more trust in single brands that do not shy away from making these unhealthy products visible to drive sales.

[20] *"What I think is cool is that it is not a general scale that kind of spans all foods from fruit to candy. So not according to the motto: fruit is great and sweet things always suck, but that it really offers a comparison within a food group." (Respondent 4)*

However, an area of conflict arises because what benefits the label is also sharply criticised (see Table 9). Although it is precisely the type of calculation and labelling that makes the Nutri-Score so understandable, it is also understood as too coarse/superficial. The criticism is that the score is based on less profound facts which may cause some consumers to classify products as healthy or unhealthy too quickly and across the board. Several participants mentioned the example of fats. Fats are primarily considered unhealthy and are also outweighed as such by the Nutri-Score. However, the fact that it makes a difference whether these are saturated or unsaturated and that healthy fats are even essential for the body is not considered by the Nutri-Score. In this context, seven women report

having perceived a Nutri-Score statement as very questionable. For example, when the cold-pressed virgin olive oil is marked with the red E, even though it is one of the highest quality and healthiest oils.

Table 9

Weakness and critic, frequencies

Axial code	Open code & frequency	
WEAKNESS	Easy to miss/mix up	2/18
CRITIC	Limited communication	10/18
	Misdirection of the consumer	9/18
	Limited application	8/18
	Questionable score	7/18
	Type of calculation	5/18

To this end, the risk of the population being misdirected was increasingly addressed in two aspects. On the one hand, some people might lack the awareness of healthy eating for correctly identifying and interpreting a questionable score. On the other hand, the type of application, and thus the comparability of the products within a product category, could be confusing. As a result, the score could favour product perception in such a way that it harms mindful consumption and health.

[21] *"And I think that could be such a fallacy that people think: Ok, if I eat these ready-made schnitzels with a score of B five times a week, then that is a healthy, balanced diet, precisely because it is labelled green. I see a bit of a problem that the label may convey something wrong for some part of the population." (Participant 15)*

However, the decisive factor for this risk is not the calculation basis or the type of application itself, but the lack of communication about what constitutes the final grade. This is where one of the biggest points of criticism is seen. Although it is perceived as very positive that the score has received media coverage, which may have increased its impact, the coverage is too superficial thematically. Since the current media coverage lacks concrete content for calculation and correct application, the potential risk is derived that people who are not familiar with the topic of healthy eating could misunderstand the score. As a result, the amount of information disseminated by authorities is perceived negatively in terms of quality.

[22] *"So that is important information that you have to include: that although the frozen pizza has an A and the cheese also has an A, it does not mean you can simply put them on the same level."* (Participant 18)

[23] *"And I only found that out when I looked more closely at the fact that it is being compared in the same category. So, if oat milk has an A, it does not mean that it is much healthier than bread that has a B, but it is actually in the same category, so it was compared in milk or bread category."* (Participant 17)

Although the pro and con arguments seem very intertwined, it is clear that the participants have not contradicted themselves in their arguments and have remained true to their overall positive attitude despite criticism. Most of the points of criticism are not originally directed against the label itself, but its marketing and its application by the food manufacturers. Despite critical points of view, 14 women show great confidence in the label because it was developed independently of the food manufacturer or brand and is supported by politics. Four women trust but have uncertainties about the reliability of the score due to its calculation. Therefore, they tend to question the product's classification critically or tend to check it against other product information.

<u>Ideas for improvement</u>

Based on critical viewpoints, suggestions for improvement are made for three specific aspects. Firstly, a fundamental expansion of the label (12/18). Seven women would welcome if politicians obliged food manufacturers to label all products with the Nutri-Score. According to them, this would not only grant complete comparability but also increase trust in the label and its acceptance. The reason for this is that a mandatory label would consistently separate from previous vague and falsified information that can be integrated into product designs without certification. Moreover, due to its conspicuousness and ease of use, the Nutri-Score creates a new approach to healthy nutrition, which could be attractive for people of different social classes and lifestyles. Therefore, this wish is also expressed in connection with the label's potential to reach a broad mass of the population and to stimulate thought (9/18). Occasionally, the interviewees can also imagine that this will motivate manufacturers in the long term to increase the production of healthier foods to maintain a good social brand image.

[24] *"And that is the same for all age groups, that it is totally easy to understand. It shortens this process to become aware of what you are consuming. I believe that many more people can be reached this way than if you had to look at the single nutritional values yourself."* (Participant 3)

Secondly, it is suggested to expand the design to facilitate the interpretation of the score (9/18) and thirdly, to promote communication about the calculation and correct application in the form of various information campaigns (8/18). The list below provides an overview of the specific proposals that are argued to help minimise critical viewpoints.

Design extension:

- Adding a QR code, which can be scanned to retrieve information on how the score is calculated for the respective product.
- Adding a slogan that indicates the correct use and interpretation of the score. [25] *This pizza has a Nutri-Score of B, compared to other pizzas". (Participant 12)*
- Adding a slogan that provides information about which nutrient content is decisive for the score. For instance, "this muesli bar has a Nutri-Score of D due to the above-average sugar content".
- Showing several traffic lights. One per nutrient value that gives its individual score for the product.
- Extending the Nutri-Score from products to dishes. Provide recipes for inspiring cooking dishes with an overall score of A or B.

Communication:

- Including information pages in the weekly analogue and digital brochures of the supermarkets.
- Setting up physical information boards in the shops to address those customers who do not follow information online.

<u>Comprehensibility and meaningfulness</u>

When asked for the comprehensibility of the label, 17 women interpret a simple classification of the respective product as its central message. Thereby, the score communicates whether a product tends to be healthy or unhealthy or respectively whether it contains more or less good nutrients. Besides, eight women perceive an appeal regarding the recommended consumption frequency. By all women, the classification of the product is understood only in the comparison of similar products within the same category. That shows two things. Firstly, all respondents use the label correctly. And secondly, the certain score from A to E is only regarded as a guideline. In other words, the label is not understood as an indicator of pure health across the board. There is agreement that it is only communicated which of two products is the (un)healthier choice. Thereby, it remains with a simple food health classification, but the label does not convey an impression of food quality. According to the participants, quality does not only refer to the nutritional composition but also to the origin and biological status, which is not considered by the Nutri-Score.

[26] *"Just because the score is not that good, it does not necessarily mean that the ingredients are of poor quality, at least that is my interpretation. It could be that there is simply a lot of fat in the product, which makes it a little less healthy and therefore gets a poorer rating. But that says nothing about the quality of these fats. Therefore, it actually only influences my assessment of the nutritional values, to what extent they are balanced, but not necessarily the quality of the product. (…) Also, as I said, a product labelled with a B does not always mean pure health, it is yet the better of both product options."* (Participant 7)

[27] *"It [Nutri-Score] does not always simply say: Yes, I am super healthy. Everyone knows that when it comes to health, a frozen pizza cannot compete with a freshly prepared dish."* (Participant 8)

In summary, from the women's point of view, the label has several strengths that make it attractive for them and society. This includes the design and the associated ease of use. In particular, the colouring of green, yellow, red was discussed. This traffic light appeals to general knowledge and enables a quick, rough classification of a product as healthy or unhealthy. At this point, the label's meaningfulness remains simple. The cross-product nature of the Nutri-Score was mentioned to differentiate the label from other formats. It is suitable for a targeted product selection, as it also identifies unhealthy products. However, the Nutri-Score has also been criticised for not being adequately explained in the media regarding how the final score is calculated and how to use it correctly. One score that participants found questionable (olive oil with Nutri-Score E) was cited as a potential source of confusion for consumers with less background knowledge of healthy eating. Nevertheless, overall high confidence in the Nutri-Score was reported. There is further interest as far as suggestions for improvement for the label design and its communication were made by the women.

Healthy lifestyle

Food intake

The understanding of a green A as healthier than a yellow C also corresponds to the respective product perception. In other words, if a product has the Nutri-Score of A, then that product is also seen as a healthier option within its category than a product labelled with a C. However, this understanding does not always have a determining effect on the purchase decision (10/18) because the occasional consumption of unhealthy products is part of the sample's balanced diet. Nevertheless, the decision to consume the unhealthier food is made much more consciously, which stimulates to consider the consumption frequency.

[28] *"And if I feel like chocolate, then I will just buy it and accept it. But then maybe just one bar instead of two, haha."* (Participant 1)

When asked whether the Nutri-Score has led to a direct and lasting change in product perception, no clear pattern can be derived from the insights. In general, product perception is changed in that individual products can be better evaluated. Seven women who recognise changes in their perspective on some food products face five women with an unchanged product perception. Six women could not give any tendency in this regard. Examples for a changed understanding of the product represent positive to negative changes with cheese and muesli products.

<u>Grocery shopping behaviour</u>

Although the Nutri-Score as a new label is very much welcomed, seen as an improvement of previous labels, and is consciously used in the sense of the women's balanced lifestyle, it does not cause any fundamentally changed purchasing behaviour. However, a few influences can be identified. The label is mainly used as a supplement to previous product criteria (11/18). This is mainly because, despite quick orientation, it does not entirely correspond to own knowledge or convey enough in-depth information about single nutritional values, which has been criticised.

[29] *"But there are products where I speak up to myself that I question the Nutri-Score rating. (...) edible paper, for example, has the grade A. I know, however, that it is not a healthy snack. And then I need to take a closer look. (...) And also, certain things like minerals and trace elements are not clear to me. And unfortunately, the Nutri-Score does not cover these needs."* (Participant 5)

[30] *"(...) there are other aspects that are also important to me, which is why I always have a quick look at what the distribution of fats is and which proteins it contains."* (Participant 15)

The label plays a significant role in product consideration. Instead of selecting a product intuitively, all participants rethink their (intended) choices and seek awareness of product alternatives. 15 women share the experience that they occasionally consciously decide against the unhealthy product alternative, which reveals a connection to lifestyle and the pursuit of health.

[31] *"Like a memory in my head: do I really want that now? (...) Or cannot I actually eat something else that is healthier? (...) It does not seal a final and permanent purchase decision, but I just ask again what I really want to eat and whether there is not a better alternative."* (Participant 6)

[32] *"I recently had the case that I bought Piccolinis. They had the cheese variant, that was labelled with a D and a vegetarian option that had a B. So, I actually went for the B product, the vegetarian one." (Participant 8)*

Emotions

When asked about the emotional influence of the label, 16 women easily described an emotion, while two of the respondents had some difficulties with describing their feeling tangibly. All decided intuitively to describe a rather positive emotional state. There is agreement that positive as well as negative feelings can be triggered by the label, depending on its score given to a product. The majority of the group explains that seeing a green A or B rating feels much better than a yellow C or a red D or E score. Thereby, a red D or E label causes some negative feelings in the first instance but not in the long run. Instead, and as also referred to as a strength of the label, it conversely has a positive effect on the emotional state of mind and satisfaction because it contributes to the awareness of healthy eating. It thus prevents from making unhealthy, undesired, and blind product choices.

Despite the positive attitudes and coherent with some critical voices, a concern for the label to potentially manipulate the consumer emotionally is mentioned. Through the visual signal effect, a green A or B score might impair the rational thinking ability to judge a product based on its actual nutritional values. The table below indicates all emotional states associated with the Nutri-Score (see Table 10).

Table 10

Insights into emotions, frequencies

Positive statements	Frequency
Seeing a green A or B score triggers a better feeling	10/18
Product decisions are made with good conscience	9/18
The label conveys a feeling of:	
• confirmation	5/18
• joy/motivation	4/18
Negative statements	
The label could manipulate	2/18

<u>Lifestyle</u>

A connection between Nutri-Score and living aspirations is perceived by all interviewees. This has already been emphasised by four women who report elicited feelings of happiness/motivation to maintain their lifestyle as part of their positive emotional state. The label is not assigned a specific role within the lifestyle, but it is perceived as a valuable tool in everyday life. Overall, the Nutri-Score-Lifestyle connection is seen in that the label provides support for product selection (16/18) and is a reminder of a healthy diet (5/18).

[33] *"I think it does play a role. Since it is around, I have been paying attention to it and it supports me in my conscious life, my balanced diet and my purchases." (Participant 3)*

[34] *"Yes, it is often the case that it confirms my lifestyle. For me this is practically also my approach, that it gives me the certainty that I am on the right path to lead a healthy life, to eat healthily." (Participant 14)*

By the initially very positive attitude towards the label and the diverse reasons for using it as a product selection criterion, all of the women once again express their interest at the end of the interview. Except for one woman, all participants intend to intensify their label use in the future. However, and coherently with their product perception, the label can be expected to remain a guideline for benchmarking products but not for determining final pro or contra attitudes towards certain foods in the long run. Thereby, the increased use is linked to three preconditions on the part of the food industry.

- Firstly, it is (compulsory) extended to all product categories and brands (10/18).
- Secondly, communication is being promoted in such a way that the basis and type of score calculation are made more transparent. This would strengthen consumers' understanding of the label, which means that purchasing decisions can be made more consciously (4/18).
- Thirdly, the label provides more detailed nutrient information at a first glance (2/18).

[35] *"With a high-protein pudding or shakes and smoothies, I just think it is good to see how the product fares in its category. Is it really only made from fruits or are there any added sugars? For these types of products, I would like to use the Nutri-Score more often." (Participant 6)*

[36] *"And it is the case that the next time I will buy some [bread] again, then I look to the right and left to have a comparison. But for that the score then would have to be on all other bread too."* *(Participant 16)*

In addition, it is hoped that the label will gain broad acceptance and increased interest among the population in Germany, but also in other European countries. Once the supply-demand system is in place, both consumers and industry will be encouraged to pursue the same goal of better-preventing disease through healthy eating. However, it is also expressed that the label in its current form is more suitable for Joe Bloggs who strive for a normal, balanced diet. The label may be unsuitable for supporting a particular form of nutrition, such as that used in bodybuilding or acute illnesses. Irrespective of individual Nutri-Score usage patterns and ratings, all women share their curiosity about the further development of the label and the extent to which some of their current points of criticism could decrease.

[37] *"I also think it is exciting to expand the application across borders. If you go on vacation and you recognise that there is a well-known label on the products that you have already dealt with in your home country, that may make life there and the diet on vacation easier."* *(Participant 14)*

In summary, no significant changes in product perception, eating habits and purchasing behaviour were observed in this study. All women consider the Nutri-Score as an additional selection criterion that draws attention to the nutritional quality of the products. Product handles are designed more consciously, which is why the women have an emotionally positive attitude towards the label. However, none of the women completely dispenses with products that, according to the Nutri-Score, represent the unhealthier alternative. However, more attention is paid to product alternatives. In everyday life, the Nutri-Score supports a balanced diet. All women desire this orientation for the future. At this point, it is important to them that politics and the food industry take up the criticism of the Nutri-Score and take it into account in its further development. A Europe-wide introduction of the label is viewed positively.

Discussion

This chapter first deals with the discussion of the research results by elaborating the sub-research questions that guided the field research. Implications for future research are then outlined. Finally, the limitations of the study are discussed and a concluding reference to the central research question is given.

Discussion of research results

The study aimed to gain in-depth insights to formulate a well-founded answer to the central research question *"How do young to middle-aged German female food consumers perceive the Nutri-Score and how are these perceptions related to a healthy lifestyle?"*. Based on a literature review, the content categories of (1) consumer variables, (2) Nutri-Score perception, and (3) healthy lifestyle were identified, for which sub-research questions were developed. These are answered in the following.

Sub-RQ. 1: consumer variables

What is the interest in the Nutri-Score based on and which factors induce women to use the label?

The reasons for using the Nutri-Score and the general interest in the label go hand in hand in many ways. Both were found to be based on individual internal consumer variables (e.g., health awareness/interest) and external label factors (e.g., label attractiveness), which corresponds to literature (e.g., Grunert & Wills, 2007; Schiano et al., 2020).

Consumer variables

Overall, the study found a high level of interest in Nutri-Score and a high frequency of use. This can be justified by the chosen target group focus and the characteristics of the respondents. Support for this interpretation can be found in the nutrition research literature (Christoph et al., 2018; Koptyug, 2020; de Magistris et al., 2010). The connection between a healthy lifestyle and active consideration of nutritional labelling described in the literature (Küster & Vila, 2017; Möser et al., 2010; Chen, 2011; BMEL, 2020) was also identified in this study, as the lifestyle of women was cited as a driving factor for the use of the Nutri-Score.

It was discussed that a balanced diet requires an awareness of the food consumed and thus the product choice. This links to Kraft and Goodell (1993), who report that the individual is responsible to maintain food balance. The fact that the Nutri-Score is actively used for obtaining information supports the literature by Möser et al. (2010), who describe food consumers to make decisions based on credible facts. The finding also suggests that the label is understood as a helpful source of

nutritional facts. This interpretation refers to Arno and Thomas (2016) who define nutrition labels as knowledge-based interventions by the food industry that are designed to help consumers choose health-promoting products.

External label factors

Interest in the Nutri-Score was aroused by its media release with a positive effect on the sample's label awareness and attitude. The involvement of Julia Klöckner, German Federal Minister for Food and Agriculture, was rated positively. Cialdini and Sagarin (2005) base this behaviour on the principle of "authority", which describes a stronger persuasive marketing effect when public figures are involved. This also relates to the literature on perception, whereby public media debates determine the salience of the stimuli, impact the attention level (Fiske & Taylor, 1991), and facilitate reactions to stimuli (Grunert et al., 2010). It can therefore be concluded that the Nutri-Score caught the attention of participants because it matches their ambitions.

It was also found that the interest depends on the type of label, which in turn refers to Arno and Thomas (2016) who mention summary labels as preferred measures. In the present study, the Nutri-Score is discussed as offering a new perspective on food. It does not repeat what is commonly known, for example, that plain yoghurt is healthier than pizza, but allows to dismiss the less healthy products per category. This contradicts the conclusion of another study that was carried out before the Nutri-Score implementation in Germany. This study showed that the participants did not expect any specific benefit in the Nutri-Score compared to other existing labels (Tillmann, 2019). It could be concluded from this discrepancy that actual usage experiences exceed initial expectations.

As described in the literature (Van Kleef & Dagevos, 2015; Egnell et al., 2020), the study found that the visual simplicity of the label arouses label interest. Reference can be made to earlier studies that show a direct relationship between label design, consumer attention and interest. Colour design in particular has a positive influence on attention and the resulting increased interest (Antúnez et al., 2013; Wąsowicz et al., 2015) if stimuli are representative of personal needs (Madichie & Kapoor, 2012). This effect was found in the present study, as the perceived expansion of competencies through the label was listed as an application motive.

Sub-RQ. 2: Nutri-Score perception

How is the Nutri-Score perceived and what is this perception based on?

Factors of influence

This study found Nutri-Score perceptions based on all investigated perception items including label attractiveness, comprehensibility, trust, and attitude. Additionally, formulating an opinion was influenced by individual consumer variables. Thereby, insights, as taken from the literature, are supported (Grunert & Wills, 2007; Julia & Hercberg, 2017; Talati et al., 2019; Schiano et al., 2020). A study by the Swedish Food Agency (2015) has shown that the successful introduction of nutrition labels depends on media coverage as it increases consumer awareness. This effect was found in the present study as the sample argued that its label interest was triggered by the Nutri-Score communication.

In the literature, it is also mentioned that the memory system (Atkinson & Shiffrin, 1968) can play a major role in drawing inferences. Visual memory, experiences, and existing beliefs may distort the perception of the new stimulus (Wąsowicz et al., 2015; Labrecque et al., 2013). Since participants in this study were known to be nutrition label experienced, they were expected to hold a default attitude. Here, their overall critical perspective towards food labels and negative experiences with previous formats could be inferred as negative nodes and thus of negative influence on perception. However, the quick acquisition of an overall positive attitude and the high level of trust in the label suggests that the effect described in the literature does not fully apply to the sample.

Perception

Overall, strengths, disadvantages and potential for the future are assigned to the Nutri-Score. The sample found the Nutri-Score useful and justified its effectiveness in society with its design, understanding and ease of use. This reasoning is supported in the news (FoodWatch, 2020) and by Nutri-Score research over the last few years (Julia & Hercberg, 2017; Talati et al., 2019; 2019; Egnell et al., 2020). In line with previous research, participants in this study argued the Nutri-Score to potentially reach society at large and to help people without nutrition knowledge to make better food choices (Ducrot et al., 2015; Egnell, et al., 2020). Since thereby the dissociation from other labels was clearly explained based on its low threshold accessibility, it can be interpreted in that the Nutri-Score is recognised as something communal.

Attractiveness

In the literature, label effectiveness is based on the design characteristics of a label. This includes whether it is a nutrition-specific label or summary label and refers to the colour-coded design

(Egnell et al., 2020). These aspects were also mentioned by participants in this study when naming the most attractive and strongest factors of the label. Here, however, its design was found to be an essential umbrella term.

In general, it can be stated that the design is a decisive factor throughout the entire perception process. For instance, based on the design, the label looks very conspicuous and appealing which favours attention. The traffic light colours support understanding of the display, make it quick and easy to use/understand and freely accessible. In this way, general knowledge is addressed, and the terms of use are reduced. Here the current study can be compared with earlier ones by Van Herpen et al. (2014) and Antúnez et al. (2015). According to them, colours carry referential meanings and illustrate a point of reference that can be recognised more quickly than letters or numbers. Thaler and Sunstein (2003) describe this as the "short-cut" characteristic that makes a nudge in nutrition labelling persuasive.

A communication science and psychological approach to explain the higher effectiveness of colours can be found in the classic network model of memory (Labrecque et al., 2013). Accordingly, colours represent nodes in memory that are connected to a meaning/experience. Exposure to colours activates these nodes, which causes a cognitive domino effect. Thoughts and emotions are influenced unconsciously, which affects the perception of the stimulus and may change consumer behaviour (Labrecque et al., 2013). This effect was observed in this study too. Green A and B labels were found to elicit better emotions as they correspond to a "good/go" message compared to a red D or E labels which carry a "bad/stop" meaning.

<u>Comprehensibility</u>

The Nutri-Score is perceived as carrying one central message that provides information about the health of a product, which is largely in line with previous research (e.g., Bravo et al., 2013; Julia & Hercberg, 2017; Egnell et al., 2020). However, the conversations did not provide as meaningful insights about changed consumer behaviour because the information expressed by Nutri-Score is not perceived convincingly enough to permanently change product perceptions and consequently product choice. The sample therefore only perceived the label as a supplementary product purchase criterion. This finding ties in with the literature that product information is not only evaluated in terms of its quality but also in terms of its quantity (BMEL, 2020). At the same time, it contradicts the definition of Agyekum et al. (2015) who explain perceptions to inform consumer grocery behaviour accordingly.

Interpretations of these findings based on the literature cannot be derived. The limited influence of perception on long-term buying behaviour could be due to lifestyle. High nutritional and health awareness can create assumptions in memory that influence product perceptions (Wąsowicz et al., 2015). However, this conclusion contradicts Ikonen et al. (2019), who explicitly describe a causal relationship between lifestyle and grocery behaviour in nutrition research. According to them, health ambitions induce consumers to choose products as suggested by health-promoting labels.

With the perception of the label's message as too superficial, a contradiction is seen within the study results. On the one hand, the sample argues with the simplification through the design as an element of effectiveness and strength that is the basis for their positive attitude. On the other hand, it is criticised that this simplification conveys too little information about single nutrients. Tillmann (2019) also finds this contradiction and Talati et al. (2019) state that the Nutri-Score performs worst in terms of the amount of information transmitted. Therefore, the study can be related to previous scientific knowledge.

Sub-RQ. 3: healthy lifestyle
To what extent are the Nutri-Score perception and a healthy lifestyle of women related?

This study found a connection between Nutri-Score and health in that the label was perceived to mediate the nutrition-health relationship, as mentioned by Wartella et al. (2010) and Petrescu et al. (2020). The Nutri-Score was said to not refer to "health" as a fixed term but to "healthy lifestyle" and "healthy food intake". As illustrated in the literature (e.g., Kraft & Goodell, 1993; Yarar & Orth, 2018; Gil et al., 2000), the Nutri-Score was found to be linked to a healthy lifestyle based on the food choices made. Health awareness thus represents the basic structure for the living, eating, and grocery shopping behaviour of women. At this point, the Nutri-Score plays a role as a nutritional indicator and a relation between lifestyle and positive label perception can be seen.

Food intake and grocery shopping behaviour

A healthy lifestyle with conscious eating habits is the main driving factor for using the Nutri-Score and the reference point at which the suitability of the Nutri-Score as a criterion for product selection is assessed. The label-health relationship is seen in the message transmitted via the Nutri-Score. This message makes it easier for consumers to evaluate the nutritional balance of foods. As reported by Labrecque et al. (2013), it can be assumed that this cognitive connection can be traced back to the design elements. This is because colours have reference meanings that provide information about the suitability of the product from a health-conscious perspective. It has been

demonstrated in the theoretical framework, that the concept of a healthy lifestyle embeds emotional and psychological factors, which need control through the individual (Leonardi, 2018). The research findings yield that this control is taken over by consciously deciding for (de)selecting products according to its Nutri-Score, which triggers a positive state of mind and thereby promotes mental health (WHO, 1998; Kraft & Goodell, 1993; Kumar, 2017; Yarar & Orth, 2018).

As already mentioned, earlier quantitative studies show a direct and definitive influence of label comprehensibility on product perception and purchase decision (e.g., Bravo et al., 2013; Julia & Hercberg, 2017, Song et al., 2021). It remains difficult to justify that this effect was not sufficiently reported in this study. However, this finding fits with the sample's perception that the Nutri-Score cannot be equated with high or low health. Instead, it only supports the maintenance of health or a healthy lifestyle. This interpretation supports the conclusions of other researchers, who emphasise the label's suitability for assessing the nutrient balance of foods, but not for assessing food health as such (Ikonen et al., 2019). At this point, the high nutritional and health awareness of the sample must be pointed out. Good nutritional information can have a strong influence on actual shopping behaviour.

Conversely, the experience of the sample that some scores are questionable and possibly misleading may have consequences for the long-term effectiveness of the label. This could mean, for example, that the Nutri-Score has lost its potential to present the topic of healthy eating fully and credibly. An explanation can be taken from the memory system (Atkinson & Shiffrin, 1968) in which some confusing Nutri-Score displays (Labrecque et al., 2013) introduced new nodes with negative associations. In the long run, these can perhaps embellish the effectiveness of the label.

The critical assessment of the extent to which the Nutri-Score is suitable for concluding the health of foods has recently been supported by Stiftung Warentest (2021), Germany's largest consumer organisation. It is reported that simplified nutrition labels like the Nutri-Score, which classify products within a category but use the same calculation formula across these categories, could stimulate the purchase of actually unhealthy products (Ikonen et al., 2019). Based on these scientific findings, the fact that the sample does not explicitly associate the Nutri-Score with food health as such could even be discussed positively. Thereby, a high level of consumer rationality in the food industry is pointed out (Solomon et al., 2012).

Implications and future research

The study theoretically contributes to existing nutritional research as it expands and complements data on Nutri-Score performance in the German consumer society (European Commission, n.d.). While the present research replicates and supports existing theoretical insights and conceptualisations of the concepts "German food consumers", "Nutri-Score perception" and "healthy lifestyle", valuable contributions are made in particular to the literature on colours in nutrition labelling and consumer perception.

Recognising that positive cognitions are largely design-based, forming strong knots in the memory system, practitioners are encouraged to use this information in the creation of information campaigns. As current research on the effect of traffic light systems in nutrition labelling, particularly in the context of the Nutri-Score, is still scarce (Labrecque et al., 2013), future research could aim to fill this gap by exploring the perception of the label design. Therefore, the evidence of the importance of colours reported in this study can be used as a theoretical basis for the design of the future study. However, as shown in this study, the previous nutritional and health awareness of the participants must be considered. The present study examined a group of participants who differed from the average in interest and knowledge about nutrition. For the future, it would therefore be advisable to also recruit participants who have not yet dealt with the topic of healthy eating. It could be researched to what extent the effect of the colours can be used for communication in the entire population.

The study promotes the goal of the federal government and can thus be of practical relevance, as the findings contribute to the debate about a Europe-wide standardisation of the Nutri-Score label (Feunekes et al., 2008; Koenigstorfer & Groeppel-Klein, 2010). Although the quantitative literature on the effectiveness of the Nutri-Score is supported by the results of this study, the study also sheds light on critical perspectives. This demonstrates that the reputation of the label in the target group examined is not black or white. Thereby, new theoretical insights are provided regarding the Nutri-Score performance. Also, since existing Nutri-Score research did not report on the role of media debates yet, this study is understood to contribute new insights on why the label appears to be effective among society.

The label is currently in the growth phase of its life cycle. Business and politics are advised to take improvement measures in the interests of the sample. The aim should be to ensure that label trust and a positive attitude are not lost but even increased. Therefore, it will be important to carry out additional qualitative research in combination with a quantitative follow-up study that explicitly examines the wishes, needs and ideas for label improvements of critical label users.

The findings of this study can also be of practical relevance for those responsible for the presence and thus the effectiveness of the label. According to Julia and Hercberg (2017), qualitative insights enable the actors involved to better understand how and why consumers buy food, based on the current Nutri-Score. The study, therefore, contributes by enabling stakeholders to better profile the sub-segment of German female consumers to advertise the Nutri-Score effectively and efficiently. Future research is suggested, which replicates the current study among the target group of young to middle-aged women but across the 16 federal states. This is believed to even expand and strengthen the understanding of the target group in Germany. These insights are desired by the food industry and politics to achieve their goals for lowering obesity (European Commission, n.d.).

Academisation has made great strides in recent years. The majority of young people therefore often move to distant cities to study instead of starting an apprenticeship close to where they grew up (Vitzthum, 2015). This means that young people are increasingly responsible for their own grocery shopping. Furthermore, dietary trends towards healthy eating coupled with an increasing number of single-person households (BBSR, 2021) predict that men will also be increasingly responsible for grocery shopping and will be interested in the food they consume. This means that communication in the food industry must also appeal to male consumers. Based on these developments, future research examining the Nutri-Score perception of male grocery shoppers is expected to be important as well. In order to successfully establish and promote the Nutri-Score label within this consumer group, it is relevant to know their interests and perceptions at an early stage. The extent to which these then harmonise with those of women could be informative for the design and alignment of campaigns. Again, future research should consider both, consumers who are well and less well informed about nutrition and health.

Limitations

Conducting a qualitative study to bring new insights to existing quantitative data and to fill scientific gaps by building on suggestions for future research in the existing literature is seen as beneficial with hindsight. In this way, practical implications for business and politics are derived. However, the design and implementation of the present study must be questioned critically. Two specific restrictions are outlined below.

The first limitation concerns the scope of the field research. Personal interaction between researcher and participant is preferred for the collection of qualitative data in individual interviews. This offers the opportunity to reduce the distance between the two, thereby building trust and making

the respondent more comfortable and motivated to provide detailed insights. The knowledge that a face-to-face meeting will take place is also said to trigger increased willingness of the respondents to provide in-depth data. However, due to the pandemic, all interviews for this study were held online. This procedure meant both were denied observation of body language and physical interaction. In order to counteract a possible reduction in quality due to these framework conditions, time was deliberately created for small talk to get to know each other shortly before the official start of the conversation. Nevertheless, it is believed that face-to-face interviews would have yielded more insightful results (Krouwel et al., 2019) as the researcher was unable to ensure a comfortable study environment that helps to elicit perceptions with psychological and emotional facets.

The second limitation concerns the study sample. For collecting qualitative data, the focus was on sample quality rather than size. The application of inclusion criteria ensured that the few data could be qualitatively compared and interpreted, which was relevant to the aim of this study. However, the low participation of 18 people reduced the external validity of the study (Verhoeven, 2015). It should also be noted that although the sample was selected using a snowball sampling method to counteract a possible response bias, the participants do not correspond geographically and socio-demographically to another nor the entire German consumer group of young to middle-aged women. In addition, the sample interviewed in this study may have a default setting regarding healthy lifestyle and nutrition, which confuses the data with regard to other target groups. Although it is not the aim of qualitative research to generalise the results, the findings of the present study are thus only partially meaningful and transferable to the entirety of the selected target group within Germany. Even though women are generally the largest target group for nutritional labelling, the selected sample does not allow any predictions to be made about the use, effectiveness, and interest of other target groups for future research on the Nutri-Score.

Conclusion

The present study investigated the Nutri-Score as the latest nutritional value indicator in Germany based on a central research question that was elaborated on the basis of three sub-research questions. In 18 individual interviews, it was discussed to what extent the label is currently perceived, used and evaluated by German, female food consumers of young to middle age. Besides that, it was investigated to what extent the label refers to a healthy lifestyle.

A direct relationship between lifestyle and Nutri-Score was found, which can be traced back to the pursuit of a healthy lifestyle through a balanced diet. Maintaining health is therefore a central point of reference for contemplating and using the label. Based on data from existing nutrition and Nutri-Score research, a preference for the label was to be expected. This positive consumer attitude was confirmed in the course of the study. The label is currently perceived as a valuable guide that comes in handy for quick grocery shopping in everyday life. The expansion of competencies through the direct comparison of similar products within a category is particularly appreciated.

Points of criticism also became clear that had not been recorded in previous quantitative research. In this context, despite the positive attitude towards the type and intention of the label and its visual representation, the calculation and the resulting classification of some products unsettle consumers. This restricts the label from fully exploiting its potential within the target group.

The Nutri-Score has been increasingly critically questioned in the media since the beginning of this study. Consumer advocates emphasise that for example organic foods, that are particularly valuable in nutritional psychology, are rated disproportionately by the Nutri-Score. Consequently, an incorrect health understanding of the product can be exhibited (BNN, 2021). In addition to other points of criticism, this critical assessment corresponds to the Nutri-Score perceptions found in this study. Furthermore, study participants suggested making the Nutri-Score mandatory labelling. This is recently being discussed and expressly supported by the German food industry and consumer advice centre (Zschirpe, 2020). Therefore, the ongoing debates and the current data collection complement each other.

In conclusion, this study successfully took a qualitative approach to consumer Nutri-Score perceptions and healthy lifestyle. Overall, the research results complement theoretical knowledge on both nutrition labelling and Nutri-Score performance. Practitioners are provided with the opportunity to develop practical solutions for the further development of the label. Given the current discussions about the further development of the label, it remains exciting to see to what extent the label will continue to establish itself. It will also be interesting to see if the policy goal of standardising a label to reduce obesity rates can be achieved and if Nutri-Score will successfully qualify.

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Appendices

Appendix A: Interview guide including topic list

Appendix B: Overview of code inconsistencies

Appendix C: Final list of code constructs

Appendix D: Process of code construct reduction

Appendix A: Interview guide including topic list

Interview guide

<u>Introduction</u>

(English version below)

Hi ___, herzlich willkommen zu diesem Interview. Als erstes möchte mich bei dir/Ihnen für deine/Ihre Einwilligung zur Teilnahme an meiner Studie bedanken. Ich bin Christina, 24 Jahre alt und studiere an der University of Twente in Enschede den Master der Kommunikationswissenschaften. Momentan arbeite ich an meiner Masterarbeit und dabei geht es inhaltlich um den Nutri-Score. Genauer gesagt möchte ich erörtern wie deutsche Konsumentinnen den Nutri-Score als Nährwertelabel wahrnehmen und wie diese Wahrnehmung dann im Zusammenhang mit dem Interesse und Bestreben nach einem gesunden Lebensstil steht.

Dazu werde ich ca. 20-25 Interviews durchführen, um wirklich die Perspektive meiner Teilnehmerinnen zu verstehen und hier und da auch mal gezielter nachfragen zu können. Die gesammelten Daten werde ich also am Ende jeweils individuell codieren, um sie dann in einer Analyse miteinander vergleichen zu können um am Ende etwas über die Label-Wahrnehmung, dessen Nutzung bei der Produktauswahl und die Auswirkungen auf den Lebensstil sagen zu können. Das Interview ist so aufgebaut, dass ich die/Ihnen offene Fragen stellen werde, welche ich dann mit Folgefragen ergänzen werde. Das Ganze soll ca. 30 Minuten dauern. Thematisch werden wir zunächst mit ein paar sozial-demographischen Aspekten starten, dann näher auf dein/Ihr Konsumentenverhalten eingehen sowie auf deine/Ihre Wahrnehmung des Labels und anschließend nochmals vermehrt auf den Lebensstil im Zusammenhang mit der Nutzung des Labels eingehen.

Die Daten werden vertraulich behandelt, was bedeutet, dass die Interviews anonym sind. Du/Sie haben natürlich jederzeit das Recht das Interview abzubrechen und somit aus der Studie auszusteigen. Hast du/ haben Sie noch Fragen, die wir klären können, bevor wir mit dem Interview starten?

Hi ___, welcome to this interview. First of all, I would like to thank you for your consent to participate in my study. I'm Christina, 24 years old and I am studying for a master's degree in communication sciences at the University of Twente in Enschede. At the moment I am working on my master's thesis and the content is about the Nutri-Score. More precisely, I aim to investigate how German consumers perceive the Nutri-Score as a nutritional label and how this perception is then related to the interest and striving for a healthy lifestyle.

For this purpose, I will conduct around 20-25 interviews in order to really understand the perspective of my participants and to be able to ask more specific questions here and there. I will code the collected data individually and then compare the insights with one another in an analysis so that at the end I can say something about label perception, its use in product selection and the effects on lifestyle. The interview is structured in such a way that I will ask you semi-structured questions, which I will then supplement with follow-up questions. The conversation should take about 30 minutes. Thematically, we will first start with a few socio-demographic aspects, then go into more detail about your consumer behavior and your perception of the label and then again increasingly focus on the lifestyle in connection with the use of the label.

The data is kept confidential, which means that the interviews are anonymous. Of course, you have the right to withdraw from the interview at any time and thus exit the study. Do you have any questions that we can clarify before we start the interview?

Topic guide

<u>Conversation</u>

(German and English version)

Content category	Theme	Main question & sub-topics	
Socio-demographic characteristics	Lifecycle stage	In welcher Lebensphase befinden Sie sich momentan? ---------------- *Where would you currently position yourself within the lifecycle?*	- family status - grocery shopping responsibility (single household / family) - occupation
	Education	Welches Bildungsniveau trifft auf Sie zu? ---------------- *Which level of education have you obtained?*	- educational level - education program
	Age	In welchem Jahr sind Sie geboren? ---------------- *In which year have you been born?*	- age
Consumer variables	Lifestyle	Wie würden Sie Ihren Lebensstil beschreiben? ---------------- *How would you describe your way of living?*	- general living patterns (status of physical activity, interests, food consumption, etc.)

	Health awareness/ interest	Inwieweit spielt die eigene Gesundheit für Sie eine Rolle in Ihrem Leben? ---------------- *To what extent does your health play a role in your life?*	- Importance of health - perspective on health - definition of health
	Nutrition awareness/ interest	Inwieweit spielen Nährwerte und dessen Angaben eine Rolle für Sie? ---------------- *To what extent do nutrition values and their information play a role for you?*	- opinion on / importance of nutrition and labelling
	Grocery shopping patterns	Wo erledigen Sie diese Einkäufe in der Regel? Wie treffen Sie in den meisten Fällen Ihre Produktauswahl? ---------------- *Where do you usually do this shopping?* *How do you make your product selection in most cases?*	- shopping location, - product choice making - recognition of labels in general
Transition phase to the Nutri-Score: shortly introducing the label by showing the labelled products (milk = A, cheese = C, chocolate = E) and giving some background information on since when it is used by the food industry in Europe and in Germany.			
	Motivations/ interests	Wie stehen Sie dem Label gegenüber? Was sind Ihre persönlichen Beweggründe für die Nutzung des Nutri-Scores bei der Produktauswahl? Bisherige Studien haben ergeben, dass der Nutri-Score das bevorzugte Label zur Erkennung gesunder und ungesunder Produkte hierzulande ist. Woran liegt das, Ihrer Meinung nach? ---------------- *What do you think about the Nutri-Score?* *What are your motivations for using the Nutri-Score label in (some of) your product selections?* *Previous studies have shown that the Nutri-Score is German consumers' preferred label for identifying healthy*	- personal opinion on the label - lifestyle related reasons for using the Nutri-Score - opinion on why Nutri-Score is effective among society

		and unhealthy products. Why is that, in your opinion?	
Nutri-Score perception	Comprehensibility	Was kommuniziert das Label für Sie? ---------------- *What does the label communicate to you?*	- understanding of the label (nutrition values, product healthiness)
	Attractiveness	Welche Label Faktoren sind ausschlaggebend dafür, dass Sie grade den Nutri-Score verwenden? ---------------- *Which label factors are decisive for you to use the Nutri-Score?*	- appealing label factors - design (colour, font)
	Trust	Wie würden Sie Ihr Vertrauen als Verbraucher dem Nutri-Score gegenüber beschreiben? ---------------- *How would you describe your trust into the label?*	- level of trust - reasons
	Attitude	Wie stehen Sie gedanklich dem Nutri-Score gegenüber? ---------------- *What are your thoughts towards the Nutri-Score label?*	- attitude - strength/weakness of the label - ideas for improvement
Healthy lifestyle	Food intake	Wie beeinflusst der Nutri-Score Ihr Bestreben nach einem gesunden Lebensstil durch die Ernährung? ---------------- *How does the Nutri-Score impact and relate to your (healthy) lifestyle via food intake?*	- relation Nutri-Score and lifestyle - future intention for label use
	Grocery shopping behaviour	Inwieweit beeinflusst der Nutri-Score Ihr Einkaufsverhalten? ---------------- *How does the Nutri-Score influence your grocery shopping behaviour?*	- impact on shopping behaviour - impact on product choice/evaluation

Closing

(English version below)

Somit sind wir auch schon am Ende des Interviews angekommen was die Fragen meinerseits angeht.

Gibt es noch etwas, dass du/Sie inhaltlich gerne ergänzen möchten?

Dann bedanke ich mich nochmal recht herzlich bei dir/Ihnen. Ich habe auf jeden Fall interessant

Einblicke bekommen, die mir bei meiner Recherche weiterhelfen werden. Ich lasse dir/Ihnen auch

noch meine Kontaktdaten zukommen, für den Fall, dass doch nochmal ein paar Fragen bezüglich der

Studie oder der Datenhandhabung aufkommen sollten. Möchtest du/möchten Sie gerne eine Kopie des Transkriptes erhalten?

Vielen Dank.

We have already reached the end of the interview as far as the questions on my part are concerned. Is there anything else that you would like to add?

Then I would like to thank you once more. I got interesting insights that will help me with my research. I will send you my contact details in case a few more questions about the study or data handling should arise. Would you like to receive a copy of the transcript?

Thanks very much.

Appendix B: Overview of code inconsistencies

Table B1

Overview of code inconsistencies and adjusted codes

Axial code	Formulation by the researcher, open code	Formulation by the second coder, open code	Adjusted formulation, open code
ACTIVITY	– meeting friends	– spending time with friends – going out together	– meeting friends
DIETARY STYLE	– balanced	– fresh ingredients – self cooking – only few unhealthy foods	– balanced nutrition
CRITERIA	– low fat – low sugar – high protein – high fiber	– single nutritional values	– low fat/low sugar/high protein
LOCATION	– discounter – supermarket – weekly market	– discounter – Aldi – discounter – Lidl – supermarket – Rewe – supermarket – Edeka – weekly market – bio store	– supermarket & discounter – supermarket, discounter & others
LABELLING CRITIC	– too difficult – too time costly	– too complicated – too costly – too many	– consumer unfriendly handling
FIRST ENCOUNTER	– Label caught the eye	– actively	– label caught the eye
USAGE	– in some product decisions	– not in all product decisions/purchases	– irregularly
STRENGTHS	– type of appeal	– type of labelling & message	– type & appeal of labelling
	– simplified nutrition information	– understandability of and access to nutritional information	– Understandability and accessibility

CRITIC	– message may be misunderstood	– score could trigger wrong conclusion	– misdirection of consumers
EFFECTIVENESS	– appeals to general knowledge	– appeals to logical thinking	– appeals to general knowledge
PURCHASE BEHAVIOUR	– not always determining	– score does not determine all decisions	– not always determining
	– being more aware of nutritional values	– having better understanding of nutritional values	– higher awareness of nutritional values
	– checking score – additional criteria	– checking the information – usual criteria + Nutri-Score	– checking / additionally using the score
DESIRABLE	– expansion	– expanded application	– expansion

Appendix C: Final list of code constructs

(German version, colours indicate code categories)

Kode Konstrukte (Alphabetische Reihenfolge)	Frequenz
1. BEGEGNUNG - durch die Medien	11
1. BEGEGNUNG - Label ins Auge gefallen	7
1. BEGEGNUNG AUSWIRKUNG - Nutri-Score recherchiert	7
1. GEDANKE - positiv / negativ	26
ALLGEMEINES KAUFVERHALTEN - Beachtung von jeglichen Produktinformationen	16
ALLGEMEINES KAUFVERHALTEN - nach Alternativen schauen	4
ALLGEMEINES KAUFVERHALTEN - nach eigenem Bewusstsein	2
ALLGEMEINES KAUFVERHALTEN - teilweise routiniert	8
ANSPRECHENDE FAKTOREN - gleichzeitig Stärken	25
AUSSAGEKRAFT - gute, gesunde / schlechte, ungesunde	12
AUSSAGEKRAFT - A nicht immer = gesund / E nicht immer = ungesund	7
AUSSAGEKRAFT - Produkteinordnung mit Schlussfolgerung für den Konsum	14
AUSSAGEKRAFT - Qualität	10
AUSSAGEKRAFT - verdeutlicht wie wichtig Ernährung ist	2
BEWEGGRÜNDE - Bewusst im Sinne des Lebensstils	13
BEWEGGRÜNDE - Kompetenzerweiterung	4
BEWEGGRÜNDE - Produkte besser einordnen können	10
BEWEGGRÜNDE - Zeitersparnis	14
DEFINITION - mental & körperlich fit sein	21
DEFINITION - via Bewegung / Sport	7
DEFINITION - via gesunder Ernährung	20
DEFINITION - Wohlbefinden / Zufriedenheit	8
EFFEKTIVITÄT IN GESELLSCHAFT - appelliert an Allgemeinwissen	5
EFFEKTIVITÄT IN GESELLSCHAFT - Design	23
EFFEKTIVITÄT IN GESELLSCHAFT - Medienpräsenz	4
EFFEKTIVITÄT IN GESELLSCHAFT - Verständlichkeit & Zugänglichkeit	17
EFFEKTIVITÄT IN GESELLSCHAFT - Zeitersparnis	7
EMOTION – Positiv- / Negativbeispiele	29
ERNÄHRUNGSSTIL - ausgewogen	21
ERNÄHRUNGSSTIL – vegan/vegetarisch	8
GESUNDE ERNÄHRUNG ANTRIEBSFAKTOR – Krankheiten vorbeugen / leistungsfähig	11

GESUNDE ERNÄHRUNG BEDEUTUNG – Treatment	7
HINDERNIS NUTZUNG - Einkaufsroutine / persönliche Kritik	6
HINDERNIS NUTZUNG - nicht auf allen Produkten / Marken	12
INTENTION IN ZUKUNFT - vermehrt nutzen, wenn…	21
KAUFVERHALTEN - bewusste Entscheidung für / gegen ein Produkt	28
KAUFVERHALTEN - Nutri-Score nicht (immer) determinierend	9
KAUFVERHALTEN - Score überprüfen / zusätzlich nutzen	16
KAUFVERHALTEN - sich den Nährwerten bewusster sein	10
KAUFVERHALTEN - Wahl überdenken / nach Alternativen schauen	24
KEIN POTENTIAL - für spezielle Ernährungsziele	5
KRITERIEN - fettarm, zuckerarm, proteinreich	16
KRITERIEN - Nachhaltigkeit	5
KRITERIEN - Nährwerte (Tabelle)	10
KRITERIEN - Nutri-Score	14
KRITERIEN - Preis	7
KRITERIEN - Produktdesign & Marken	8
KRITIK - Berechnung	6
KRITIK - fehlende Kommunikation	12
KRITIK - Fehlleitung der Konsumten	13
KRITIK - fragwürdiger Score	12
KRITIK - nicht auf allen Produkten / Marken	13
LABELLING - allgemeine Skepsis	7
LABELLING KRITIK - kosumentenunfreundliche Handhabung	13
LEBENSSTIL - eher geringer Einfluss	5
LEBENSSTIL - Nutri-Score erinnert an gesunde Ernährung	7
LEBENSSTIL - Nutri-Score ist eine Unterstützung / Bestätigung	30
LOCATION - Discounter & Supermarkt	11
LOCATION - Discounter, Supermarkt & Wochenmarkt	6
NÄHRWERTE - haben Relevanz	16
NÄHRWERTE - weniger Relevanz	2
NUTZUNG (wann) - bei manchen Produktentscheidungen	19
NUTZUNG (wobei) - bei neuen Produkten	10
NUTZUNG (wobei) - Produktarten	18
NUTZUNG (wofür) - um Alternativen zu suchen	6

NUTZUNG (wofür) - um zu vergleichen	9
NUTZUNG (wofür) - zur allgemeinen Orientierung	8
POTENTIAL - Denkanstoß in Richtung gesunder Ernährung	13
POTENTIAL - Herstellung gesünderer Produkte	3
POTENTIAL - Reichweite in der Bevölkerung	13
PRODUKTWAHRNEHMUNG - Produkte / Nährwerte besser einschätzen können	10
PRODUKTWAHRNEHMUNG - unveränderte Wahrnehmung	7
PRODUKTWAHRNEHMUNG - veränderte Wahrnehmung	9
ROLLE - sehr wichtig	20
SCHWÄCHEN - leicht zu übersehen / verwechseln	4
STÄRKEN - Art & Appell der Kennzeichnung	10
STÄRKEN - Design; Allgemein	16
STÄRKEN - Design; Buchstaben	4
STÄRKEN - Design; Farben	17
STÄRKEN - Design; Platzierung	6
STÄRKEN - vereinfachte Aussage über die Nährwerte	9
STÄRKEN - Zeitersparnis & kein extra Aufwand	17
VERANTWORTUNG - selbstständig & für andere	10
VERANTWORTUNG - selbstständig & für sich allein	8
VERBESSERUNGSVORSCHLÄGE - Designerweiterungen	10
VERBESSERUNGSVORSCHLÄGE - Info-Kampagnen (analog/digital)	5
VERTRAUEN - nicht 100% vertrauenswürdig	5
VERTRAUEN - vertrauenswürdig	17
WISSENSSTAND - worauf sich der Score bezieht	24
WÜNSCHENSWERT - Ausweitung	16
WÜNSCHENSWERT - Designerweiterung (mehr Infos)	7
WÜNSCHENSWERT - Info-Kampagnen / Vermarktung	7
WÜNSCHENSWERT - Nutri-Score verpflichtend / alleinstehend einführen	7

Appendix D: Process of code construct reduction

Table D1

Process of code construct reduction; individual steps with respective deduction value; start nr. 138 code constructs

Nr. of step	Nr. of code constructs	Step	Deduction value	
1.	138	First review by the researcher after formulating code constructs to all 18 interview transcripts	-25	
2	113	Adjustments made based on consultation with second coder by discussing three interview excerpts	-6	Final number of code constructs: 93
3	107	Final review of all transcripts by the researcher	-14	